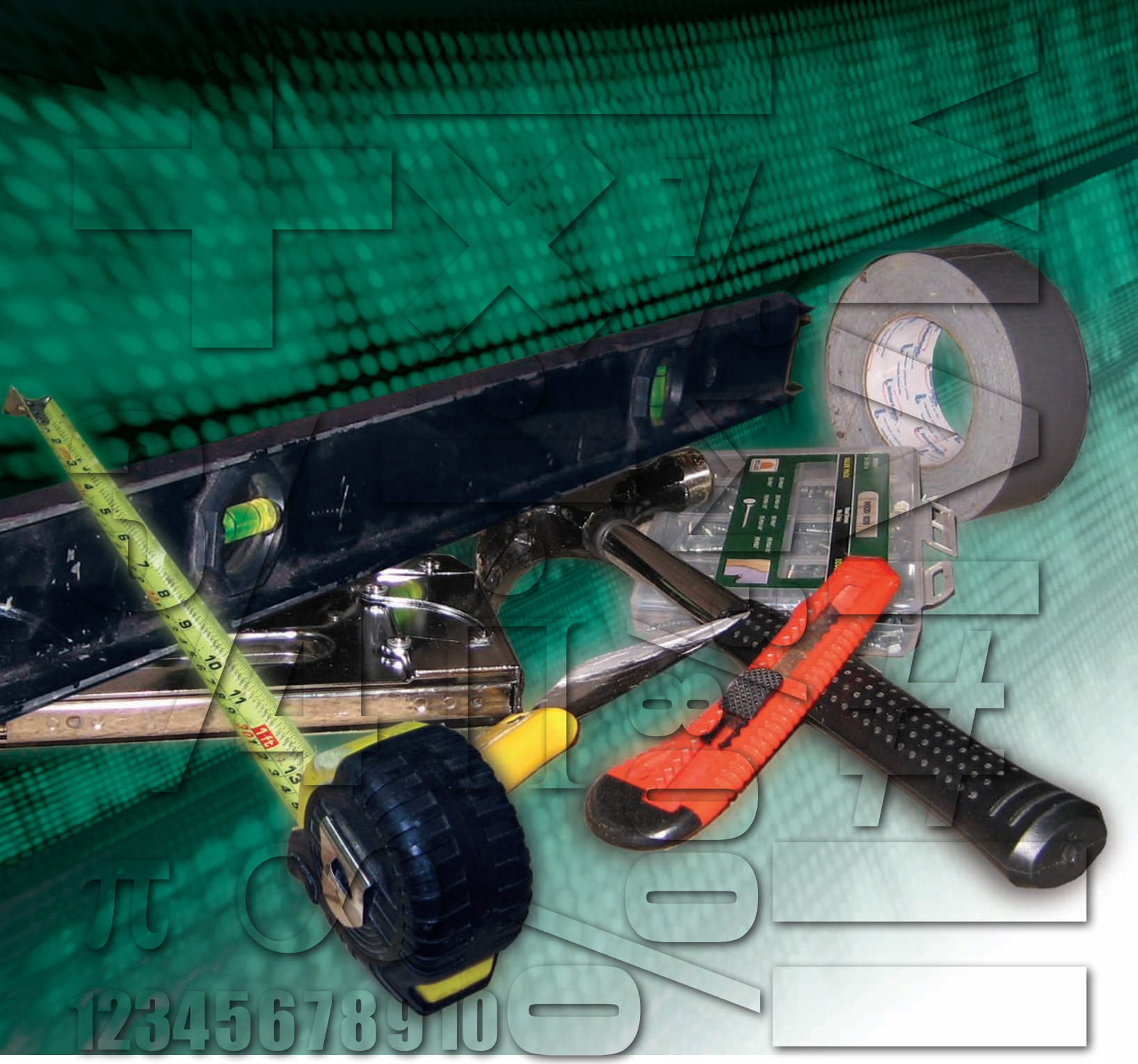

Home Math

Everyday Math Skills | 2009

NWT Literacy Council

Acknowledgements

The NWT Literacy Council gratefully acknowledges the financial assistance for this project from the Department of Education, Culture and Employment, GNWT.

Northwest Territories Education, Culture and Employment

Lisa Campbell did the research and writing for this workbook. We would like to thank Joyce Gilchrist for reviewing and editing this workbook.

Contact the NWT Literacy Council to get copies of the *Home Math Workbook*. Or you can download it from our website.

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NWT Literacy Council

Table of Contents

Introduction

Math is everywhere and yet we may not recognize it because it doesn't look like the math we did in school. Math in the world around us sometimes seems invisible. But math is present in our world all the time – in the workplace, in our homes, and in our personal lives.

You are using math every time you pay a bill, book a flight, look at the temperature for the day or buy paint for your house.

Home Math is one workbook of the *Everyday Math Skills* series. The other workbooks are:

- *Kitchen Math*
- *Money Math*

We have also developed a math skills booklet called *Simply Math* to help learners with different math operations that are needed for this series.

Home Math has three sections. Each section has a variety of topics and worksheets and a review page. The workbook is designed so that you can work on your own or with others in your class.

Section One: Measurement

This section has a variety of activities that will help you understand area, perimeter, circumference, temperature and time. You will also learn about the metric system of measurement as well at the imperial system of measurement.

Section Two: Environmental Math

You can help save the environment and at the same time save money. There are many ways you can cut down on your water use, electricity use and garbage waste. This section gives you an opportunity to evaluate your home life style and make some changes that will save you money and also help save the environment.

Section Three: Paying Bills

We all have bills to pay, but do we really know what we are paying for. Check out this section to learn more about paying your telephone bill, electrical bill, your utilities bill and your visa bill. Also, learn all about mortgages.

In this workbook you will do the following skills:

- Addition and subtraction
- Multiplication and division
- Order of operations
- Rounding off
- Estimation
- Follow formulas
- Reading charts
- Analyzing data
- Fractions
- Decimals
- Percents
- Metric measurement
- Metric conversions
- Exponents
- Averages
- Problem solving

Measurement in Your Home

In this section you will be required to do a variety of math skills:

- Addition
- Subtraction
- Multiplication
- Division
- Estimation
- Formulas
- Decimals
- Metric measurement and conversion
- Averages
- Rounding
- Problem solving
- Percents

This section has the following worksheets:

It also has a page for math projects on this topic.

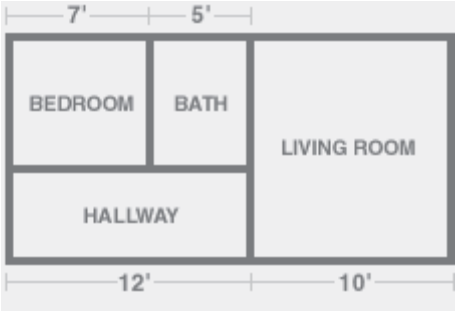
Area: Home Decorating #1

Addition, multiplication, using formulas, percents

What does math have to do with home decorating? Most home decorators need to work within a budget. But in order to figure out what you'll spend, you first have to know what you need. Understanding some basic geometry can help you stick to your budget. In this section we will learn how to calculate the area of a square and rectangle. We have used inches and feet in this section as most carpenters and building stores still use the imperial system.

Area of a square or rectangle = Length x Width A = L x W

Example: Imagine you're planning to buy new carpet for your home. You're going to put down carpet in the living room, bedroom, and hallway, but not in the bathroom. The diagram beside shows you the dimensions of each room.



Problem: Calculate the square footage of all the space except the bathroom. Most contractors work with the imperial system when calculating area. Most materials come in square feet.

Solution:

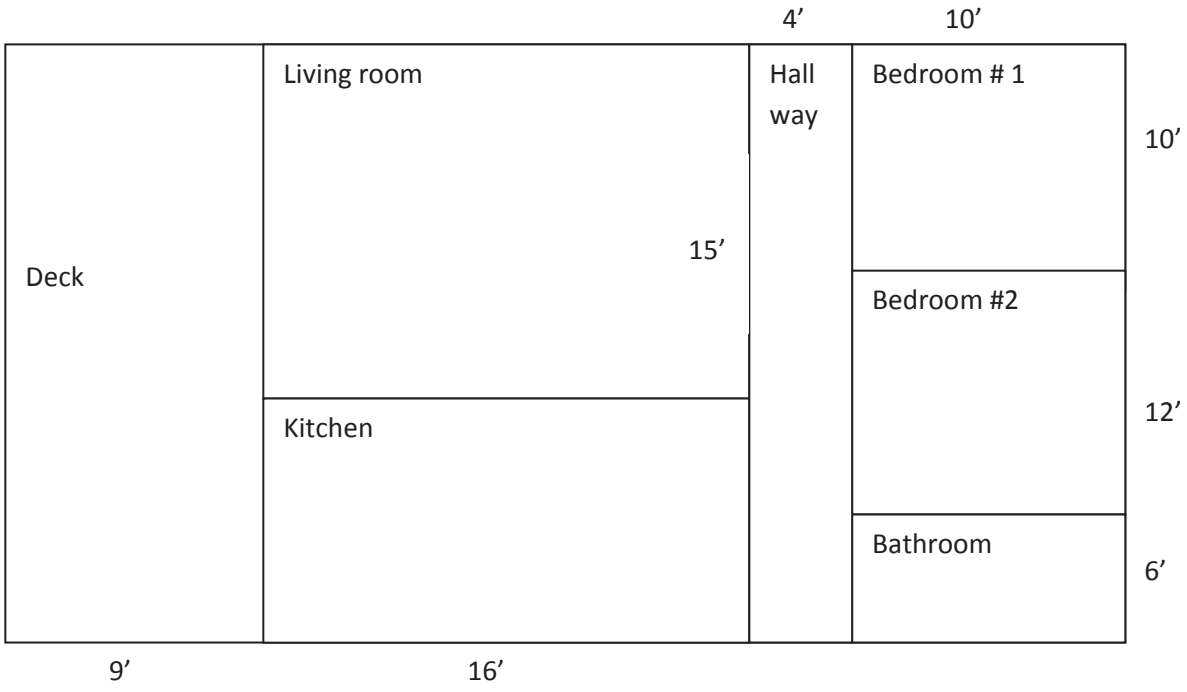
Step 1: Start by figuring the total area of the floor plan.
A = L x W
L = 7 feet + 5 feet + 10 feet = 22 feet
W = 7 feet + 5 feet = 12 feet
A = 22 feet x 12 feet = 264 square feet

Step 2 Calculate the area of the bathroom.
A = 7 feet x 5 feet = 35 square feet

Step 3: Subtract the total area from the area of the bathroom.
264 square feet – 35 square feet = 229 square feet

The square footage of all the space except the bathroom is 229.

Part 1: Tim and Susie want to do some renovations to their home. They would like to put tile in the kitchen, carpet in the living room and bedrooms and laminate in the bathroom and hallway. They also want to paint their deck.



1. What is the area of the kitchen? _____

2. Each tile is one square foot. How many tiles would they need for the kitchen (they will need 10% more than what is needed to account for breakage). Round your answer to the nearest whole number. _____

3. Each tile costs $4.59. How much will it cost to tile the kitchen? _____

4. What is the combined area of the living room and bedrooms? _____

5. How much carpet will they need if they add 10% onto your total square footage? Round your answer to the nearest whole number. _____

6. The cost for carpet is $3.19 per square foot. How much will it cost for materials to carpet the living room and bedrooms? _____-

7. What is the area of the bathroom and hallway combined? _____

8. How much laminate will they need if they add 10% onto your total square footage? _____

9. Laminate comes in 4 square foot pieces. How many pieces will they need to do the bathroom and hallway? Round to the nearest piece. _____

10. Each 4 square foot piece costs $4.15. How much will it cost to put laminate in the bathroom and hallway? _____

11. What is the area of the deck? _____

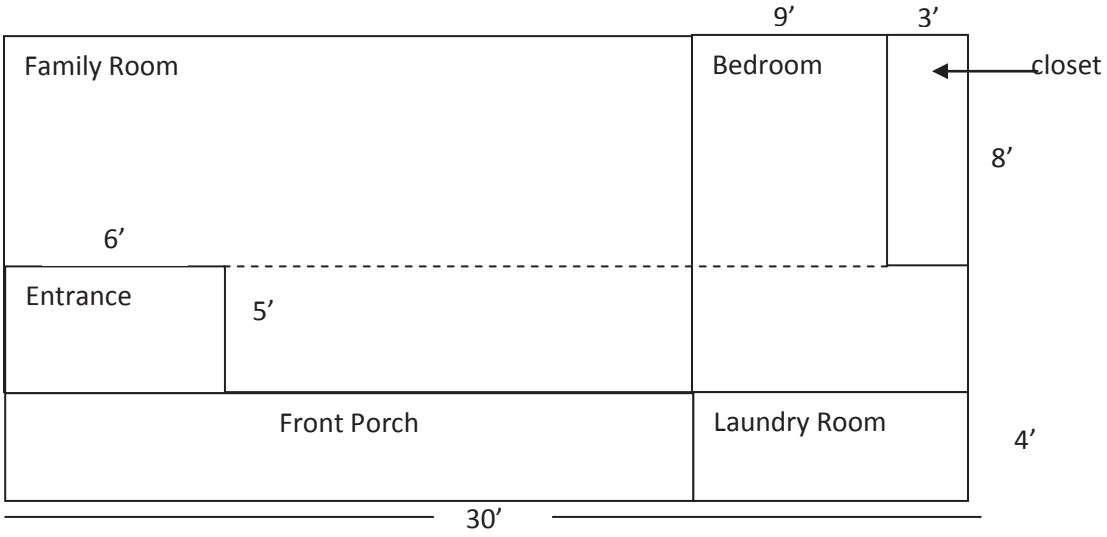
12. How much paint will they need for their deck if a 1 gallon can of paint covers 350 square feet and they need to do 2 coats? _____

13. Each gallon of paint costs $45.89. How much will it cost to paint their deck? _____

14. They have hired a contractor to do the work. He has estimated that it will take 50 hours to do all the installation and painting. He charges $45.00 per hour. How much will it cost for the labour? _____-

15. How much will it cost Tim and Susie for all their renovations? _____

Part 2: Tim and Susie also have a family room, bedroom and laundry room downstairs. They are oddly shaped rooms. After they finished the upstairs, they decided they would also renovate the downstairs.



1. Calculate the area of the family room. Hint you will have to break the room up into two rectangles. Use the dotted line as a guide. _____

2. Calculate the area of the bedroom (not including the closet). _____

3. They decide to put the same carpet in the family room and bedroom. Calculate how much it will cost them for materials. The carpet is $3.19 per square foot. Remember to add 10% to the square footage (round to the nearest foot).
_____

4. Calculate the square footage of the entrance. _____

5. They put tile in the entrance. The tile costs $5.89 per square foot. Again they need an extra 10% for breakage. How much will it cost them for material for the front entrance way? _____

6. Calculate the area of the laundry room. _____

7. They put down laminate in the laundry room. The laminate costs $1.98 per square foot. Again add 10% to your square footage. Round to the nearest foot. How much will it cost for materials for the laundry room?
_____

8. They need to stain the front porch. 1 gallon at $55.78 is good for 350 square feet. They will put two coats on. What is the square footage of the porch?
_____ How many gallons of paint will they need? _____

9. How much will it cost them to renovate the downstairs? The carpenter says it will take 30 hours at $45 per hour. _____

10. How much does it cost Tim and Susie for the whole house? _____

Area: More on Home Decorating #2

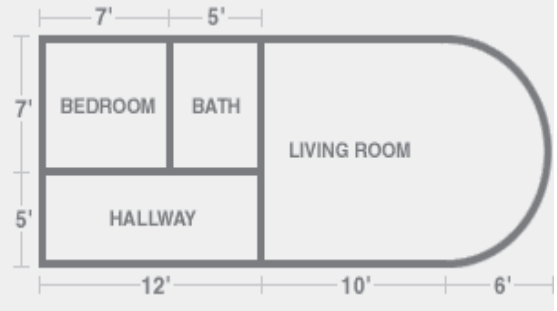
Multiplication, exponents, addition, using formulas, percents, rounding decimals

Calculating how much carpet you'll need is a fairly simple task if your home has only square or rectangular rooms. But what if you have a circular alcove at the end of one room? How do you figure the area of a circle? Geometry comes to the rescue again with a handy formula:

Area = Pi x radius^2 **A = π x r^2**

A circle's radius is one half of its diameter, or one half of what you get if you measure all the way across its widest part. "Squaring" something means you multiply it by itself. Pi is a number that roughly equals 3.14159; we usually round it off to 3.14.

Example: If your living room has a semi-circular alcove as in this floor plan you'll need to use this additional equation to figure out its area.



Problem: What is the square footage of the living room?

Solution: Step 1: To figure the radius of your alcove (the number you'll need to plug into the equation) you'll divide its diameter in half. Its diameter is the same as the width of the living room: 12 feet. Half of that is its radius: 6 feet.

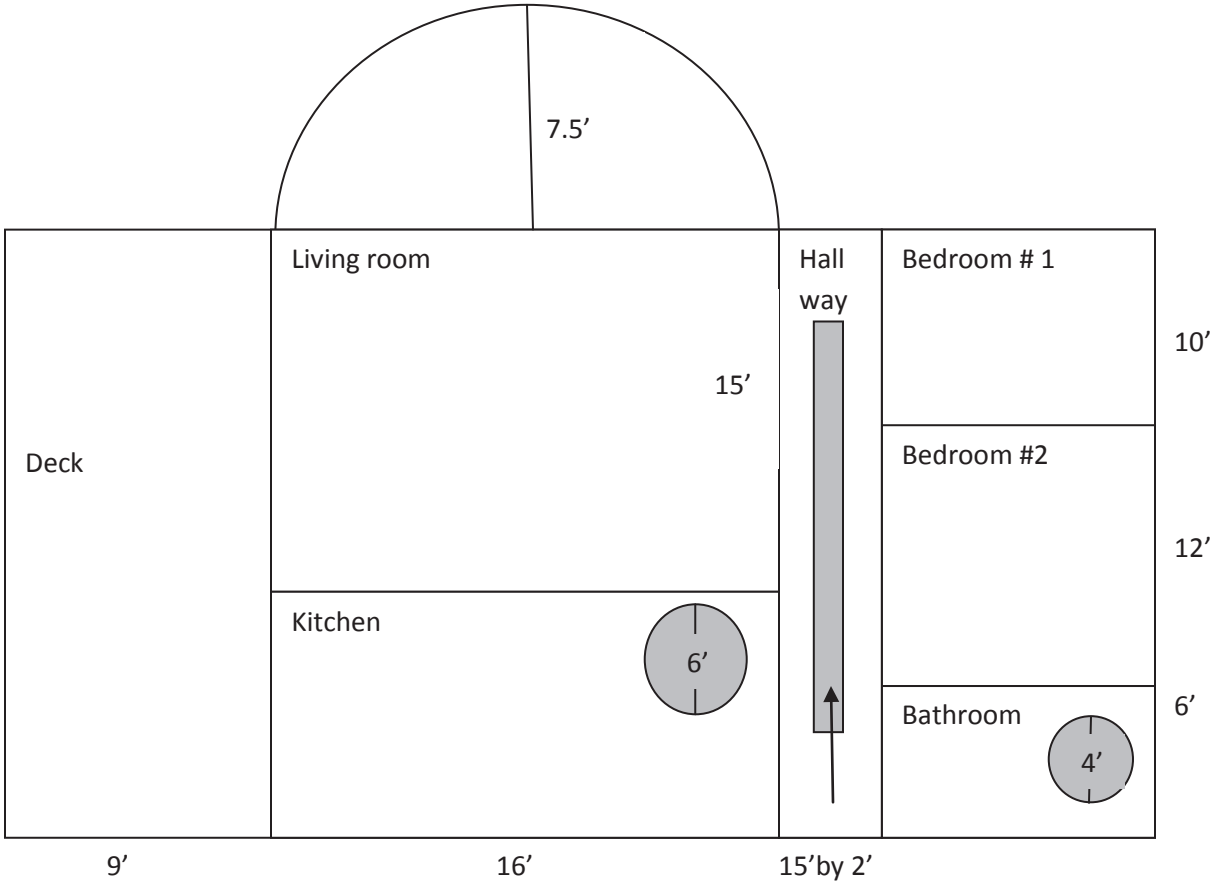
Step 2: **A = 3.14 x (6 feet x 6 feet)**
A = 113 square feet (rounded to the closest square foot)

Step 3: If your alcove were a complete circle, it would have an area of 113 square feet. Because it's a half circle, the area is half of 113
113 ÷ 2 = 56.5 square feet.

Step 4: Calculate the rest of the living room
10 feet x 12 feet = 120 square feet.

The total square footage is 120 square feet + 56.5 square feet = 176.5 square feet.

Directions: Tim and Susie decided to put an addition onto their living room. They added a circular alcove. They need to add carpet to this new section. They also want to buy area rugs for the kitchen, hallway and bathroom. Each area is marked on the diagram. Answer the questions below.



1. Calculate the area of the new part of the living room. Round your answer to the nearest whole number. _____

2. How much will the carpet cost for the addition? The carpet costs $3.19 per square foot and they should buy 10% extra to cover any mistakes or mishaps. Round your answer to the nearest whole number._____

3. What is the area of the rug in the kitchen? Round your answer to the nearest decimal. _____

4. What is the area of the rug in the bathroom? Round your answer to the nearest decimal. _____

5. What is the area of the rug in the hallway? _____

6. The rugs cost $39.95, $15.95 and $25.89. How much does it cost for all the area rugs? _____

Area: Painting Your Home #3

Addition, multiplication, division, estimation

To calculate how much paint you will need for one room you will need to find the area of all the walls in the room. We already know that A = L x W. Paint comes in 1 gallon cans. 1 gallon of paint will cover 350 square feet.

Example: The Triggs family want to paint their living room walls a pale yellow. They will need to do two coats. How much paint will they need? The dimensions of the living room are below.

a. Wall one: 16 feet by 10 feet
b. Wall two: 16 feet by 10 feet with a window that is 3 feet by 5 feet
c. Wall three: 12 feet by 10 feet
d. Wall four: 12 feet by 10 feet with a doorway that is 3 feet by 8 feet.

Problem: Calculate the area of all the walls. Make sure you subtract the area of the window and door.

Solution: Step 1: Calculate the area of all the walls

a. Wall one: A = 16 x 10 = **160 square feet**

b. Wall two: A = 16 x 10 = 160 square feet (subtract square footage of window)
Window: A = 3 x 5 = 15 square feet
Wall two: 160 – 15 = **145 square feet**

c. Wall three: A = 12 x 10 = **120 square feet**

d. Wall four: A = 12 x 10 = 120 square feet (subtract square footage of door)
Door: A = 3 – 8 = 24 square feet

Wall four: 120 – 24 = **96 square feet**

Total area = 160 + 145 + 120 + 96 = 521 square feet
Total Area = 521 square feet x 2 coats = 1042 square feet

Step 2: Calculate the amount of paint when 1 gallon covers 350 square feet. 1042 square feet ÷ 350 square feet = 2.98

The Triggs family will need 3 cans of paint.

Directions: Answer the questions below. Remember that 1 gallon of paint covers 350 square feet.

1. Kerry wants to paint her bedroom. The wall dimensions are 14 feet by 10 feet for two walls and 12 feet by 10 feet for the other two walls. There is one door that is 3 feet by 8 feet and one window that is 5 feet by 5 feet.

   a. What is the square footage of the walls in Kerry's room?

   _____

   b. How many gallons of paint should she buy? She will need to do two coats.

   _____

   c. If one gallon of paint is $45.59. How much will she pay for the paint?

   _____

2. Sam needs to paint his whole house. He is going to start with the upstairs. The dimensions of the rooms are below:

   - **Living room/Kitchen:** 22 feet by 12 feet (2 walls) and 18 feet by 12 feet (2 walls) **One doorway:** 5 feet by 10 feet and **Two windows:** 6 feet by 4 feet.
   - **Bedroom #1**: 15 feet by 12.5 feet (2 walls) and 12 feet by 12 feet (2 walls) **One door:** 3 feet by 9 feet and **One window:** 5 feet by 4 feet.

- **Bedroom #2:** 12 feet by 12 feet (2 walls) and 10 feet by 12 feet (2 walls) **One door:** 3 feet by 9 feet and **One window:** 4 feet by 4 feet.
- **Bedroom #3:** 10 feet by 10 feet (2 walls) and 10 feet by 12 feet (2 walls) **One door:** 3 feet by 9 feet and **One window:** 3 feet by 5

a. Calculate the area for each room:

i. Living room/Kitchen _____

ii. Bedroom #1 _____

iii. Bedroom #2 _____

iv. Bedroom #3 _____

b. What is the square footage of the upstairs walls? _____

c. How much paint will Sam need – assuming he will do two coats?

_____

d. How much will it cost Sam to paint the upstairs if one gallon of paint costs $43.78? _____

3. Terry wants to paint the downstairs recreation room. It is a rather large room – 22 feet long and 10 feet high (2 walls) and 16 feet wide and 10 feet high. There are two windows in the recreation room that are 3 feet by 4 feet, 2 feet by 3 feet.

a. What is the square footage of the walls? _____

b. How much paint will Terry need if he needs to do 3 coats?

_____

c. How much will it cost him if one gallon of paint costs $35.90?

_____

Perimeter #4

Addition, multiplication, estimation

Perimeter is the distance around a 2-dimensional object. We use perimeter to measure the distance around the yard so we can order the correct amount of fencing. We can also use perimeter to measure the distance around a room to plan for installing base boards.

For perimeter of a square, triangle or rectangle you simple add each side up or multiply the length by 2 and the width by 2.

Example: Lisa and Mike would like to install a new fence around their property. They would like to put in a wood fence that is 6' tall so their dogs can't get out. The width of their yard is 50 feet and the length is 40 feet. They will also need to put in a post every six feet to secure the fencing. The posts cost $13.50 each. Fencing costs $8.50 per foot.

Problem 1: Calculate the perimeter of their yard.

Solution 1: P = 2W + 2L P = 2 x 50 feet + 2 x 40 feet P = 180 feet

Problem 2: How many posts do they need?

Solution 2: 180 feet ÷ 6 feet = 30 posts

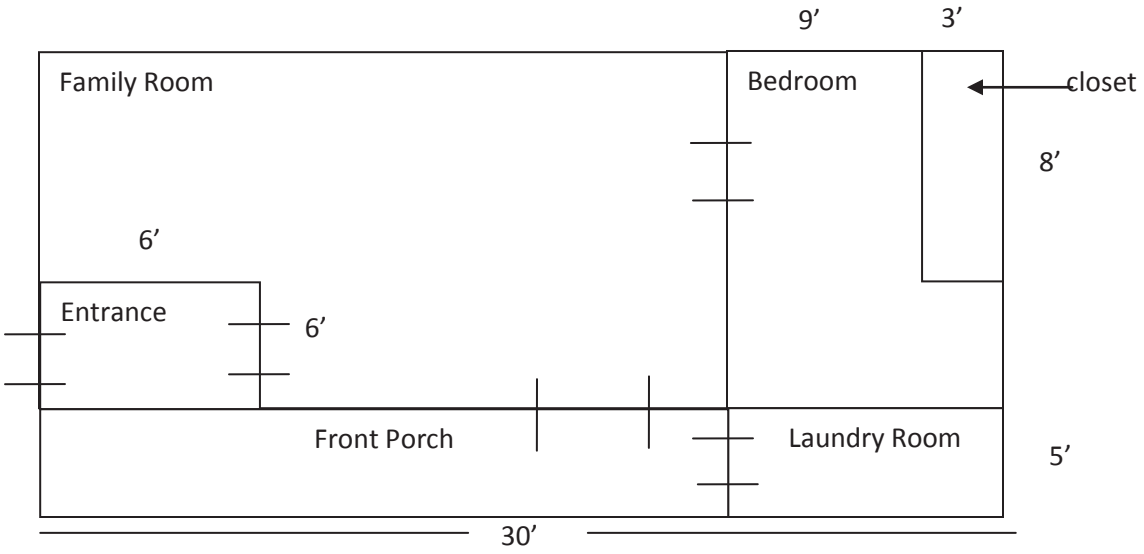
Problem 3: How much will it cost in materials for the fence?

Solution 3:

Posts	30 posts x $ 13.50 = $405
Fencing	180 feet x $8.50 = $1530
Total	$405 + $1530 = $1960

The total cost for the materials for the fence is $1960.

Part 1: Tim and Susie would like to put baseboard in each room. Answer the following questions using the diagram below.



1. Find the overall perimeter of the family room. _____

2. There are three doors in the family room – one going to the entrance, one going to the front porch and one going to the bedroom. The door going to the entrance is 3 feet wide, the door going to the front porch is 5 feet wide and the door going to the bedroom is 3 feet wide. Recalculate your perimeter. _____

3. The baseboard that they would like to install is $7.89 per foot. How much would it cost them in materials for baseboard for the family room? _____

4. Find the perimeter and cost for the baseboard for all the other rooms – all the doors in these rooms are 3 feet wide.

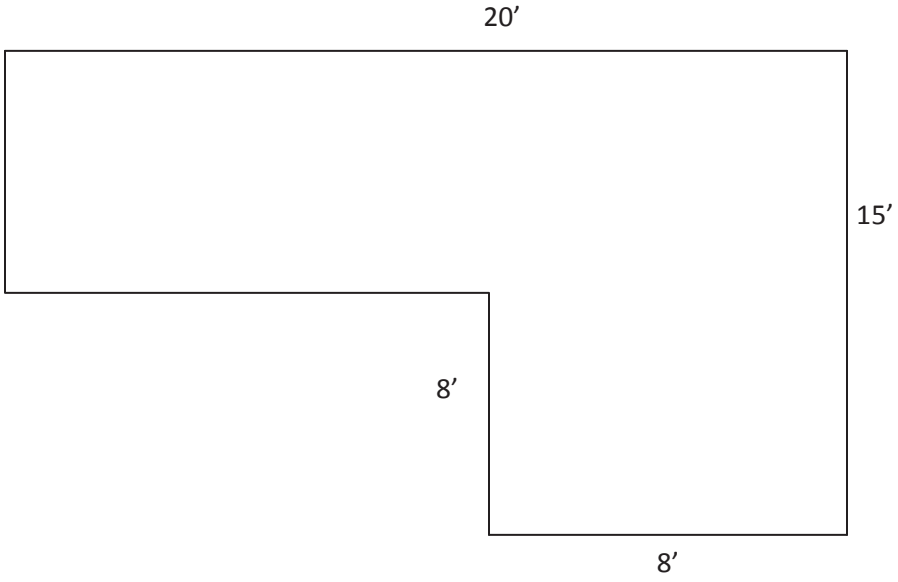
   a. Bedroom _____ _____

   b. Laundry room _____ _____

   c. Entrance _____ _____

5. How much will it cost altogether for the base board? _____

Part 2: Helen and Wayne would like to fence in their garden. They are having problems with the rabbits eating all their vegetables. Below are the dimensions.



1. Calculate the perimeter of the garden. _____

2. Helen and Wayne want to build the fence 2 feet out from the garden. Calculate the perimeter of the fence. _____

3. The fencing costs $4.50 per foot. A gate costs $60 and is 3 feet wide. Calculate the costs for the fence. _____

4. Helen and Wayne have hired Monique to install their fence. She charges $40 per hour and estimates that it will take her 10 hours to put up the fence. How much does it cost for the labour? _____

5. How much does it cost altogether for the fence? _____

Temperature #5

Addition, subtraction, multiplication, division, positive and negative numbers

Temperature is a form of measurement. Temperature is a degree of hotness or coldness that can be measured using a thermometer. It's also a measure of how fast the atoms and molecules of a substance are moving. Temperature is measured in degrees on the Fahrenheit, Celsius, and Kelvin scales.

In the 1700s, G. Daniel Fahrenheit developed a scale used by meteorologists for measuring surface temperature. The scale was named for the developer, and the unit of measure has become known as degree **Fahrenheit (°F)**.

Also in the eighteenth century, a second scale was developed for measuring surface temperature; it became known as the Celsius scale. The unit of measure in the Celsius scale is the degree **Celsius (°C**).

A third scale later developed for use by scientists became known as the **Kelvin** scale. This scale begins at absolute zero and is sometimes more convenient to use because it does not involve negative temperatures. (The word degree is not used in Kelvin measure.)

The United States primarily use the Fahrenheit scale, the rest of the world uses the Celsius scale, and scientists use either the Celsius or Kelvin scale. Since we can use three different scales to measure temperature, it seems reasonable to have formulas for changing or converting from one scale to the other. Here are some useful conversion formulas.

$$C° = (F° - 32°) \div 1.8$$

$$F° = 1.8 \times C° + 32$$

$$K = C°+273$$

Part 1: Use the formulas below to answers the questions. Round your answers to the nearest tenth.

$$C° = (F° - 32°) \div 1.8$$
$$F° = 1.8 \times C° + 32$$
$$K = C°+273$$

1. If the temperature is 75° Fahrenheit, what are the equivalent readings on the Celsius and Kelvin scales? _____ _____

2. If the temperature is 26° Celsius, what are the equivalent readings on the Fahrenheit and Kelvin scales? _____ _____

3. If the temperature is 288 Kelvin, what are the equivalent readings on the Celsius and Fahrenheit scales? _____ _____

4. If the temperature is 100° F, what temperature would it be in Celsius? _____

5. Has it ever been 100° F in your community? _____

6. Have you ever experienced 100° F temperatures before? _____

7. If the temperature is -40°C, what temperature would it be in Fahrenheit? _____ Can you explain this? _____

Part 2: Read the statements below and choose the answer you think fits best. When you convert your answers round to the nearest degree

1. The average human body temperature is:

    a. 89.6° F

    b. 37° C

    c. 99.9° F

    d. Convert your answer to the other _____

2. A hot summer's day in Florida would be close to:

    a. 100° F

    b. 130° F

    c. 14° C

    d. Convert your answer to the other _____

3. A fairly cold winter day in Inuvik might be:

    a. -15 ° C

    b. -22° F

    c. 0° F

    d. Convert your answer to the other _____

4. A comfortable room temperature would be around:

    a. 21° C

    b. 78° F

    c. 88 ° F

    d. Convert your answer to the other _____

5. A pot of boiling water is:

    a. 80° C

    b. 100° C

    c. 100° F

    d. Convert your answer to the other _____

6. The temperature of a pitcher of iced tea would be around:

    a. 2° C

    b. 57° F

    c. 40° F

    d. Convert your answer to the other _____ (round to nearest tenth)

7. A normal body temperature is between:

    a. 36 - 36.8° C

    b. 33 - 35° C

    c. 99 – 100.5 °F

    d. Convert your answer to the other _____ (round to nearest tenth)

8. In children, any temperature of _____ or above is considered high and is classed as a fever.

    a. 100.4° F

    b. 37° C

    c. 104.5 °F

    d. Convert your answer to the other _____

Short Cut to Converting Temperatures #6

Addition, subtraction, multiplication, division, positive and negative numbers (addition and subtraction)

Short-cut Method #1

To convert from Celsius to Fahrenheit try this short cut method:

Step 1:	Double the temperature:	17°C + 17 °C = 34
Step 2:	34 is in the 30s, so subtract 3 (if the number is in the 40s, subtract 4):	34 - 3 = 31
Step 3:	Add 32:	31 + 32 = 63°F

If the number in Step 2 is going to be a negative number then you must add in the second step.

Step 1:	Double the temperature	-10 °C + (-10 °C) = - 20
Step 2:	-20 is in the 20's, so add 2	-20 + 2 = -18
Step 3:	Add 32	-18 + 32 = 14 °F

To convert form Fahrenheit to Celsius try this short cut method:

Step 1:	Subtract 32:	50°F - 32 = 18
Step 2:	18 is in the 10s, so add 1:	18 + 1 = 19
Step 3:	Cut in half:	19 ÷ 2 = 9.5°C

If the number is going to be negative in Step 2 you must subtract in the second step.

Step 1:	Subtract 32	10°F - 32 = - 22
Step 2:	-22 is in the 20's so subtract 2	-22 - 2 = -24
Step 3:	Cut in half	-24 ÷ 2 = -12°C

Part 1: Use the short cut methods above to answer the questions.

1. Convert 25°C to Fahrenheit.	
2. Convert 25°F to Celsius.	
3. Convert 15°C to Fahrenheit.	
4. Convert -25°F to Celsius.	
5. Convert 5°F to Celsius.	
6. Convert -15°C to Fahrenheit.	
7. Convert 30°C to Fahrenheit.	
8. Convert 80°F to Celsius.	
9. Convert -30°C to Fahrenheit.	
10. Convert 0°F to Celsius.	
11. Convert -20°C to Fahrenheit.	
12. Convert 35°C to Fahrenheit.	
13. Convert -20°F to Celsius.	
14. Convert -40°F to Celsius.	
15. Convert 0°C to Fahrenheit.	
16. Convert -50°C to Fahrenheit.	

17. Convert 35°F to Celsius.	
18. Convert 11°C to Fahrenheit.	
19. Convert 100°F to Celsius.	
20. Convert 15°F to Celsius.	

Short-cut Method #2

There is even a shorter method to converting from Celsius to Fahrenheit and vice versa. Although this method can be off as many as five degrees it usually only happens in extreme cold and extreme hot temperatures.

Fahrenheit to Celsius

Step 1: Subtract 30
Step 2: Cut in half

Example: 80°F
80 – 30 = 50
50 ÷ 2 = 25°C

When you do the real calculations for 80°F – the conversion is 26.7°C. So this method is off by 1.7 degrees.

Celsius to Fahrenheit

Step 1: Double
Step 2: Add 30

Example: 20°C
2 x 20 = 40
40 + 30 = 70°F

When you do the real calculations for 20 °C – the conversion is 68°F. So this method is off by 2 degrees.

Part 2: Fill in the chart using the second short-cut method. Compare your answers to the first short-cut method.

1. Convert 25°C to Fahrenheit.	
2. Convert 25°F to Celsius.	
3. Convert 15°C to Fahrenheit.	
4. Convert -25°F to Celsius.	
5. Convert 5°F to Celsius.	
6. Convert -15°C to Fahrenheit.	
7. Convert 30°C to Fahrenheit.	
8. Convert 80°F to Celsius.	
9. Convert -40°C to Fahrenheit.	

10. Convert 0°F to Celsius.	
11. Convert -20°C to Fahrenheit.	
12. Convert 35°C to Fahrenheit.	
13. Convert -20°F to Celsius.	
14. Convert -40°F to Celsius.	
15. Convert 0°C to Fahrenheit.	

Wind Chill Index #7

Reading charts

The wind chill temperature is how cold people and animals feel when outside. Wind chill is based on the rate of heat loss from exposed skin caused by wind and cold. The higher the wind speed the faster exposed areas of your body lose heat and the cooler you feel. Therefore, the wind makes it FEEL much colder.

Wind chill does *not* affect objects and does *not* lower the actual temperature. It only describes how a human being would feel in the wind at the temperature. Below is a chart that shows the relationships between wind and temperature.[1]

T air = Actual Air Temperature V_{10} = Wind Speed at 10 m in km/hr

T air (°C) / **V_{10} (km/hr)**	**5**	**0**	**-5**	**-10**	**-15**	**-20**	**-25**	**-30**	**-35**	**-40**
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-53
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54
20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56
25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63
55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63
60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65
75	-3	-10	-17	-24	-30	-38	-45	-52	-59	-66
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67

[1] http://www.msc.ec.gc.ca/education/windchill/windchill_chart_e.cfm

Part 1: Use the chart on the previous page to answer the questions below.

1. What is the wind chill if the temperature is -20°C and the wind is 30 km/h?

   _____

2. What is the wind chill if the temperature is -10°C and the wind is 70 km/h?

   _____

3. What is the wind chill if the temperature is -15°C and the wind is 20 km/h?

   _____

4. What is the wind chill if the temperature is -30°C and the wind is 80km/h?

   _____

5. What is the wind chill if the temperature is -40°C and the wind is 80 km/h?

   _____

6. What is the wind chill if the temperature is -25°C and the wind is 65 km/h?

   _____

7. What is the wind chill if the temperature is -35°C and the wind is 20 km/h?

   _____

8. What is the wind chill if the temperature is -15°C and the wind is 75 km/h?

   _____

9. What is the wind chill if the temperature is -5°C and the wind is 60 km/h?

   _____

10. What is the wind chill if the temperature is -40°C and the wind is 20 km/h?

    _____

Wind Chill Warnings

Wind chill warnings are issued when wind combined with very cold temperatures will create outdoor conditions hazardous to human activity. Wind chill warnings are announced for the NWT (except Ulukhaktok, Sachs Harbour and Paulatuk) when the wind speed is 15 km/hr or more and there is a wind chill of -50 or colder.

Part 2: Look at the same chart and decide on what wind speed and temperature would contribute to a wind chill warning.

For example: If the wind speed was 15 km/hr and the temperature was -40°C the wind chill would be -54°C and this would result in a wind chill warning.

Your Answers:

Average Temperatures #8

Reading charts, figuring averages, positive and negative numbers

Calculating averages is a skill used throughout life for many reasons. You may want to find the average height of a group of people. You may want to find the average age in a group. Or you may want to find your average grade in a class based on test results

Below are some average temperatures in Yellowknife, Whitehorse and Fort Smith.

Yellowknife

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
°C	-23.6	-20.2	-12.4	-1.1	9.6	17.5	20.6	18.1	10.1	1.4	-10.3	-19.8	-0.8
°F	-10.4	-4.3	9.7	30.0	49.3	63.5	69.1	64.6	50.2	34.5	13.5	-3.5	30.6

Whitehorse

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
°C	-14.2	-8.6	-1.7	5.4	13.0	18.4	20.1	18.1	12.4	4.4	-5.6	-11.5	4.2
°F	6.4	16.5	28.9	41.7	55.4	65.1	68.2	64.6	54.3	39.9	21.9	11.3	39.6

Fort Smith

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
°C	-20.6	-15.8	-6.9	4.2	14.2	20.2	22.7	20.7	13.0	4.6	-7.7	-16.8	2.7
°F	-5.0	3.6	19.6	39.6	57.6	68.4	72.9	69.3	55.4	40.3	18.1	1.8	36.9

Example: Find the average temperature for Whitehorse for the months June, July and August.

Solution: Add up all the temperatures and then divide by the number of items that you added (in this case 3 months)

18.4 + 20.1 + 18.1 = 56.6

56.6 ÷ 3 = 18.866666 (round to the nearest tenth)

18.9°C

Directions: Answer the questions below using the information on the charts on the previous page.

1. Which place has the lowest temperature for October? _____
2. Which place has the highest temperature for July? _____
3. Which place has the lowest overall temperature? _____
4. Which place has the highest overall temperature? _____
5. What is the average temperature in Celsius for all three places for the winter months December, January, February and March? Round your answers to the nearest tenth.
    a. Yellowknife: _____
    b. Whitehorse: _____
    c. Fort Smith: _____

6. What is the average temperature for all three places for the spring months April and May?

    a. Yellowknife: _____

    b. Whitehorse: _____

    c. Fort Smith: _____

7. What is the average temperature for all three places for the summer months June, July and August?

    a. Yellowknife: _____

    b. Whitehorse: _____

    c. Fort Smith: _____

8. What is the average temperature for all three places for the fall months September, October and November?

    a. Yellowknife: _____

    b. Whitehorse: _____

    c. Fort Smith: _____

Weight and Height #9

Converting metric to imperial and vice versa, multiplication, division

What do you weigh yourself in - kilograms or pounds? How do you measure your height - in feet and inches or centimetres? Most people use the imperial measurement system (pounds and inches) to weigh and measure themselves, even though Canada switched over to the metric system almost 40 years ago. Sometimes on forms we are asked for our weight and height in metric terms, so it is good to know how to convert pounds to kilograms and vice versa and inches to centimetres and vice versa.

2.2 pounds = 1 kilogram.
1 inch = 2.54 centimetre
1 meter = 3.2808399 feet
1 foot = 12 inches

Example: Lisa goes to the doctor's office and she is asked to write down how much she weighs in kilograms and what her height is in centimetres. She only knows how much she weighs in pounds and how tall she is in feet and inches. She weighs 140 lbs and is 5′ 6″ tall.

Problem: Convert Lisa's weight to kilograms and her height to centimetres.

Solution 1: 140 lbs ÷ 2.2 = 63.6 kg (rounded to the nearest decimal)

Lisa weighs 63.6 kg.

Solution 2: 5′ 6″ is 66 inches
66 inches x 2.54 = 167.6 cm (rounded to the nearest decimal)

She is 167.6 cm tall.

Directions: Answer the following questions. Use the information below for your conversions.

2.2 pounds = 1 kilogram
1 inch = 2.54 centimetre
1 metre = 3.3 feet
1 foot = 12 inches

1. How tall is Mike in feet and inches if he is 185 cm tall? Round your answer to the nearest inch. _____

2. How tall is David in centimetres if he is 6′ 3″ tall (6 feet and 3 inches)? Round your answer to the nearest centimetre. _____

3. Laurie is 5′ 7″ tall. How tall is she in centimetres? Round your answer off to the nearest centimetre. _____

4. Gayle is 165 cm tall. How tall is she in inches? Round your answer to the nearest inch. _____ How many feet and inches is she? _____

5. How much does Maria weight in kilograms if she weighs 85 lbs? Round your answer to the nearest decimal. _____

6. How much does Kacee weigh in lbs if she is 71 kilograms? Round your answer to the nearest pound. _____

7. Larry goes to the store to buy some rope. He asks for 6 metres. The sales person does a quick calculation and gives Larry how many feet? Round your answer off the nearest foot. _____

8. Suzanne is going swimming but she wants to know how big the pool is. The lifeguard tells her that the pool is 25 metres long and 15 metres wide. How much is this in feet and inches? Round your answer to the nearest decimal point.

   _____ _____

9. The grocery store often sells produce in both pounds and kilograms. Potatoes are priced at $7.15 per kilogram. How much are the potatoes per pound?

   _____

10. Mushrooms are $4.59 per pound. How much are they in kilograms?

    _____

11. Your doctor tells you that you should lose at least 7 kilograms. How many pounds is this? Round your answer to the nearest pound. _____

12. You go to an amusement park with your family. For one ride there is a height requirement. Children must be at least 147 centimetres tall. You have two children. One is 4′ 8″ and the other is 4′ 11″. Round your answer to the nearest inch. Can both of your children go on the ride? _____

    Why or why not? _____

    _____

13. The local swimming pool has a shallow end. The shallow end is 1 metre deep. Your child is 3 feet. Will your child be able to stand up in the shallow end? _____

    Why or why not? _____

    _____

Time #10

Addition, subtraction, problem solving

Time is a funny thing. Often we run out of time during the day or find ourselves rushing to get to places on time. For many cultures time is attached to the seasons: time for fishing, time for hunting or time for resting. In this day and age, we are ruled by the clock.

Don't forget there are:

1. 15 minutes in quarter of an hour.
2. 30 minutes in half an hour.
3. 60 minutes in an hour.
4. 12 hours in half a day.
5. 24 hours in a whole day.

Directions: Read the following word problems and solve.

1. Lisa has to be at work for 7:00 pm – she will work a 10 hour shift. When does she get off? _____

2. You get home at 5:15pm and you have a friend coming to pick you up to go to a party at 8:30. You have to do the following:

    - switch the laundry (5 min)
    - walk the dog (30 min)
    - gather and take out the trash (10 min)
    - cook and eat dinner (60 min)
    - do the dishes (20 min).
    - shower (10 min)
    - do your hair (15 min)
    - iron clothes (10min)
    - get dressed (10 min)

    a. Do you have enough time before your friend comes? _____

b. How much time do you have left or how much time do you need?
_____

3. Jill works from 7:00 am to noon and then from 4:00 pm to 11:00 pm. How many hours does she work? _____

4. You have to be at work for 8:30 am. These are the things you must do:

   a. Walk the dog (15 min)
   b. Have breakfast (10 min)
   c. Feed your children breakfast (15 min)
   d. Have a shower (15 min)
   e. Get dressed (5 min)
   f. Get your children dressed (10 min)
   g. Walk your children to daycare (15 min)
   h. Walk to work (10 min)
   i. Pick up a coffee (10 min)

   a. When should you wake up if you want to make it to work on time? _____

   b. Where do you think you can cut down on time? _____

5. The movie starts at 7:30 pm. You get off work at 5:00 pm. You have to do the following before you go to the movie and you would like to get there 15 minutes ahead of time.

   - Pick up your daughter from after school care (15 min)
   - Make supper (40 min)
   - Eat supper (20 min)
   - Clean-up (10 min)
   - Walk the dog (20 min)
   - Make lunches for the next day (20 min)
   - Bike to the theatre (10 min)

   a. Will you make it on time? _____

   b. How much time do you have to spare or need? _____

24 Hour Clock #11

24 hour clock, filling in charts, addition and subtraction

The 24-hour clock is a way of keeping time where the day runs from midnight to midnight and is divided into 24 hours, numbered from 0 to 23. The 12-hour clock requires the use of am and pm to clearly identify the time of day. Since the 24-hour clock uses a unique two-digit number to identify each of the 24 hours in a day, am and pm are unnecessary.

The 24-hour clock begins at midnight (which is 0000 hours). So, 1:00 a.m. is 0100 hours, 2:00 AM is 0200 hours, and so-on up until 11:00 am which is 2300 hours. When converting from the 12-hour clock to the 24-hour clock and vice versa, the minutes and seconds do not change.

The 24-hour clock is the most commonly used time notation in the world today. The 12-hour clock is, however, still used in a few countries, particularly the United States, Canada (except Quebec) and Australia. 24-hour notation is also popularly referred to as military time or astronomical time in the US and Canada

The military does not use a colon between the numbers. For example: 1300 hrs. However you will find that airlines use a colon. For example: 13:00 hrs. You can choose to use colons or not.

1. Fill in the following table.

12-hour clock	24-hour clock	12-hour clock	24-hour clock
Midnight	0000 or 00:00	Noon	1200 or 12:00
1:00 a.m.	0100 or 01:00	1:00 p.m.	1300 or 13:00
2:00 a.m.		2:00 p.m.	
3:00 a.m.		3:00 p.m.	

4:00 a.m.		4:00 p.m.	
5:00 a.m.		5:00 p.m.	
6:00 a.m.		6:00 p.m.	
7:00 a.m.		7:00 p.m.	
8:00 a.m.		8:00 p.m.	
9:00 a.m.		9:00 p.m.	
10:00 a.m.		10:00 p.m.	
11:00 a.m.		11:00 p.m.	

2. Louise works from 0100 hours to 1100 hours. How many hours does she work?

   _____

3. Kathryn goes from Yellowknife to Edmonton. The flight leaves at 07:30 and arrives 1 hour and 40 minutes later. What time does she land in 24-hour clock time?

   _____

4. Mike goes from Inuvik to Edmonton. The flight leaves at 13:04 and arrives in Edmonton 4 hours and 20 minutes later. What time does he land in Edmonton in 24-hour clock time? _____

5. Janice was told to report to the police station at 1530 hours. What time is this in 12-hour clock time? _____

6. Joe's plane landed at 2012. What time is this in 12-hour clock time?

   _____

7. Susan decides to take the bus from Hay River to Edmonton. She will leave at 06:12 and will arrive in Edmonton 18 hours later. What time does she arrive?

   _____

Time Zones #12

Addition, subtraction

Canada uses six primary time zones. From east to west they are Newfoundland Time Zone, Atlantic Time Zone, Eastern Time Zone, Central Time Zone, Mountain Time Zone, and the Pacific Time Zone.

In most of Canada Daylight Saving Time begins at 2:00 a.m. local time on the second Sunday in March. On the first Sunday in November areas on Daylight Saving Time return to Standard Time at 2:00 a.m. During Daylight Saving Time turn your clocks ahead one hour.

The map below shows the different time zones. Use the map to answer the questions on the next page

Directions: Use the map on the previous page and answer the questions below.

1. If it is 2:00 pm in Vancouver (BC), what time is it in Winnipeg (Man)? _____

2. If it is 1:00 am in Yellowknife, what time is it in Toronto (ON)? _____

3. If it is 4:00 pm in Alert Bay (Nu), what time is it in Whitehorse (Yk)? _____

4. If it is 4:30 pm in Halifax (NS), what time is it in Saskatoon (SK)? _____

5. If it is 5:30 am in Newfoundland (NFL), what time is it in Iqaluit (Nu)?
   _____

6. Jared is going on a trip from Inuvik to Halifax. He gets his itinerary and it says that he leaves at 7:00 am and arrives at his destination at 2300 hours. How many hours will it take him to get there? _____

7. Susan is going on a trip from Yellowknife to St John's Newfoundland. She leaves at 9:15 am and arrives in St. John's at midnight. How many hours will it take her to get there? _____

8. Pat is going on a trip from Hay River to Vancouver. She leaves at 1:00 pm and arrives at 1750 hours. How many hours will it take her to get there?
   _____

9. Bruce is travelling from Ottawa to Yellowknife. He leaves Ottawa at 8 a.m. and arrives in Yellowknife at 2015 hours. How long was his trip?
   _____

10. Sarah is moving to Yellowknife from New Brunswick. She leaves New Brunswick at 0600 hours and arrives in Yellowknife at 2010. How long was her trip?
    _____

More on Time #13

Multiplication, division

Time is measured in milliseconds, seconds, minutes, hours, days, weeks, months, years, decades, centuries and millenniums. Often we need to convert different times. For example 5 minutes is 300 seconds or 14 days is 2 weeks.

Table of Time Conversions

1,000 milliseconds	1 second
60 seconds	1 minute
60 minutes	1 hour
24 hours	1 day
7 days	1 week
4 weeks	1 month
12 months	1 year
52 weeks	1 year
365 days	1 year
10 years	1 decade
10 decades	1 century
100 years	1 century
1,000 years	1 millennium

Directions: Use the table above to answer the following questions.

1. 3 minutes is how many seconds? _____

2. 6 hours is how many minutes? _____ How many seconds? _____

3. 10 weeks is how many months? _____

4. 4 decades is how many years? _____

5. 3 centuries is how many years? _____ How many decades? _____

6. We are in the year 2009 – how many millennia is that? _____

7. 5 seconds is how many milliseconds? _____

8. 1 week is how many hours? _____

9. 10 years is how many days? _____

10. 150 years is how many centuries? _____

11. 60 months is how many years? _____ How many decades? _____

12. 2190 days is how many years? _____ How many hours? _____

13. 20 decades is how many years? _____ How many centuries? _____

14. 78 weeks is how many years? _____ How many days?_____

15. 72 hours is how many days? _____ How many minutes? _____

16. Write down your age _____

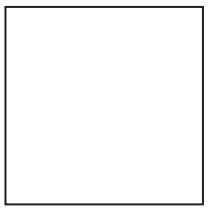
    a. How many decades have you been living? _____

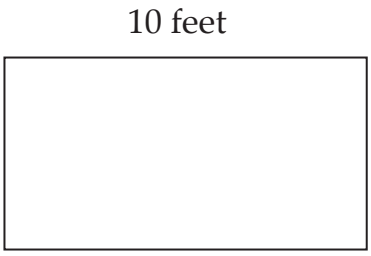
    b. How many months? _____

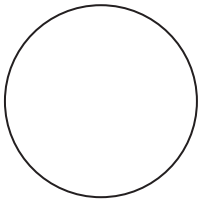
    c. How many days? _____

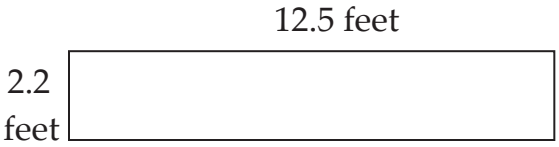
Measurement in Your Home Review #14

1. Find the area of the following shapes. Round to the nearest hundredth.

a. 

b. 

c. 

d. 

2. Find the perimeter for the shapes above (except the circle)

   a. _____

   b. _____

   d. _____

3. If it is 20°C outside what is the temperature in Fahrenheit? _____

4. What is a good room temperature? _____

5. If it is -30°F outside what is the temperature in Celsius? Round to the nearest degree. _____

6. Fort Good Hope had the following temperatures for one week:

   a. Sunday -23°C

   b. Monday -15°C

c. Tuesday -30°C

d. Wednesday -27°C

e. Thursday -17°C

f. Friday -22°C

g. Saturday -35°C

What was the average temperature for the week? Round to the nearest degree.

_____

7. Joe weighs 180 lbs. He goes to the doctor's office and they ask him to write down how much he weighs in kilograms. Round to the nearest kilogram.

   a. How should Joe convert his weight from pounds to kilograms?

   _____

   b. How much does he weight in kilograms? _____

8. Joe also has to write down how tall he is on the form in centimetres. He knows that he is 5 feet 11 inches. Round to the nearest centimeter.

   a. How should Joe convert feet and inches to centimetres?

   _____

   b. How tall is Joe in centimetres? _____

9. Lisa needs to pick up her daughter in 20 minutes. She is in a meeting at work and knows that she will be late picking up her daughter by 10 minutes. The time now is 3:45. What time will she end up picking up her daughter? _____

10. Maria's plane arrives in Yellowknife at 2010. Maria has been travelling since 9:00 am from Toronto.

    a. What time does she arrive in Yellowknife at? _____

    b. How many hours did it take her to get home to Yellowknife? (refer back to the time zone map on page 41) _____

Measurement in Your Home Math Projects

1. Calculate how much it would cost you to paint the interior of your house or apartment. You will need to calculate the area for each wall in each room. You will also have to check out costs for paint in your community.

2. Paint your child's room. Calculate the area of the walls in your child's bedroom. Let your child pick out the colour they would like in their bedroom. Paint the room with your child.

3. Research the time zones for the following places – you can use the following website http://www.timeanddate.com/worldclock . Calculate the time difference from the NWT to:
   - London, England
   - Melbourne, Australia
   - New Delhi, India
   - Cape Town, South Africa
   - Anchorage, Alaska

4. Compare the average temperature for each month in Inuvik to the average temperature in Fort Simpson, Edmonton, Vancouver and Toronto.

5. Research what place in Canada has the mildest weather on average for the year. What place has the coldest temperature on average for the year?

6. What is the rhyme for knowing the calendar? Find out on the Internet by googling "songs and calendars."

Environmental Math

In this section you will be required to do a variety of math skills:

- Addition
- Subtraction
- Multiplication
- Division
- Estimation
- Rounding
- Decimals
- Percents
- Metric measurement
- Reading charts
- Comparisons

This section has the following worksheets:

It also has a page for math projects on this topic.

Home Water Audit #15

Filling in charts, multiplication and addition

Saving water is easy when you think about it. Here's a fun and easy way to see how water-wise you are around your home. Check the column that describes your water use habits then calculate your score to see how you're doing. It might surprise you just how easy it is to save water – and money – around your home.

Take this little quiz to find out how you rate with your water use.

Personal Habits	Always	Sometimes	Never
Keep showers to under 5 minutes			
Only shower 3 times per week			
Use only a little water in the bathtub			
Turn off the water while brushing your teeth			
Put water in the sink while washing up			
Flush the toilet only when necessary.			
Use a shovel to clean driveway and sidewalk			
Use a bucket when washing the car			
Turn water faucet off tight			
Run the dishwasher only when it's full			
Run the washing machine only when it is full			
Dry your clothes on a drying rack			
Use rain water to water your garden or flowers			

To calculate your score:

- Give yourself 5 points for every “always”.
- Give yourself 2 points for every “sometimes”.
- Give yourself 0 points for every “never”.

Calculate your score: _____

If your score is between 50 -70 points — You are an excellent water saver!

If your score is between 30-50 points — You could use some pointers on saving water.

If your score is between 0 – 30 points — You are a water pig! It is time to start conserving water in your house.

How Much Water Do You Use in One Day? #16

Addition, multiplication

Each of us uses about 340 litres of water each day! How do you compare? This chart will help you calculate how much water you use each day.

Showers	20 litres per minute – regular shower 10 litres per minutes - low-flow shower head	
Baths	432 litres for a full bath or 216 litres for a half bath.	
Toilet	1 flush is 16 litres – regular toilet 1 flush is 6 litres – water saving toilet (average is 4 – 5 flushes a day)	
Brushing teeth	4 litres per one brush 1/2 litre per one brush (if you turn off the water while brushing)	
Dishwashing	25 litres per one sink load with rinsing	
Dishwasher	40 litres per load	
Hand washing	4 litres per minute	
Laundry	150 litres per load – regular washer 50 litres per load – front loading washer	
Cooking	10 litres per day	
Drinking water	4 litres per day	

Now calculate your daily use. _____

Next calculate your monthly use by multiplying the amount used daily by 30.

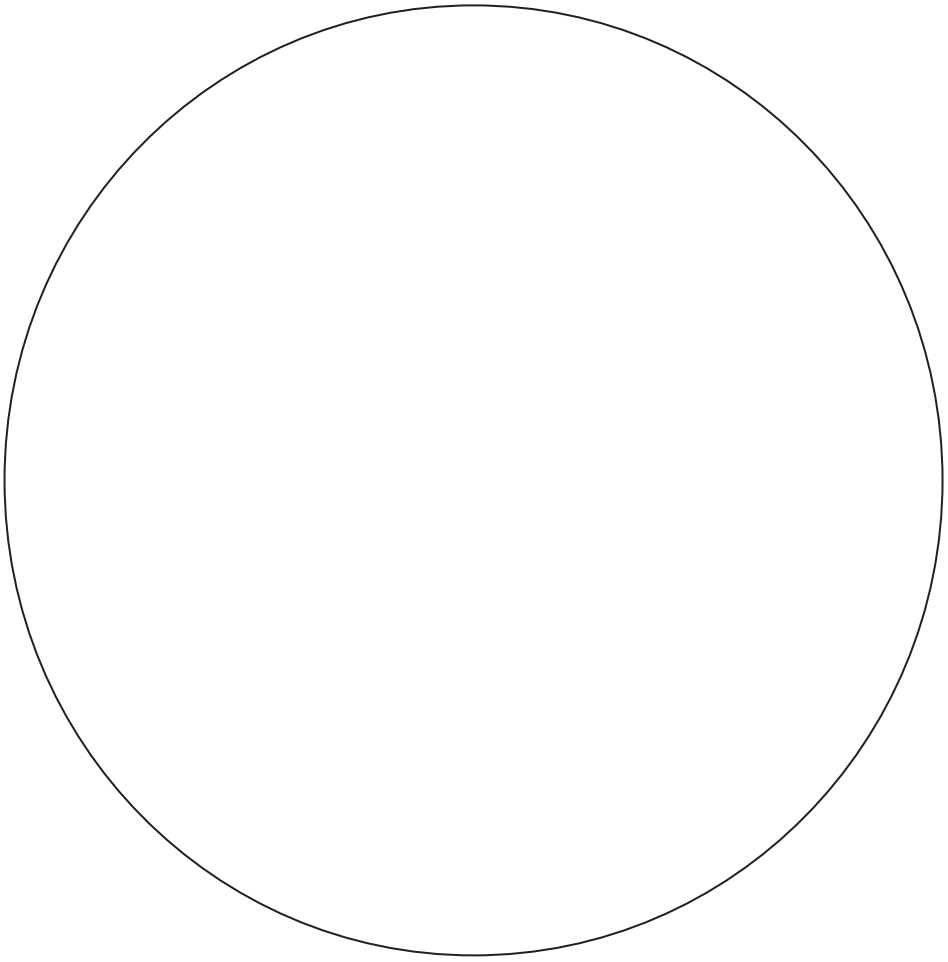
_____

Water Use – Did You Know? #17

Percents, pie charts

- Toilets use 30 per cent of the total water used in a household.
- Bathing, shaving and brushing teeth use 35 per cent.
- Laundry and dish washing use 20 per cent.
- Cleaning uses 5 per cent.
- Cooking and drinking uses 10 per cent.

Create a circle graph to display this information. Use a different colour for each one. Fill in the key at the side.



☐ Toilet
☐ Bathing, shaving, brushing teeth
☐ Laundry and dish washing
☐ Cleaning
☐ Cooking and drinking

Saving Water #18

Multiplication, division, filling in charts, comparisons

We can save water in a variety of ways. Read the following information and fill in the charts to see how much water we use in our everyday activities.

Part 1: The average shower uses about 20 litres a minute. Finish the table.

Time in Shower	Water Use
30 seconds	
1 minutes	20 litres
2.5 minutes	
3 minutes	
3.5 minutes	
4 minutes	
4.5 minutes	
5 minutes	
5.5 minutes	
6 minutes	

New low-flow shower heads only use 10 litres per minute. Finish the table.

Time in Shower	Water Use
30 seconds	
1 minutes	10 litres
2.5 minutes	
3 minutes	
3.5 minutes	
4 minutes	
4.5 minutes	
5 minutes	
5.5 minutes	
6 minutes	

1. How much water can you save if you have a 3 minute shower using the low-flow shower head? _____

2. How much water can you save if you have a 6 minute shower using the low-flow shower head? _____

Part 2: How efficient is your shower?

AT HOME Hold a bucket under your shower for 15 seconds. Measure the amount of water. Multiply by 4. Have you got an efficient shower?	
Check 9 litres or less per minute = excellent 9 - 12 litres/minute = high efficiency 12 plus litres/minute = poor	

Part 3: Cleaning Your Teeth

Leaving the tap running while you clean your teeth can waste 7 litres of water assuming you brush your teeth twice a day. How much water do you use?

Time	Water used
A day	7 litres
A week	
A year	

Turning the tap off while you brush your teeth saves water. You use only 1 litre to brush your teeth per day assuming you brush your teeth twice a day. How much water do you use?

Time	Water used
A day	1 litres
A week	
A year	

1. How much water do you save by turning the tap off while you brush your teeth?

   a. In one day _____

   b. In one week _____

   c. In one year _____

Part 4: Dripping tap

Fact: Did you know that 10 drips per minute from a leaking tap wastes 3000 litres of water a year? At the rate of 10 drips per minute, how many litres of water are wasted in a day and in a week? Round your answers to the nearest tenth of a litre.

Drips per Minute	Litres Wasted		
	Day	Week	Year
5			
10			3000 litres
20			
30			

Saving Water Saves Money! #19

Multiplication, division, rounding decimals

Saving water is not only good for the environment but it is also good for your pocket book. When we save water we don't have to pay for it. It costs about $2.86 per cubic metre for water use. There are 1000 litres of water per cubic metre.

A household with two adults and two children can easily save about 55,000 litres of water in the bathroom alone, which is $157.30 a year.

Example: You replace your regular shower head that uses 20 litres per minute with a new low-flow shower head that only uses half as much water (10 litres per minute).

Problem: How much water and how much money will you save each year if the shower is used 15 times each week (52 weeks per year) and each shower lasts 10 minutes and the price of water is $2.86 per cubic metre?

Solution: **Water Savings**

15 showers per week X 52 weeks per year X (20 litres per minute – 10 litres per minute) X 10 minutes per shower = 78,000 litres

Convert litres to cubic metres 78,000 ÷ 1000 = 78 cubic metres (m^3)

Cost Savings

78 m^3 per year X $2.86 per m^3 = $223.08 per year

You would save $223.08 per year in water costs. You will actually save more than this because you will also save on the cost to heat the water!

Directions: Answer the problems below. Round to the nearest cent where necessary.

1. You replace your regular toilet that uses 16 litres per flush with a new low-volume toilet that only uses 6 litres per flush.

    a. How much water will you save each year if the toilet is flushed 6 times each day, 365 days each year?

    _____

    b. How much money will you save each year if the price of water is $2.86 per cubic metre? When converting to cubic metres - keep the two decimal points and then multiply. _____

2. You replace your regular top-loading washing machine that uses 150 litres of water per load with a new Energy Star front-loading washer that uses only 50 litres per load.

    a. How much water will you save in each year if you do 5 loads of laundry each week of the year (52 weeks per year) _____

    b. How much money will you save each year if the price of water is $2.86 per cubic metre? _____

3. Your faucet in your bathroom has been dripping for some time now. It drips at a rate of 10 drips per minute which equals about 8 litres per day.

    a. How much water will you save in one year if you fix the leaky faucet?

    _____

    b. How much money will you save in one year if water is $2.86 per cubic metre?

    _____

4. Leaving the tap running while you clean your teeth can waste 7 litres of water assuming you brush your teeth twice a day.

    a. How much water will you save in one year if you turn off the tap while you brush your teeth? _____

    b. How much money will you save in one year if water is $2.86 per cubic metre?

5. You decide that you are no longer going to have baths. You usually take 2 baths per week. Each bath is about 430 litres of water.

    a. How much water will you save in one year if you cut out your baths? _____

    b. How much money will you save in one year if water is $2.86 per cubic metre? _____

6. You usually give your child a bath every night. You decide that to save on water you will only bath her 3 times per week. You usually only fill the bath up half way which is about 215 litres of water.

    a. How much water will you save in one year if you reduce your child's bathing to 3 times per week? _____

    b. How much money will you save in one year if water is $2.86 per cubic metre? _____

Saving on Electricity #20

Order of operations, subtraction, multiplication, division, percents

Before we see how much electricity costs, we have to understand how it's measured. When you buy gas they charge you by the litre. When you buy electricity they charge you by the *kilowatt-hour (kWh).* When you use 1000 watts for 1 hour, that's a kilowatt-hour. For example:

Device wattage	Device	Hours used	kWh
light bulb	100 watts	730 hours (i.e., all month)	73 kWh
CFL light bulb	25 watts	730 hours	18 kWh

Watts and watt-hours

Watts is the measure of the rate of electrical use at any moment. For example, a laptop computer uses about 50 watts. If your device lists amps instead of watts, then just multiply the amps times the voltage to get the watts. For example:

2.5 amps x 120 volts = 300 watts

What is the difference between ***watts*** and ***watt-hours****:*

- Watts is the *rate* of use at *this instant.*
- Watt-hours is the *total energy used over time.*

How much does electricity cost?

The cost of electricity depends on where you live, how much you use, and possibly when you use it. There are also fixed charges that you pay every month no matter how much electricity you use. Check your utility bill for the rates in your area. If it's not on your bill then look it up on the utility's website.

Remember: 1000 watt-hours = 1 kilowatt-hour

Example: You replace a 60-watt incandescent light bulb with a 15-watt compact fluorescent lamp.

Problem: How much energy (kilowatt-hours) and how much money would you save each year if the light bulb is on for 4 hours each day, 300 days each year and the price of electricity is 24 cents ($0.24) per kilowatt-hour?

Solution:

Energy Savings

(60 watts – 15 watts) X 4 hours per day X 300 days per year = 54000 watt-hours

54000 watt-hours ÷ 1000 watt-hours per kilowatt-hour = 54 kilowatt-hours

Cost Savings

54 kilowatt-hours per year X $0.24 per kilowatt-hour = $12.96 per year

You would save 54 kilowatt-hours per year and save $12.96.

---

1. You buy a timer for your car block heater and now your block heater is only on for 4 hours each day instead of 12 hours.

   a. How much energy (kilowatt-hours) would you save each year if the block heater uses 650 watts and it is plugged in for 90 days each year?

   _____

   b. How much would you save if the price of electricity is 24 cents ($0.24) per kilowatt-hour? _____

2. You buy a timer for your Christmas tree lights and now the lights are only on 4 hours each day instead of 16 hours.

   a. How much energy in kilowatt-hours would you save each year if there are 60 lights, each light uses 5 watts and they are plugged in for 30 days each year? _____

   b. How much money would you save if the price of electricity is 24 cents ($0.24) per kilowatt-hour? _____

3. Refrigerators are the second-largest user of electricity in most homes. You decide to replace your old fridge with a brand new Energy Star efficient brand. Your old fridge used 1400 kWh per year. Your new energy efficient fridge uses 425 kWh per year.

   a. How much energy in kilowatt-hours do you save each year? _____

   b. How much money would you save if the price of electricity is 24 cents per kilowatt-hour? _____

   c. If the new fridge cost $975. How long would it take you to recoup your costs? _____

4. Computers can use quite a bit of energy, especially high-end computers with gaming-level graphics cards and an old CRT monitor. If you leave on your computer 24/7 – that's about 330 watts per hour.

   a. How many kilowatt- hours are being used in one year? Round your answer to the nearest kilowatt-hour. _____

   b. How much does it cost if you are paying 24 cents per kilowatt-hour? _____

c. How much energy would you save if you used it 8 hours per day? Round your answer to the nearest kilowatt-hour. _____

d. How much money would you save? _____

5. You have a computer that uses less energy, like an iMac G5-20, which uses about 105 watts per hour.

a. How many kilowatt- hours are being used in one year if you have it on all the time? Round your answer to the nearest kilowatt-hour. _____

b. How much does it cost if you are paying 24 cents per kilowatt-hour? _____

c. How much energy would you save if you turned off your computer when you weren't using it (say 16 hours per day)? Round your answer to the nearest kilowatt-hour. _____

d. How much would it cost you? _____

e. How much money would you save? _____

6. Replacing 75-watt bulbs with 15-watt bulbs reduces energy usage by 80%. Replacing them with CFLs or LED lights saves even more.

a. How many kilowatt-hours do you use if you use a 75 watt bulb for a light that is on 24/7? _____

b. How much does it cost per year if electricity is 24 cents per kilowatt-hour? _____

c. How much energy do you save in a year in kilowatt-hours by replacing a 75-watt bulb with a 5-watt bulb, for a light that's on 24/7? Round your answer to the nearest kilowatt-hour. _____

d. How much money would you save if the cost of electricity is 24 cents per kilowatt-hour? _____

e. What percentage do you save? _____

7. Your clothes dryer uses 4400 watts per use. If you did 5 loads a week:

a. How many kilowatt-hours would you use in one year? _____

b. How much does it cost to run your dryer in one year if electricity costs 24 cents per kilowatt-hour? _____

c. How much would you save if you hung your clothes to dry 25% of the time? _____

8. Exterior security lights automatically shut off after 15 minutes, so you're not paying to run them all night. You decided to buy a security light for $20. The light used to be on all night, for 12 hours each night. Now it's on for about an hour a night. You're using two 75-watt bulbs in the fixture. Round your answers to the nearest kilowatt-hour.

a. How much did it cost to have the security light on for 12 hours per day for a year assuming that electricity costs 24¢/kWh? _____

b. How much does it cost with the new automatic sensor? _____

c. How much energy do you save? _____

d. How much money do you save? _____

e. How long does it take for the security light to pay for itself? _____

Should You Replace Your Refrigerator? #21

Reading charts, multiplication, division, comparison

In most homes the refrigerator is the second-largest user of electricity (13.7%), right after heating costs. With most appliances you save energy by using them less, but you can't very well do that with your fridge. The main way to save money with your fridge is to use an efficient model. New fridges aren't just a little more efficient, they're *incredibly* more efficient. A 1986-era fridge uses 1400 kWh a year, while a post-2001 fridge uses only 500 kWh - a 64% savings. And the *most* efficient fridges use as little as 200 kWh.

Here are some sample yearly costs to run various fridges, based on an average NWT rate of electricity (24 cents per kWh)

- **$336 - Old 1976-86 fridge** (1400 kWh/yr.)
- **$120 - Post-2001 fridge** (500 kWh/yr.)
- **$102 - Post-2001 Energy Star fridge** (425 kWh/yr.)

Should you get a new fridge?

Should you replace your current fridge with a newer, more efficient model? If your fridge was made before 2001, then yes, you should probably trade it in. If it's 2001 or later, it's probably better to hold onto it until it *needs* replacing.

Let's take a look at the typical electrical savings by upgrading to a new, efficient fridge based on what year your existing fridge was made.

A fridge made in this year...	Uses about this much energy...	And replacing it with an Energy Star model saves about...
1976	1800 kWh	$329 / yr.
1976-86	1400 kWh	$233 / yr.

1987-89	950 kWh	$127 / yr.
1990-92	900 kWh	$113 / yr.
1993-00	700 kWh	$65 / yr.
2001+	500 kWh	$17 / yr.
		Assumes electricity rate of $0.24 per kWh

So now we're ready to figure out whether it makes sense to replace our current fridge.

1. **Find the annual cost of your current fridge.**
   If you no longer have the paperwork that came with your fridge you can most likely look up the brand name and find the rating on the Internet. Figure your annual cost. For example, if your fridge uses 800 kWh/yr. and you're paying 24¢/kWh, then you're paying **$192/yr.** to run it.

2. **Find the annual costs of the fridge you'd like to buy.**
   The annual kWh usage of the new fridge is printed on the yellow label on the fridge. Even if you shop online you'll still see the kWh per year listed. Once you know the annual kWh, multiply it by the amount you pay for electricity. For example, if the fridge you'd like to buy uses 425 kWh a year and you pay 24¢ kWh, then it'll cost you 425 x $0.24 = $102/yr. to run this fridge.

3. **Figure the annual savings.**
   Take the old fridge's cost minus the new fridge's cost to find the savings.

4. **Figure out how many years it will cost to pay off the fridge using your electricity savings.**
   Take the cost of your fridge – say $895 and divide it into the savings per year in electricity – say $233 per year. It will take you 3.8 years to pay off your fridge with your savings.

Directions: Answer the questions below.

1. You have an ancient refrigerator from 1985. It uses 1500 kWh per year. You decide to buy a brand new efficient model that uses 300 kWh per year.

    a. How many kWh per year will you save? _____

    b. How much does the old model cost if electricity costs 24 cents per kilowatt-hour? _____

    c. How much does the new model cost if electricity is 24 cents per kilowatt-hour? _____

    d. How much money can you save? _____

    e. How long will it take you to pay off the new fridge ($1095) with your savings from the electricity bill? _____

2. You have a fairly new fridge. It is rated at 500 kWh per year. You wonder if it is worth it to buy a brand new really efficient model that is rated at 300 kWh per year.

    a. How many kWh per year will you save? _____

    b. How much does the old model cost to run each year if electricity costs 24 cents per kilowatt-hour? _____

    c. How much will the new model cost each year if electricity is 24 cents per kilowatt-hour? _____

    d. How much money can you save? _____

    e. How long will it take you to pay off the new fridge ($995) with your savings from the electricity bill? _____

    f. Do you think it is worth it to buy a brand new fridge? _____

Heating Your Water for Laundry #22

Reading and using charts, comparisons, subtraction, multiplication, decimals

A whopping 95% of the energy used by a washing machine could be going just to heat the water. So you can save a bundle by just lowering the temperature. You could also get a front-loading machine, which uses about 63% less water than a top-loader (and therefore spend less to heat the water.)

Part 1: Here's the cost when your water is heated with electricity:

How water temperature affects the price per load.			
Wash/Rinse Setting	Electrical Use kWh/load	Cost per load 24 cents per kWh/hr	Cost per year (4 loads per week)
Hot/Warm	5.24	$1.26	$262.08
Hot/Cold	3.58	$.86	$178.88
Warm/Warm	3.58	$.86	$178.88
Warm/Cold	1.92	$.46	$95.68
Cold/Cold	0.26	$.06	$12.48

1. How much money can you save if you use the Cold/Cold setting versus the Hot/Warm setting in one year? _____

2. How much money can you save if you use the Warm/Cold setting versus the Hot/Warm setting in one year? _____

3. How much would it cost if you did 6 loads of laundry per week for each setting:

    a. Hot/Warm _____

    b. Hot/Cold _____

c. Warm/Warm _____

d. Warm/Cold _____

e. Cold/Cold _____

4. How much would it cost for the year if electricity was 20 cents per kilowatt-hour for 6 loads each week using the Hot/Warm setting? _____

5. How much would it cost per year if you used the Hot/Warm setting for 2 loads and the Warm/Cold setting for 2 loads at 24 cents per kilowatt-hour? _____

To put in perspective how wasteful hot water is, washing your clothes in hot instead of cold water for a year, uses more electricity than leaving the refrigerator door open 24 hours a day for a year. (Fridge open 24/7: 143 watts x 14.4 extra hours day x 365 days/yr. = 752 kWh.)

Part 2: List all the ways you can save money from changing the way you wash your clothes.

1. _____

2. _____

3. _____

4. _____

5. _____

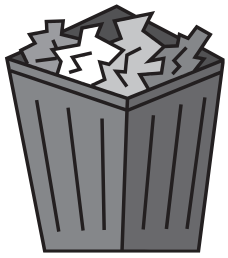
6. _____

7. _____

8. _____

Garbage, Garbage, Garbage[2] #23

Multiplication, addition, problem solving, decimals



Did you know that on the average each of us throws away about 2 kilograms (4.4 lbs) of trash every day? This does not mean that we each throw away 2 kilograms each day, but if we even out what is thrown away across everyone, it would turn out that each of us would contribute 2 kilograms of garbage.

1. How much is 2 kilograms in pounds? _____

2. On average, how much garbage does each person throw away in a week in both kilograms and pounds? Round your answers to the tenth._____
   _____

3. On average, how long does it take for each person to throw away 50 kilograms of garbage? _____

4. On average, how much garbage will a person throw away in one year in kilograms and pounds? Round your answers to the tenth. _____
   _____

5. On average, how much garbage does a household of 4 throw away in kilograms and pounds?

   a. In a week (7 days) _____ _____

   b. In a month (4 weeks) _____ _____

   c. In a year (52 weeks) _____ _____

   d. In ten years _____ _____

Answers may vary depending on how you calculated the answers.

_____

[2] http://www.pbs.org/teachers/mathline/concepts/earthday/activity1.shtm

6. On average, how long does it take for each person to throw away a ton, or 2000 pounds of garbage? _____

7. About how long would it take for a person to create 4 tons or 8,000 pounds of garbage? _____

8. So far in your lifetime, about how much garbage have you contributed? _____

What's in a Bag? #24

Multiplication, addition

Did you know that plastic bags are generally not degradable? If we throw them in a landfill and wait 200 years, or even 2000 years from now, and dig them up, most plastic bags would still be there as plastic bags.

Paper sacks are reusable and recyclable, but they cost more than plastic. It takes a 15-20 year old tree to create 700 grocery sacks! Even better is to use cloth bags for your groceries.

1. Say you used cloth bags each week at the grocery store. On average you save 14 bags per week.

    a. How many bags do you save in one year? _____

    b. How many trees would you save in one year if you don't use paper bags? _____

    c. How many trees would be saved if 30 people used cloth bags instead of paper bags in one year (at 14 bags per week)? _____

2. Some stores are charging for plastic bags. They charge 5 cents per bag.

    a. How much money would I save in one month (4 weeks) if I used cloth bags instead of plastic? On average I would need about 10 plastic bags per week. _____

    b. How much would you save in one year (52 week)? _____

    c. How much would you save in 2 years? _____

    d. How much would you save in 10 years? _____

    e. How long would it take you to recover your costs if you bought 5 cloths bags for $1.50 each? _____

3. Some stores are thinking of increasing the price per bag to 50 cents to encourage people to bring cloth bags.

    a. How much money would you save in one month (4 weeks) if you used cloth bags instead of plastic? On average you would need about 12 plastic bags per week. _____

    b. How much would you save in one year? _____

    c. How much would you save in 2 years? _____

    d. How much would you save in 10 years? _____

    e. How long would it take you to recover your costs if you bought 10 cloths bags for $2.50 each? _____

4. Your community decides to promote using cloth bags. They give each family 3 cloth bags to use at the grocery store. There are 40 families in your community. On average each family uses about 9 plastic bags per week.

    a. How many plastic bags are saved in one week if all the families use their cloth bags instead? _____

    b. How many plastic bags are saved in 1 month? _____

    c. How many plastic bags are saved in 1 year? _____

    d. Let's assume your grocery store uses paper bags. How many trees are saved in one month if each family uses their cloth bags instead of paper bags (9 per week)? _____

    e. How many trees are saved in one year? _____

    f. How many trees are saved in 10 years? _____

More Environmental Math Problems[3] #25

Problem solving, addition, multiplication, division

Problem 1: Should the Richards Manufacturing Company Use Wind Power?

Maggie wants to help the owners of the Richards Manufacturing Company become more environmentally friendly. Right now they buy gas generated power. It costs the Richards Manufacturing Company $1000 a month for its power.

Maggie has helped them to find a company that sells wind power. For each wind generator that they install, the company will save $150 per month on their power bill. But it will cost $5,400 to buy each wind generator.

If the Richards Manufacturing Company buys 3 wind generators, how many years will it take it to recover the amount of money it spent on converting to wind power?

To help you solve this problem, think about these things:

1. How much will the company save each month with 3 wind generators?
   _____

2. How much will the company save each year with 3 wind generators?
   _____

Your Final Answer.

3. How many years will it take the Richards Manufacturing Company to recover the amount of money it spent on changing to wind power? _____

Think About It...

4. Do you think this is a good decision for the Richards Manufacturing Company to make? Explain your answer.
   _____
   _____

[3] From Maggie's Earth Adventures LLC 2001 http://www.missmaggie.org/mission2_parts/eng/teaching/mathproblem.pdf

Problem 2: What Car Should Laura Buy?

Maggie and her friend Laura go car shopping. They find a car with an internal combustion engine (one that burns fossil fuel, gasoline). The car sells for $18,660. It will cost Laura $115 each month to buy fuel and maintain this car.

Laura and Maggie also look at a fuel cell car. This car that is cleaner for the environment, costs $22,400. It will cost Laura $65 each month to run and maintain this car.

If Laura is going to keep her new car for 5 years, how much will each car cost to buy and run over the 5 year period? Which car should Maggie advise Laura to buy?

To help you solve this problem, think about these things.

1. How much will the internal combustion engine car cost to buy and run for five years? _____

2. How much will the fuel cell car cost to buy and run for five years?
   _____

Your Final Answer...

3. Which car is a better buy? _____

Think About It...

4. Which car should Maggie advise Laura to buy? Explain your answer.
   _____
   _____
   _____

Environmental Math Review #26

Part 1: Answer the questions below. You may need to look back on this section for examples and formulas.

1. The average shower uses 20 litres of water a minute. How much water would you use for a:
   a. 2 minute shower _____
   b. 4 minute shower _____
   c. 5 minutes shower _____
   d. 8 minute shower _____
   e. 10 minute shower _____
   f. 12 minute shower _____

2. You replace your regular shower head that uses 20 litres per minute with a new low-flow shower head that uses only half as much water (10 litres per minute).

   a. How much water and how much money will you save each year if the shower is used 10 times each week (52 weeks per year) and each shower lasts 10 minutes and the price of water is $2.86 per cubic metre ($m^3$)?

   _____

   _____

   b. How much water and how much money will you save each year if the shower is used 15 times each week (52 weeks per year) and each shower lasts 5 minutes and the price of water is $2.86 per cubic metre ($m^3$)?

   _____

   _____

3. Replacing 75-watt bulbs with 15-watt bulbs reduces energy usage by 80%. Replacing them with CFLs or LED lights saves even more.

   a. How much do you save in a year in kilowatt-hours by replacing a 75-watt bulb with a 15-watt bulb, for a light that's on 24/7? Round your answer to the nearest kilowatt-hour. _____

   b. How much money would you save if the cost of electricity is 24 cents per kilowatt-hour? _____

   c. What percentage do you save? _____

4. You have a fairly new fridge. It is rated at 650 kWh per year. You wonder if it is worth it to buy a brand new really efficient model that is rated at 275 kWh per year.

   a. How many kWh per year will you save? _____

   b. How much does the old model cost if electricity costs 24 cents per kilowatt-hour? _____

   c. How much does the new model cost if electricity is 24 cents per kilowatt-hour? _____

   d. How much money can you save? _____

   e. How long will it take you to pay off the new fridge ($1095) with your savings from the electricity bill? _____

   f. Do you think it is worth it to buy a brand new fridge? _____

How water temperature affects the price per load.			
Wash/Rinse Setting	Electrical Use kWh/load	Cost per load 24 cents per kWh/hr	Cost per year (4 loads per week)
Hot/Warm	5.24	$1.26	$262.08
Hot/Cold	3.58	$.86	$178.88
Warm/Warm	3.58	$.86	$178.88
Warm/Cold	1.92	$.46	$95.68
Cold/Cold	0.26	$.06	$12.48

5. How much would it cost if you did 2 loads of laundry per week for each setting for one year:

   a. Hot/Warm _____

   b. Hot/Cold _____

   c. Warm/Warm _____

   d. Warm/Cold _____

   e. Cold/Cold _____

6. How much would it cost if electricity was 30 cents per kilowatt-hour for 5 loads using the Hot/Warm setting? _____

Part 2: Solve the problem below:

Energy Saving Windows?

The Arctic Food Company spends $20,000 a year on heating. They want to put in new windows that will help save money on this part of their fuel bill. The new windows will cost $8,000 in total.

By adding these new windows, the company will save 10% a year on their heating. How long will it take the Arctic Food Company to recover the amount of money spent on the new windows by their savings on their heating bills?

To help you solve this problem, think about this.

1. How much is 10% of the current power bill? _____
2. How much did the windows cost? _____

Your Final Answer...

3. How long will it take the Arctic Food Company to recover the amount of money it spent on the new windows by its savings of 10% each year of their heating bill?
   _____

Think About It....

4. If you were the president of the Arctic Food Company, would you choose to install the new windows? Explain your answer.

_____

_____

_____

Environmental Math Projects

1. According to World Health Organization estimates in 2006, 1.1 billion people do not have access to improved sources of drinking water, negatively impacting almost every aspect of daily life. Nearly everywhere around the globe, collecting water falls to the task of women and children, who often have to carry water for several miles a day. In addition to the time and energy spent on water collection, there are many consequences resulting from unsafe and unsanitary conditions. Although most citizens in Canada generally have reliable access to clean water, conditions such as drought, pollution, increased population and unequal distribution of natural resources threaten our water supply. This makes it necessary for each of us to conserve water and find ways to reduce our daily water usage.

    a. Research ways to reduce your water use.

    b. Present your finding to your class and to others in the community.

    c. Implement your research in your home.

2. Develop some posters for your community about reducing water use. On the poster give 5 tips for reducing water and show people how they can save money too!

3. Start a recycling program at your learning centre or school.

4. Write a letter to your local grocery store and ask them to give out free cloth bags for one week. Then encourage people in your community to use them!

5. Look at your electricity bill. Try to reduce your kWh in the next month. Calculate how much money you save.

Paying Bills

In this section you will be required to do a variety of math skills:

- Addition
- Subtraction
- Multiplication
- Division
- Estimation
- Decimals
- Metric measurement and conversion
- Averages
- Rounding
- Problem solving
- Analysing data

This section has the following worksheets:

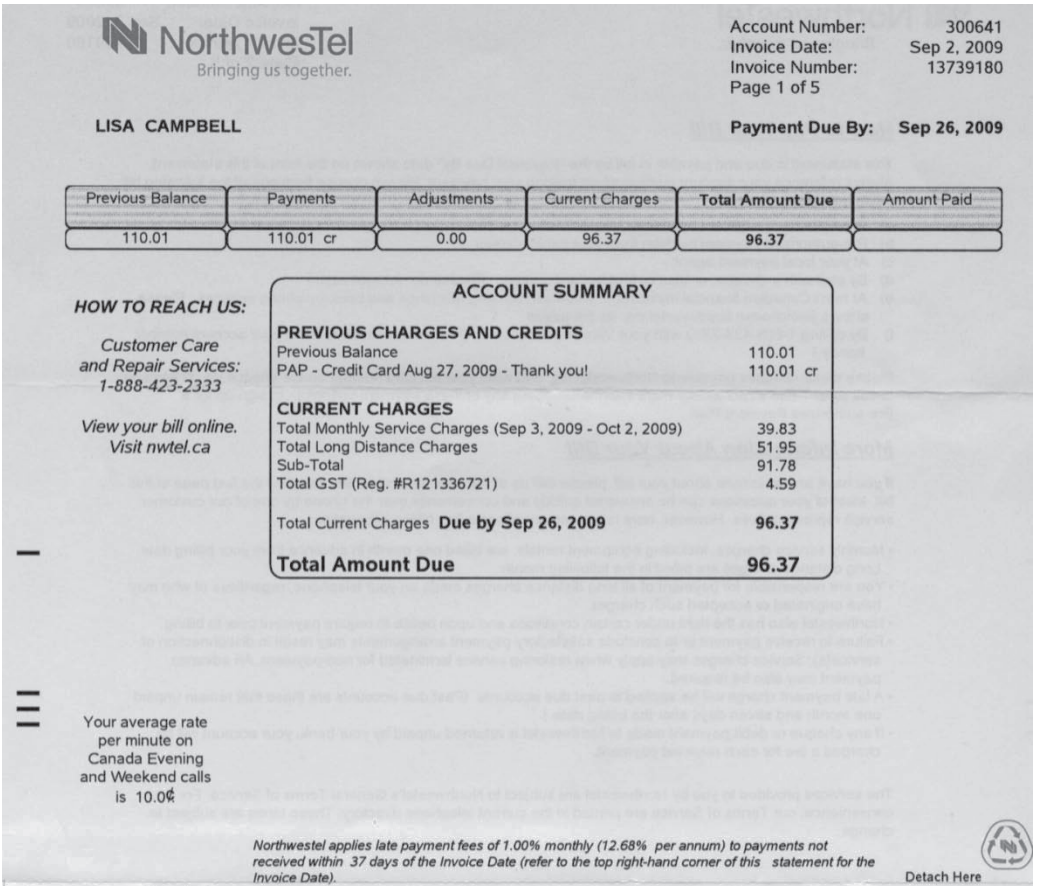
- Worksheet #27: Telephone Bill
- Worksheet #28: Northland Utilities Bill
- Worksheet #29: City of Yellowknife Utilities Bill
- Worksheet #30: Visa Bill
- Worksheet #31: Understanding How Mortgages Work
- Worksheet #32: Analyzing Interest on Your Mortgage
- Worksheet #33: Closing Costs
- Worksheet #34: Paying Bills Review

It also has a page for math projects on this topic.

Telephone Bill #27

Anaylsing data, multiplication, percents

Figuring out your telephone bill can be tricky. Here is an example of a bill.



NorthwesTel
Bringing us together.

Account Number: 300641
Invoice Date: Sep 2, 2009
Invoice Number: 13739180
Page 1 of 5

LISA CAMPBELL

Payment Due By: Sep 26, 2009

Previous Balance	Payments	Adjustments	Current Charges	Total Amount Due	Amount Paid
110.01	110.01 cr	0.00	96.37	**96.37**	

HOW TO REACH US:

Customer Care and Repair Services: 1-888-423-2333

View your bill online. Visit nwtel.ca

ACCOUNT SUMMARY

PREVIOUS CHARGES AND CREDITS	
Previous Balance	110.01
PAP - Credit Card Aug 27, 2009 - Thank you!	110.01 cr
CURRENT CHARGES	
Total Monthly Service Charges (Sep 3, 2009 - Oct 2, 2009)	39.83
Total Long Distance Charges	51.95
Sub-Total	91.78
Total GST (Reg. #R121336721)	4.59
Total Current Charges **Due by Sep 26, 2009**	**96.37**
Total Amount Due	**96.37**

Your average rate per minute on Canada Evening and Weekend calls is 10.0¢

Northwestel applies late payment fees of 1.00% monthly (12.68% per annum) to payments not received within 37 days of the Invoice Date (refer to the top right-hand corner of this statement for the Invoice Date).

Detach Here

ACCOUNT DETAILS

Monthly Service Charge Details

For [redacted]

	Period	Quantity	Amount
Local Basic Access			
*Telephone Line - Residential	(Sep 3 - Oct 2)	1	31.33
Optional Features			
*Voice Mail - Basic	(Sep 3 - Oct 2)	1	6.95
Long Distance Service - Residential	(Sep 3 - Oct 2)	1	0.00
Directory			
Directory Listing - Additional Listing - Residential	(Sep 3 - Oct 2)	1	1.55
Sub-Total (867) 873-8030			**39.83**

For 4531489215

	Period	Quantity	Amount
Optional Features			
Long Distance Service - Residential	(Sep 3 - Oct 2)	1	0.00
Special Billing Calling Card	(Sep 3 - Oct 2)	1	0.00
Sub-Total 4531489215			**0.00**

Part 1: Answer the following questions by using the information on the previous page.

1. What is the account number? _____
2. What is the invoice date? _____
3. How much are the total monthly service charges? _____
4. For what dates are the total monthly service charges applied to? _____
5. Outline the monthly service charge details (charge and then cost)

    a. _____ _____

    b. _____ _____

    c. _____ _____

6. How much were the total long distance charges? _____
7. What is the sub-total? _____
8. How much is the GST? _____
9. How much in total does this person owe? _____
10. When is the payment due? _____

Part 2: Look at the information below. Northwestel has a savings plan called *Freedom After Hours*. Answer the questions below about this plan.

Northwestel *Freedom After Hours* Savings Plan

Evening and weekend rates can be as low as $0.04/minute when you use 600 minutes!
You pay only $0.10/minute for the first 250 minutes and the rest are free! (Up to a maximum of 600 minutes.)

Plan Details:

- Direct-dialed evening and weekend calls made within Canada:
  - Up to 250 minutes are rated at $0.10/minute
  - 251 to 600 minutes at no charge
  - Over 600 minutes are rated at $0.10/minute
- Other direct-dialed and calling card calls are discounted by 15% off the regular rates.

1. How much do you pay per minute for this plan if you talk for 250 minutes long distance? _____

2. How much would you pay for 250 minutes for one month? _____
   How much would the GST be (5%)? _____

3. How much would you pay if you talked for 400 minutes in one month?
   _____

4. How much would that work out to be per minute? _____

5. How much would you pay if you talked long distance for 550 minutes one month?
   _____

6. How much would that work out to be per minute? _____

7. You talk for 700 minutes long distance in one month:

   a. How much would it cost? _____

   b. How much per minute does it work out to be? _____

   c. How much would the GST be (5%)? _____

   d. How much would it cost altogether? _____

8. You talk for 850 minutes long distance in one month:

   a. How much would it cost? _____

   b. How much per minute does it work out to be? _____

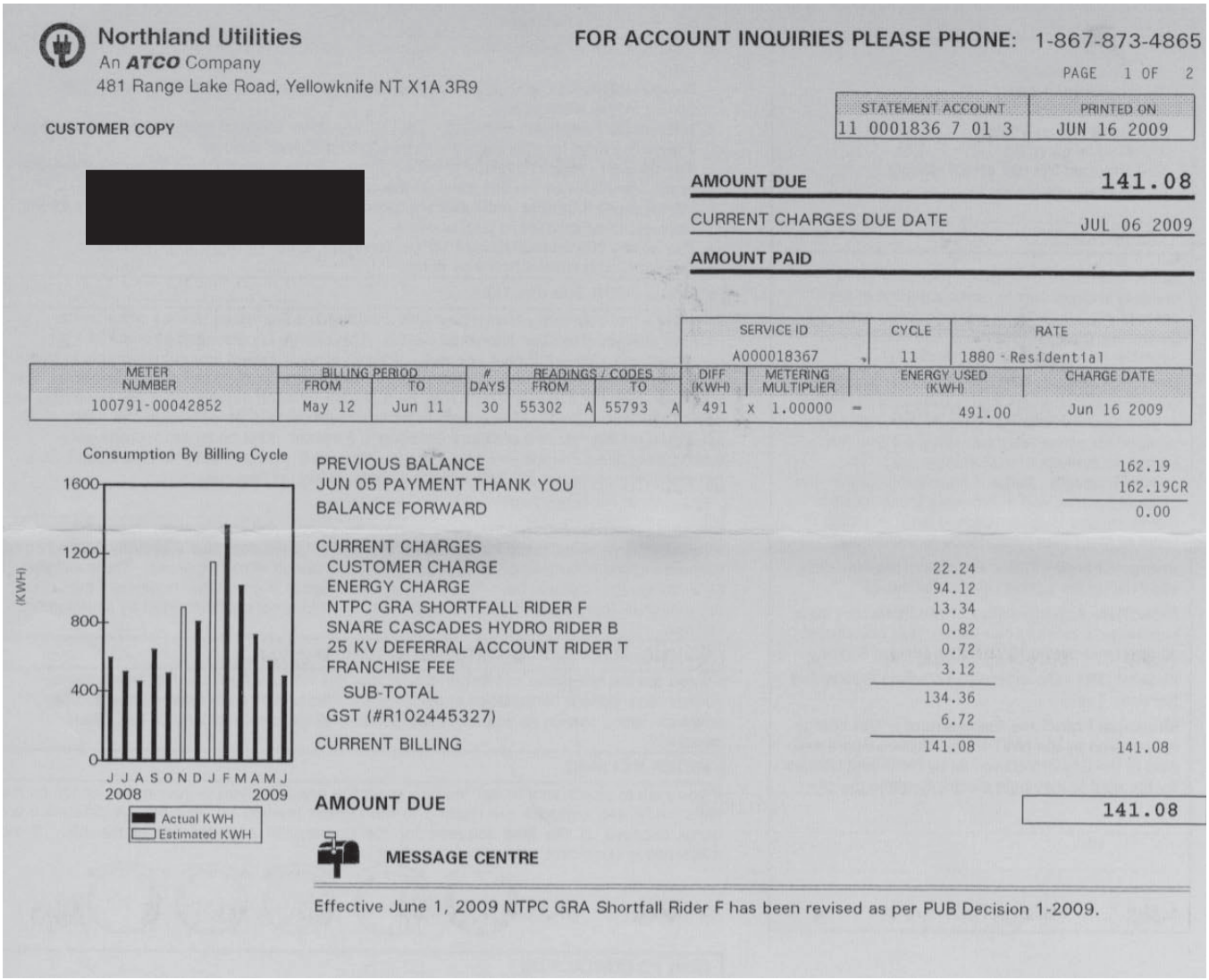
   c. How much would the GST be (5%)? _____

   d. How much would it cost altogether? _____

Northland Utilities Bill #28

Analysing data, metric conversion, multiplication, division

Let's examine a bill from Northland Utilities. Before we start we need to understand what a kWH is. When you buy gas they charge you by the litre. When you buy electricity they charge you by the *kilowatt-hour (kWh).* When you use 1000 watts for 1 hour, that's a kilowatt-hour.



Northland Utilities
An ATCO Company
481 Range Lake Road, Yellowknife NT X1A 3R9

FOR ACCOUNT INQUIRIES PLEASE PHONE: 1-867-873-4865

PAGE 1 OF 2

CUSTOMER COPY

STATEMENT ACCOUNT	PRINTED ON
11 0001836 7 01 3	JUN 16 2009

[redacted]

AMOUNT DUE 141.08

CURRENT CHARGES DUE DATE JUL 06 2009

AMOUNT PAID

SERVICE ID	CYCLE	RATE
A000018367	11	1880 - Residential

METER NUMBER	BILLING PERIOD FROM	BILLING PERIOD TO	# DAYS	READINGS / CODES FROM	READINGS / CODES TO	DIFF (KWH)	METERING MULTIPLIER	ENERGY USED (KWH)	CHARGE DATE
100791-00042852	May 12	Jun 11	30	55302 A	55793 A	491	x 1.00000 =	491.00	Jun 16 2009

Consumption By Billing Cycle

PREVIOUS BALANCE		162.19
JUN 05 PAYMENT THANK YOU		162.19CR
BALANCE FORWARD		0.00
CURRENT CHARGES		
CUSTOMER CHARGE	22.24	
ENERGY CHARGE	94.12	
NTPC GRA SHORTFALL RIDER F	13.34	
SNARE CASCADES HYDRO RIDER B	0.82	
25 KV DEFERRAL ACCOUNT RIDER T	0.72	
FRANCHISE FEE	3.12	
SUB-TOTAL	134.36	
GST (#R102445327)	6.72	
CURRENT BILLING	141.08	141.08

AMOUNT DUE 141.08

MESSAGE CENTRE

Effective June 1, 2009 NTPC GRA Shortfall Rider F has been revised as per PUB Decision 1-2009.

1. How much is owed on this bill? _____
2. When is it due? _____
3. What is the billing period? _____
4. How much does this customer pay for the customer charge? _____
5. How much does this customer pay for his energy use? _____
6. How much does this customer pay in other charges? _____
7. How much is the GST? _____
8. How much was last month's charge? _____
9. How many kWH were used during this billing period? _____
10. Calculate how much it costs for one kWH using the energy charge on the bill. (to the nearest cent) _____
11. Now calculate how much it costs per kWH using the total bill (all the charges)? _____
12. Look at the chart on the left hand side of the bill.
    a. How many times did Northland Utilities estimate the KWH over the one year period? _____
    b. What month did the customer use the most amount of power? _____
    c. How much would their energy cost have been in February assuming they used about 1400 KWH and the price was 19 cents per KWH? _____

d. How much would their energy cost have been in December assuming they used about 800 KWH and the price was 19 cents per KWH?

_____

e. How much would this customer save if they cut down their use next year by 10% in February? _____

f. How much would this customer save if he/she cut down his/her use next year by 20% in February? _____

g. Is it worth it to this customer to cut down on his/her energy use? _____ Why or why not? _____

_____

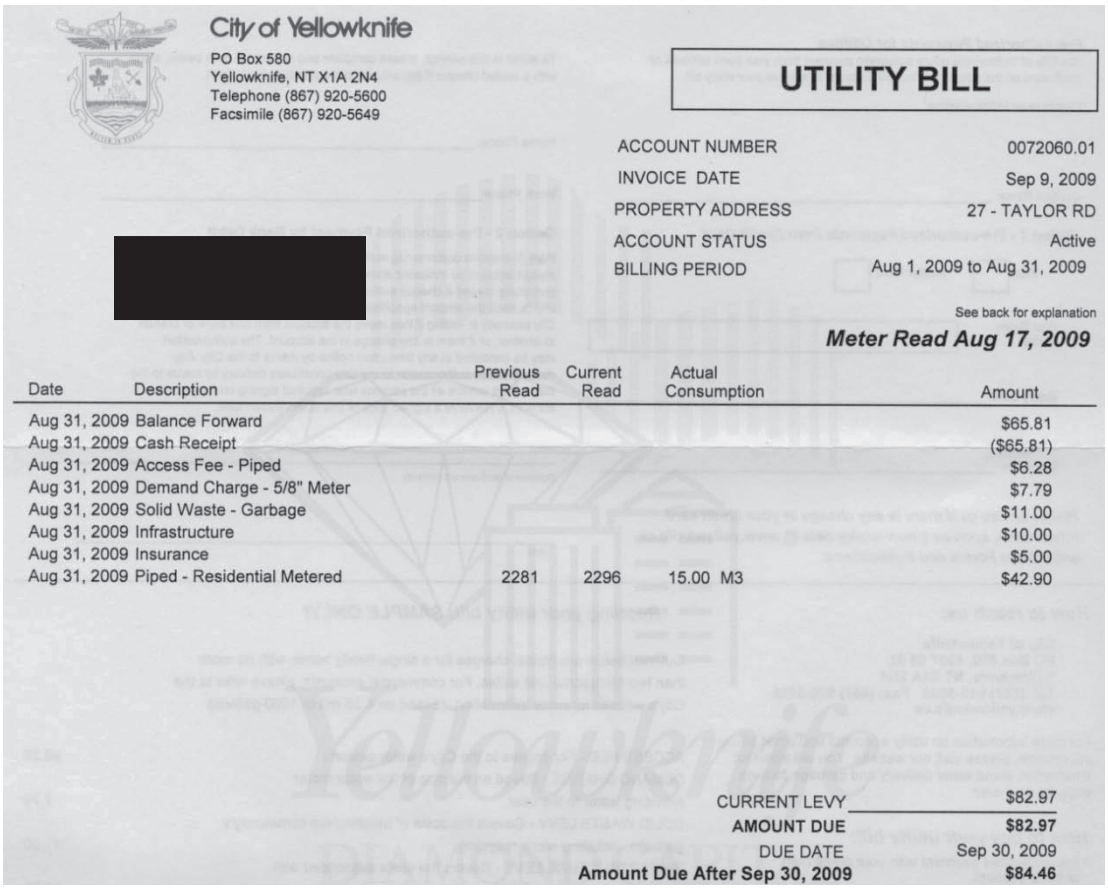
City of Yellowknife Utility Bill #29

Analysing data, percentage, multiplication, division

Let's examine a utility bill from the City of Yellowknife. It has a several different charges on it.

- **Access Fee** – for access to the city's water system
- **Demand Charge** – based on the size of the water meter
- **Sold Waste Levy** – covers the cost of handling the community's garbage
- **Infrastructure Levy** – covers the costs associated with water and sewer upgrades
- **Insurance Program** – insurance to help cover costs if there is damage to outside lines to your house
- **Consumption** – cost of the water used

The water usage is measured in m^3 – cubic metres. One m^3 is equal to 1000 litres of water.



City of Yellowknife
PO Box 580
Yellowknife, NT X1A 2N4
Telephone (867) 920-5600
Facsimile (867) 920-5649

UTILITY BILL

[redacted]

ACCOUNT NUMBER	0072060.01
INVOICE DATE	Sep 9, 2009
PROPERTY ADDRESS	27 - TAYLOR RD
ACCOUNT STATUS	Active
BILLING PERIOD	Aug 1, 2009 to Aug 31, 2009

See back for explanation

Meter Read Aug 17, 2009

Date	Description	Previous Read	Current Read	Actual Consumption	Amount
Aug 31, 2009	Balance Forward				$65.81
Aug 31, 2009	Cash Receipt				($65.81)
Aug 31, 2009	Access Fee - Piped				$6.28
Aug 31, 2009	Demand Charge - 5/8" Meter				$7.79
Aug 31, 2009	Solid Waste - Garbage				$11.00
Aug 31, 2009	Infrastructure				$10.00
Aug 31, 2009	Insurance				$5.00
Aug 31, 2009	Piped - Residential Metered	2281	2296	15.00 M3	$42.90

CURRENT LEVY	$82.97
AMOUNT DUE	**$82.97**
DUE DATE	Sep 30, 2009
Amount Due After Sep 30, 2009	**$84.46**

Directions: Answer the questions below about the utilities bill on the previous page.

1. What is the invoice date? _____
2. What is the billing period? _____
3. When was the meter read? _____
4. When is the due date? _____
5. How much does it cost each month for the Access Fee? _____
6. How much does it cost each month for the Demand Charge? _____
7. How much does it cost for garbage removal? _____
8. What was the total cost of the bill? _____
9. How much more will the customer have to pay if they do not pay on the due date? _____
10. What percentage is that (rounded to the nearest tenth)? _____
11. How much water did this customer use in cubic metres? _____
12. How much did this customer use in litres? _____
13. Calculate how much it cost for one m^3? _____
14. If the customer used 18 m^3 – how much would it cost? _____
15. If the customer dropped their water usage by 5 m^3 – how much would he/she save in one month? _____ One year (assuming he/she uses the same amount each month)? _____

Visa Bill #31

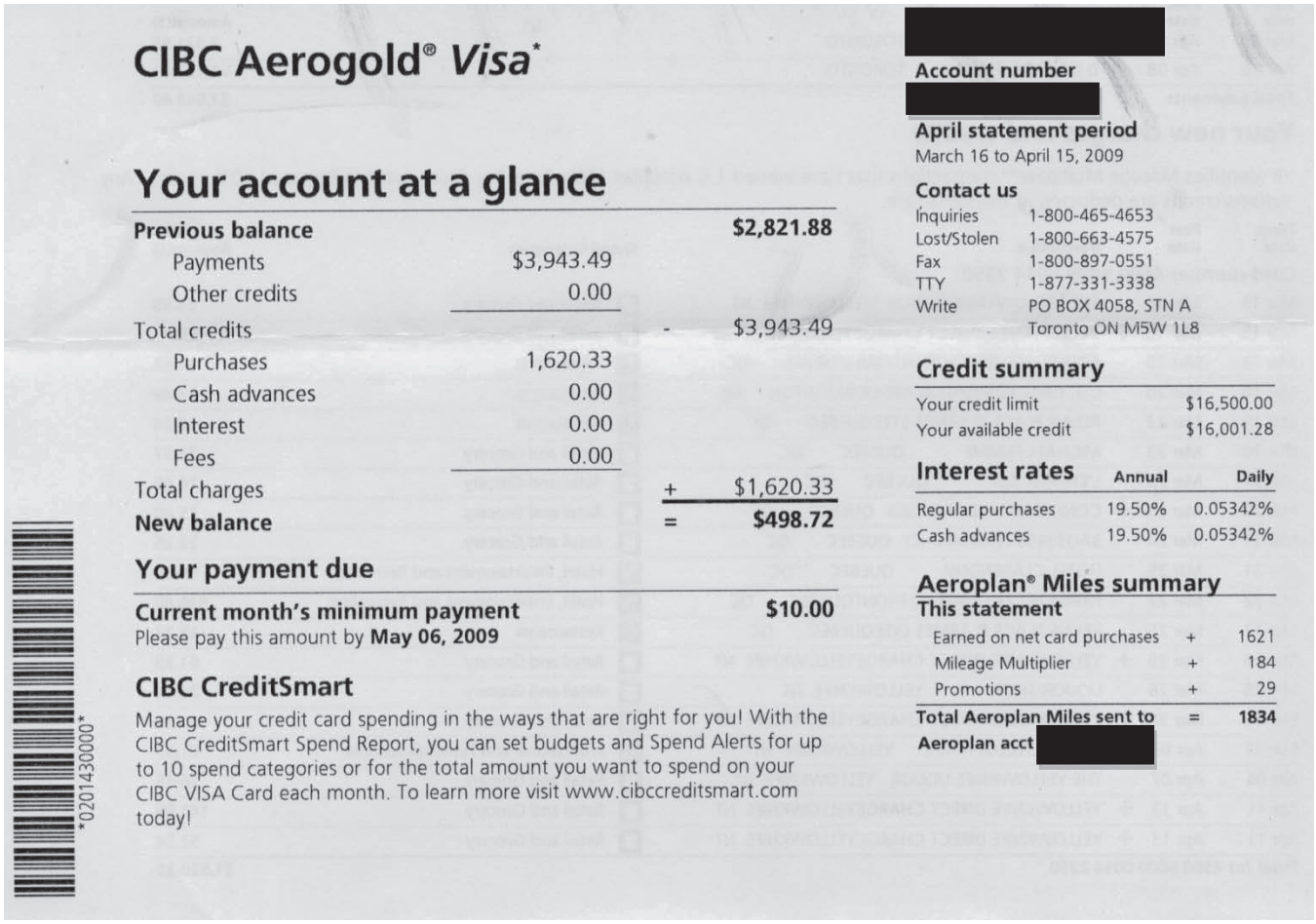
Analysing data, division

Credit cards are plastic cards issued by a bank or other business allowing the holder of the card to purchase goods and services without using cash, also called "buying on credit." They allow you to purchase things that you may not currently have the money to buy.

When you use a credit card, the credit company that issued the credit card pays the store. Later, you will get a bill in the mail from your credit card company for the amount you purchased. At that time, you can either pay the bill in full, or only pay a minimum amount, and wait till later to finish paying. If you wait till later, you will owe the credit card company interest on the amount that you do not pay. They often charge very high rates of interest for money that is not paid.

Credit card issuers usually waive interest charges if the balance is paid in full each month, but typically will charge full interest on the entire outstanding balance from the date of each purchase if the total balance is not paid.

For example, if a user had a $1,000 transaction and repaid it in full within this grace period, there would be no interest charged. If, however, even $1.00 of the total amount remained unpaid, interest would be charged on the $1,000 from the date of purchase until the payment is received.



CIBC Aerogold® *Visa**

[redacted]
Account number
[redacted]
April statement period
March 16 to April 15, 2009

Contact us

Inquiries	1-800-465-4653
Lost/Stolen	1-800-663-4575
Fax	1-800-897-0551
TTY	1-877-331-3338
Write	PO BOX 4058, STN A Toronto ON M5W 1L8

Your account at a glance

Previous balance			**$2,821.88**
Payments	$3,943.49		
Other credits	0.00		
Total credits		-	$3,943.49
Purchases	1,620.33		
Cash advances	0.00		
Interest	0.00		
Fees	0.00		
Total charges		+	$1,620.33
New balance		=	**$498.72**

Your payment due

Current month's minimum payment **$10.00**
Please pay this amount by **May 06, 2009**

CIBC CreditSmart

Manage your credit card spending in the ways that are right for you! With the CIBC CreditSmart Spend Report, you can set budgets and Spend Alerts for up to 10 spend categories or for the total amount you want to spend on your CIBC VISA Card each month. To learn more visit www.cibccreditsmart.com today!

0201430000

Credit summary

Your credit limit	$16,500.00
Your available credit	$16,001.28

Interest rates

	Annual	Daily
Regular purchases	19.50%	0.05342%
Cash advances	19.50%	0.05342%

Aeroplan® Miles summary

This statement

Earned on net card purchases	+	1621
Mileage Multiplier	+	184
Promotions	+	29
Total Aeroplan Miles sent to Aeroplan acct [redacted]	=	**1834**

Directions: Answer the questions below using the Visa statement on the previous page.

1. What was the previous balance? _____
2. How much did the customer pay off? _____
3. How much did this customer over pay? _____
4. What is the billing period? _____
5. What are the total charges for this month? _____
6. What is the new balance? _____

7. How much is the minimum payment? _____

8. What is this customer's credit limit? _____

9. What is this customer's available credit? _____

10. What is the annual interest rate? _____

11. What is the daily interest rate? _____

12. This Visa card allows you to collect areoplan miles. How many miles did this customer collect this month? _____

13. If this customer chooses to pay only $200 on this month's bill, on what amount will he/she be charged interest? _____

Understanding How Mortgages Work #32

Using formulas, positive and negative numbers, exponents, multiplication, division

Tom wants to buy a house sometime soon. He knows that real estate is a reasonably safe way to build wealth. It is slow, but generally low risk. He will come across many choices of **mortgages**. A mortgage is just a fancy word for the process of borrowing money to buy a house.

The bank actually buys the house and keeps the title deed. You agree to pay off the borrowed amount each month, usually over a period of 20 to 30 years. When you have finally paid it off, you get the title deed, meaning you now fully own the house.
If you stop paying for any reason, the bank has the right to sell the house. After all, they own most of it.

Example:

Tom's house will cost $300,000. He needs to pay a **deposit** of 10% and will pay the remaining 90% over 30 years at 8% per annum. So he will need to pay a deposit of 10% of $300,000 = $30,000. The remaining amount he owes is $270,000.

Monthly Payments

The formula for the amount Tom has to pay each month is

$$\text{(A)}\quad \text{Payment} = \frac{L \times r}{1 - (1 + r)^{-n}}$$

A = amount to pay each month
L = loan amount (or **principal**)
r = interest rate (per year as a decimal - or divide by 12 to get the rate per month)
n = number of payments (years x 12)

So for this case:

$L = 270{,}000$
$r = 8\%\ (.08) \div 12 = 0.0066667$
$n = 30 \times 12 = 360$

$$\text{Payment} = \frac{L \times r}{1 - (1 + r)^{-n}}$$

$$= \frac{270000 \times 0.08/12}{1 - (1 + 0.08/12)^{-360}}$$

$$= \$1981.16$$

So Tom needs to find just under $2000 per month to buy his house.

Directions: Fill in the chart below using the information above. The first one is done for you. Your answers may be out by a few pennies depending on how many decimal points you left in during your calculations.

Cost of House	**Down Payment 10%**	**Interest Rate**	**Years to Pay**	**Monthly Mortgage Payments**
$350,000	$35, 000	4.99%	25	$1839.62
$200,000		3.59%	20	
150,000		5.25%	15	
400,000		3.99%	30	
375,000		4.5%	20	
100,000		5.5%	15	

Analysing Interest on Your Mortgage #33

Analysing charts, addition, subtraction

Look at the chart below and on the next page. This shows a $100,000 mortgage for a term of 36 months at a 4.35% interest rate compounded semi annually.

Answer the questions on the next page.

Month	Days	Interest Payments	Principal Payments	Extra Payments	Balance
1	Jan - 31	$366	$179	$0	$99,821
2	Feb - 28	$330	$215	$0	$99,606
3	Mar - 31	$365	$180	$0	$99,425
4	Apr - 30	$352	$193	$0	$99,233
5	May - 31	$363	$182	$0	$99,051
6	Jun - 30	$351	$194	$0	$98,857
7	Jul - 31	$362	$183	$0	$98,673
8	Aug - 31	$361	$184	$0	$98,490
9	Sep - 30	$349	$196	$0	$98,293
10	Oct - 31	$360	$185	$0	$98,108
11	Nov - 30	$348	$198	$0	$97,911
12	Dec - 31	$359	$187	$0	$97,724
13	Jan - 31	$358	$187	$0	$97,537
14	Feb - 28	$323	$223	$0	$97,314
15	Mar - 31	$356	$189	$0	$97,125
16	Apr - 30	$344	$201	$0	$96,924
17	May - 31	$355	$190	$0	$96,734
18	Jun - 30	$343	$202	$0	$96,531
19	Jul - 31	$353	$192	$0	$96,340
20	Aug - 31	$353	$192	$0	$96,147
21	Sep - 30	$341	$204	$0	$95,943
22	Oct - 31	$351	$194	$0	$95,749
23	Nov - 30	$339	$206	$0	$95,543
24	Dec - 31	$350	$195	$0	$95,348
25	Jan - 31	$349	$196	$0	$95,152

26	Feb - 28	$315	$231	$0	$94,921
27	Mar - 31	$348	$198	$0	$94,724
28	Apr - 30	$336	$210	$0	$94,514
29	May - 31	$346	$199	$0	$94,315
30	Jun - 30	$334	$211	$0	$94,104
31	Jul - 31	$345	$201	$0	$93,903
32	Aug - 31	$344	$201	$0	$93,702
33	Sep - 30	$332	$213	$0	$93,489
34	Oct - 31	$342	$203	$0	$93,286
35	Nov - 30	$331	$215	$0	$93,072
36	Dec - 31	$341	$204	$0	$92,867
Totals	**1095 days**	**$12,493**	**$7,133**	**$0**	**$92,867**

Directions: Answer the questions using the chart above.

1. How much did this person pay off on their house after the end of the term?
   _____

2. How much did they pay in interest? _____

3. How much do they still owe on the house? _____

4. How much more interest is paid than principal? _____

5. How much had this person paid on their house after 2 years on the principal amount? _____

6. How much interest did they pay after 2 years? _____

7. Are you shocked by how much interest is paid? _____

8. How do you think this person could pay off her mortgage faster?
   _____

Closing Costs #34

Percents, addition, multiplication

It's important to remember that there are additional costs to purchasing a new home, including land transfer taxes, lawyer/notary fees, and moving expenses, to name just a few. You will need to budget a minimum of 1.5% of the purchase price.

Example: Sarah buys a house for $275,000.

Problem: How much can she expect to pay in closing costs?

Solution:

Change 1.5% to a decimal	1.5/100 = .015
Multiply the purchase price by .015	275,000 x .015 = $4125

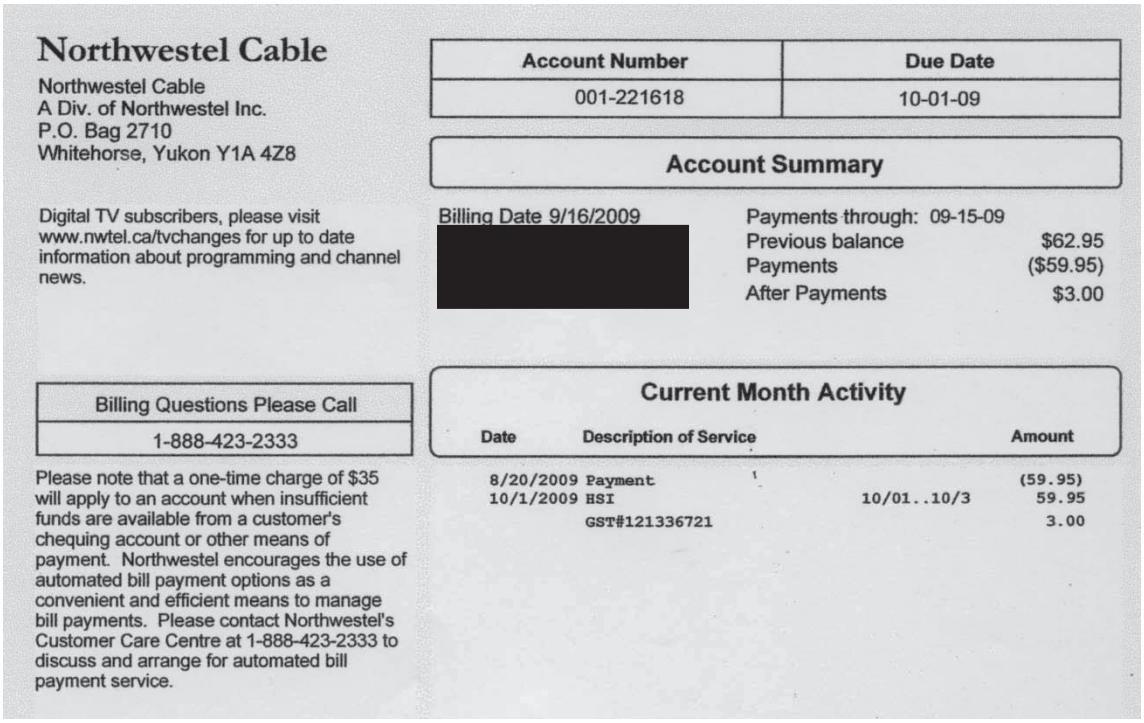
Sarah should expect to pay around $4125 for closing costs.

Directions: Fill in the following chart with the correct information.

Cost of House	Closing Costs	Total Paid
$459,000		
$258,000		
$158,000		
$580,000		
$399,000		
$499,000		
197,000		

Paying Bills Review #35

1. Look at the bill below and then answer the questions.



Northwestel Cable

Northwestel Cable
A Div. of Northwestel Inc.
P.O. Bag 2710
Whitehorse, Yukon Y1A 4Z8

Account Number	Due Date
001-221618	10-01-09

Account Summary

Digital TV subscribers, please visit www.nwtel.ca/tvchanges for up to date information about programming and channel news.

Billing Date 9/16/2009 [redacted]

Payments through: 09-15-09	
Previous balance	$62.95
Payments	($59.95)
After Payments	$3.00

Billing Questions Please Call
1-888-423-2333

Please note that a one-time charge of $35 will apply to an account when insufficient funds are available from a customer's chequing account or other means of payment. Northwestel encourages the use of automated bill payment options as a convenient and efficient means to manage bill payments. Please contact Northwestel's Customer Care Centre at 1-888-423-2333 to discuss and arrange for automated bill payment service.

Current Month Activity

Date	Description of Service		Amount
8/20/2009	Payment		(59.95)
10/1/2009	HSI	10/01..10/3	59.95
	GST#121336721		3.00

a. What is the billing date? _____

b. When is the due date? _____

c. What was the previous balance? _____

d. Was the whole bill paid for? _____

e. How much is still owed from last month? _____

f. What is the current balance? _____

g. When was the last payment made? _____

h. How much is charged to the customer if there is insufficient funds in their account for the monthly bill? _____

2. Sue's house will cost $250,000. She needs to pay a **deposit** of 10% and will pay the remaining 90% over 30 years at 4.8% per annum.

   a. How much does Sue need for a down payment? _____

   b. How much will she need to get a mortgage for? _____

   c. What will her monthly payments be? _____

The formula for the amount Sue has to pay each month is

$$\text{(A) Payment} = \frac{L \times r}{1 - (1 + r)^{-n}}$$

A = amount to pay each month
L = loan amount (or **principal**)
r = interest rate (per year as a decimal - or divide by 12 to get the rate per month)
n = number of payments (years x 12)

3. Sue will also need to pay closing costs. Closing costs are usually 1.5% of the total sale of the house. How much will she need to pay in closing costs?

   _____

4. Jen is considering two mortgage options for her $200,000 house.

   Option 1: 15 year plan

   - 15 year rate 4.99%
   - Monthly payment $1580.58
   - Total payment $284,498

   Option 2: 30 year plan

   - 30 year rate 5.25%
   - Monthly payment $1104.41
   - Total payment $397,586

a. How much more each month will she pay if she opts for the 15 year plan?
_____

b. How much will she pay in interest for the 15 year plan? _____

c. How much will she pay in interest for the 30 year plan? _____

d. How much more will she pay in interest for the 30 year plan? _____

e. What do you think Jen should do? _____

Paying Bills Math Projects

1. Do some comparison shopping for credit cards. Find the best interest rate.

2. Simulate a house buying scenario in your community. Use actual advertisements for houses and for housing loans. Get students to find the best loan deals. Which is best - fixed or variable interest? What will they pay in total for the house? What will it be worth at the end of the loan period? How much will they have paid after 10 years and how much will they own by then?

3. Paying extra on your mortgage is a good idea. It can shave years off your loan and save tens of thousands of dollars in interest charges. For example: If you increased your mortgage payments by just $170 from $830 to $1,000, you could:

   - **Save almost $48,000** in interest over the entire amortization period of your mortgage
   - Own your home about **8 years sooner**

   Find out some other ways you can pay down your loan more quickly without being penalized.

4. Do you have a cell phone? Take a look at your bill. What are you actually paying for? Can you cut down on your costs? Is there a better plan for you?

Answer Key

Area: Home Decorating #1

Part 1

1) 208 square feet	2) 229 tiles	3) $1051.11	4) 460 square feet
5) 506 square feet	6) $1614.14	7) 172 square feet	8)189 square feet
9) 47 pieces	10) $195.05	11) 252 square feet	12) 2 gallons
13) $91.78	14) $2250	15) $5202.08	

Part 2

1) 204 square feet	2) 132 square feet	3) $1179.02	4) 30 square feet
5) $194.37	6) 48 square feet	7) $104.54	8) 72, 1
9) $2883.71	10) $8085.79		

Area: More on Home Decorating #2

1) 88 square feet	2) $308.79	3) 28.3 square feet	4) 12.6 square feet
5) 30 square feet	6) $81.79		

Painting Your Home #3

1a) 471 square feet	1b) 3 gallons	1c) $136.77	
2a) i) 862 square feet	ii) 616 square feet	iii) 485 square feet	iv) 398 square feet
2b) 2361 square feet	2c) 14 gallons	2d) $612.92	
3a) 742 square feet	3b) 7 gallons	3c) $251.30	

Perimeter #4

Part 1

1) 52 feet	2) 41 feet	3) $323.49
4a) 37 feet, $291.93	4b) 31 feet, $244.59	4c) 18 feet, $142.02
5) $1002.03		

Part 2

1) 70 feet	2) 90 feet	3) $451.50
4) $400	3) $851.50	

Temperature #5

Part 1

1) 23.9 °C, 296.9 2) 78.8°F, 299 3) 59°F, 15 °C4) 37.8 °C

5) Answers will vary (most likely no) 6) Answers will vary

7) -40°F, they equal out at a certain temperature

Part 2

1) 37°C, 99°F 2) 100 °F, 38 °C 3) -22°F, -30°C

4) 21°C, 70°F 5) 100°C, 212°F 6) 2°C, 35.6°F

7) 36-36.8 °C, 96.8 - 98.2 °F 8) 100.4°F, 38°C

Shortcut to Converting Temperatures #6

Part 1

1) 77°F	2) 3.5 °c	3) 59°F	4) -31°C
5) 14.5°C	6) 5°F	7) 86°F	8) 26°C
9) -22°F	10) - 17.5°C	11) -4°C	12) 95°F
13) -28.5 °C	14) - 39.5°C	15) 32°F	16) -58°F
17) 3°C	18) 52°F	19) 37°C	20) -9°C

Part 2

1) 80°F	2) -2.5 °C	3) 60°F	4) -27.5°C
5) -12.5°C	6) 0°F	7) 90°F	8) 25°C
9) -50°F	10) -15°C	11) -10°F	12) 100°F
13) -25°C	14) -35°C	15) 30°F	

Wind Chill Index #7

Part 1

1) -33°C	2) -23°C	3) -24°C	4) -52°C
5) -67°C	6) -44°C	7) -49°C	8) -30°C
9) -16°C	10) -56°C		

Part 2

15km/h, -40°C, 20 km/h. -40°C, 25 km/h. -35°C, 25 km/h. -40°C, 30 km/h. -35°C, 30 km/h. -40°C, 35 km/h. -35°C, 35 km/h. -40°C, 40 km/h. -35°C, 40 km/h. -40°C, 45 km/h. -35°C, 45 km/h. -40°C, 50 km/h. -35°C, 50 km/h. -40°C, 55 km/h. -30°C, 55 km/h. -35°C, 55 km/h. -40°C,
60-80 km/hr, -30°C, 60-80 km/hr, -35°C, 60-80 km/hr, -40°C,

Average Temperature #8

1) Yellowknife	2) Fort Smith	3) Yellowknife	4) Whitehorse
5a) YK -19°C	5b) WH -9°C	5c) FS -15°C	
6a) YK 4.3°C	6b) WH 9.2°C	6c) FS 9.2°C	
7a) YK 18.7°C	7b) WH 18.9°C	7c) FS 21.2°C	
8a) YK 0.4°C	8b) WH 3.7°C	8c) FS 3.3°C	

Weight and Height #9

1) 6 feet 1 inch (6'1")	2) 191 cm	3) 170 cm	4) 5'5"
5) 38.6 kg	6) 156 lbs	7) 20 feet	8) 82.5 feet, 49.5 feet
9) $3.25/lb	10) $10.10/kg	11) 15 lbs	

12) No only one child can go on the ride as the height requirement is 4'10".

13) No, as the shallow end is 3.3 feet deep and the child is only 3 feet tall.

Time #10

1) 5 am	2a) yes	2b) 25 minutes	3) 12 hours
4a) 6:45 am	b) answers will vary		
5a) Yes	5b) no time - she will arrive at 7:15 pm		

24 Hour Clock #11

12-hour clock	24-hour clock	12-hour clock	24-hour clock
Midnight	0000	Noon	1200
1:00 a.m.	0100	1:00 p.m.	1300
2:00 a.m.	0200	2:00 p.m.	1400
3:00 a.m.	0300	3:00 p.m.	1500
4:00 a.m.	0400	4:00 p.m.	1600
5:00 a.m.	0500	5:00 p.m.	1700
6:00 a.m.	0600	6:00 p.m.	1800
7:00 a.m.	0700	7:00 p.m.	1900
8:00 a.m.	0800	8:00 p.m.	2000
9:00 a.m.	0900	9:00 p.m.	2100
10:00 a.m.	1000	10:00 p.m.	2200
11:00 a.m.	1100	11:00 p.m.	2300

2) 10 hours 3) 0910 4) 1724 5) 3:30 pm
6) 8:12 pm 7) 0012

Time Zones #12

1) 4:00 pm 2) 3:00 am 3) 1:00 pm 4) 1:30 pm
5) 3:00 am 6) 13 hours 7) 11 hours 15 min
8) 5 hours 50 min 9) 14 hours 15 min 10) 17 hours 10 min

More on Time #13

1) 180 seconds
2) 360 min, 21600 seconds
3) 2 ½ or 2.5 months
4) 40 years
5) 300 years, 30 decades
6) 2 millenniums
7) 5000 milliseconds
8) 168 hours
9) 3650 days
10) 1 ½ or 1.5 centuries
11) 5 years, ½ decade
12) 6 years, 52560 hours
13) 200 years, 2 centuries
14) 1 ½ or 1/5 years, 546 days
15) 3 days, 4320 min
16) answers will vary

Measurement in Your Home Review #14

1a) 16 square feet 1b) 40 square feet 1c) 16.61 square feet 1d) 27.50 square feet
2a) 16 feet 2b) 28 feet 2d) 29.4 feet 3) 68°F
4) Between 20 -21°C 5) -34 °C 6) -24°C
7a) 180 ÷ 2.2 7b) 82 kg
8a) change 5 feet to 60 inches and add 11 inches=71 inches and then multiply by 2.54
8b) 180 cm 9) 4:15 pm 10) 8:10 pm 11) 13 hours 10 min

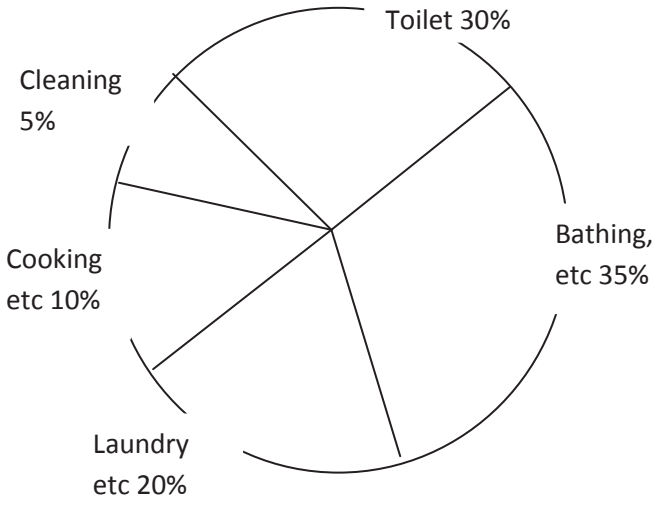
Home Water Audit #15

Answers will vary.

How Much Water Do You Use in One Day #16

Answers will vary.

Water Use - Did You Know #17



Saving Water #18

Part 1:

1)

Time in Shower	Water Use
30 seconds	10 litres
1 minutes	20 litres
2.5 minutes	50 litres
3 minutes	60 litres
3.5 minutes	70 litres
4 minutes	80 litres
4.5 minutes	90 litres
5 minutes	100 litres
5.5 minutes	110 litres
6 minutes	120 litres

2)

Time in Shower	Water Use
30 seconds	5 litres
1 minutes	10 litres
2.5 minutes	25 litres
3 minutes	30 litres
3.5 minutes	35 litres
4 minutes	40 litres

4.5 minutes	45 litres
5 minutes	50 litres
5.5 minutes	55 litres
6 minutes	60 litres

3) 30 litres 4) 60 litres

Part 2: Answers will vary

Part 3:

Time	Water used
A day	7 litres
A week	49 litres
A year	2548 litres

Time	Water used
A day	1 litres
A week	7 litres
A year	364 or 365 litres

2a) 6 litres 2b) 42 litres 2c) 2183 or 2184 litres

Part 4: (your answers might be off by a few decimal points depending on how you calculated the answer)

Drips per Minute	Litres Wasted		
	Day	Week	Year
5	4.1 litres	28.8 litres	1500 litres
10	8.2	57.6	3000 litres
20	16.4	115.2	6000 litres
30	24.6	172.3	9000 litres

Saving Water Saves Money #19

1a) 21,900 litres 1b) $62.63 2a) 26,000 litres 2b) $74.36

3a) 2920 litres 3b) $8.35 4a) 2555 litres 4b) $7.29

5a) 44,720 litres 5b) $127.90 6a) 44720 6b) $127.90

Saving on Electricity #20

1a) 468 kWH 1b) $112.32 2a) 108 kWH 2b) $25.92

3a) 975 kWH 3b) $234 3c) Just over 4 years (4.2 years)

4a) 2891 kWH 4b) $693.79 4c) 1927 kWH 4d) $231.31
5a) 920 kWH 5b) $220.80 5c) 613 kWH 5d) $73.58 5e) $147.22
6a) 657 kWH 6b) $157.68 6c) 613 kWH 6d) $147.12 c 6e) 93%
7a) 1144 kWH 7b) $274.56 7c) $68.64
8a) $157.68 8b) $13.14 8c) 622 kWH
8d) $144.54 8e) about 2 months

Should You Replace Your Refrigerator? #21

1a) 1200 kWH 1b) $360 1c) $72 1d) $288 1e) 3.8 years (almost 4 years)
2a) 200 kWH 2b) $120 2c) $72 2d) $48 2e) Almost 21 years
2f) No reason to buy a new fridge at this time.

Heating Your Water for Laundry #22

Part 1
1) $249.60 2) $166.40
3a) $393.12 3b) $268.32 3c) $268.32 3d) $143.52 3e) $18.72
4) $326.98 5) $178.88 or $178.71
Part 2 - Answers will vary

Garbage, Garbage, Garbage #23

1) 4.4 lbs 2) 14 kg, 30.8 lbs 3) 25 days 4) 730 kg, 1606 lbs
5a) 56 kg, 123.2 lbs 5b) 224 kg, 492.8 lbs
5c) 2912 kg, 6406.4 lbs 5d) 29,129 kg, 64,064 lbs
6) About 1 ¼ years 7) About 5 years 8) Answers will vary

What's in a Bag #24

1a) 728 1b) 1 tree 1c) 31 trees
2a) $2 2b) $26 2c) $52 2d) $260 2e) 15 weeks
3a) $24 3b) $312 3c) $624 3d) $6240 3e) 4 weeks or 1 month
4a) 360 4b) 1440 4c) 18,720 4d) 2 trees
4e) Almost 27 4f) 267 trees

More Environmental Math Problems #25

Problem 1

1) $450 2) $5400 3) 3 year

4) Yes, it is a good idea to convert to wind power as they can recoup the cost in only 3 years.

Problem 2

1) $25,560 2) $26,300 3) Internal Combustion Engine

4) Answers will vary

Environmental Math Review #26

Part 1

1a) 40 litres 1b) 80 litres 1c) 100 litres 1d) 160 litres

1e) 200 litres 1f) 240 litres

2a) 52,000 litres or 52 m^3, $148.72 2b) 39,000 or 39 m^3, $111.54

3a) 525 kWH 3b) $126.24 3c) 80%

4a) 375 kWH 4b) $156 4c) $66 4d) $90

4e) Just over 12 years 4f) Answers will vary (although maybe not worth it)

5a) $131.04 5b) $89.44 5c) $89.44 5d) $47.84 5e) $6.24

6) $7.86

Part 2

1) $2000 2) $8000 3) 4 years 4) Answers will vary

Telephone Bills # 27

Part 1

1) #300641 2) Sep 2, 2009 3) $39.83 4) Sep 3 - Oct 2, 2009

5a) Local Basic Access - $31.33

5b) Voice Mail - $6.95

5c) Directory Listing - Additional Listing - $1.55

6) $51.95 7) $91.78 8) $4.59 9) $96.37

10) Sep 26, 2009

Part 2

1) 10 cents per minutes 2) $25, $1.25 3) $25 4) 6 cents a minute

5) $25 6) 4 ½ cents per minute

7a) $35 7b) 5 cents per minute 7c) $1.75 7d) $36.75

8a) $50 8b) Almost 6 cents per minute 8c) $2.50 8d) $52.50

Northland Utilities Bill #28

1) $141.08	2) July 6, 2009	3) May 12 - June 11, 2009	4) $22.24
5) $94.12	6) $18	7) $6.72	8) $162.19
9) 491 kWH	10) 19 cents	11) 29 cents	
12a) 2 times	12b) February	12c) $266	12d) $152
12e) $26.60	12e) $53.20	12g) Yes, to save money and the environment	

City of Yellowknife Utility Bill #29

1) Sep 9, 2009	2) Aug 1 - Aug 31, 2009	3) Aug 17, 2009	4) Sep 30, 2009
5) $6.28	6) $7.79	7) $11	8) $82.97
9) $1.49	10) 1.8%	11) 15 m^3	12) 15000 litres
13) $2.86 per m^3	14) $51.48	15) $14.30, $171.60	

Visa Bill #31

1) $2821.88	2) $3943.49	3) $1121.61	4) March 16 - April 15, 2009
5) $1620.33	6) $498.72	7) $10	8) $16,500
9) $16,001.28	10) 19.50%	11) 0.05342%	12) 1834
13) $498.72			

Understanding How Mortgages Work #32

Cost of House	Down Payment 10%	Interest Rate	Years to Pay	Monthly Mortgage Payments
$350,000	$35, 000	4.99%	25	$1839.62
$200,000	$20,000	3.59%	20	$1052.27
150,000	$15,000	5.25%	15	$1085.23
400,000	$40,000	3.99%	30	$1716.62
375,000	$37,500	4.5%	20	$2135.19
100,000	$10,000	5.5%	15	$735.38

Analysing Interest on Your Mortgage #33

1) $7133 2) $12,493 3) $92,867 4) $5360

5) $4652 6) $8432 7) answers will vary

8) answers will vary

Closing Costs #34

Cost of House	Closing Costs	Total Paid
$459,000	$6885	$465,885
$258,000	$3870	$261,870
$158,000	$2370	$160,370
$580,000	$8700	$588,700
$399,000	$5985	$404,985
$499,000	$7485	$506,485
197,000	$2955	$199,955

Paying Bills Review #35

1a) Sep 16, 2009 1b) Oct 1, 2009 1c) $62.95 1d) No

1e) $3.00 1f) $59.95 1g) Aug 20, 2009 1 h) $35

2a) $25,000 2b) $225,000 2c) $1180.50

3) $3750

4a) $476.17 4b) $84,498 4c) $197,586

4d) $113,088 4e) Answers will vary.