1. Darryl is hauling a load of chickens from Altona, Manitoba to Rapid City, South Dakota. A sign says that Rapid City is 629 miles away. Note that 1 km is 0.621 miles.
   a) How many kilometers is 629 miles? \[ \frac{1 \text{ km}}{0.621 \text{ mi}} = \frac{1012.9 \text{ km}}{629 \text{ mi}} \]
   b) If Darryl drives a steady 90 km/h the entire distance, how many hours and minutes will it take him to get to Rapid City?
   \[ \frac{1012.9 \text{ km}}{90 \text{ km/h}} = 11.25 \text{ hours} \]
   \[ 0.25 \times 60 = 15 \text{ min} \]

2. Darlene is bragging to her friends that she can drive from Altona, Manitoba to Regina, Saskatchewan in 5 hours. The distance from Altona to Regina is 624 kilometers.
   a) What is Darlene’s speed? \[ \frac{624 \text{ km}}{5 \text{ hours}} = 124.8 \text{ km/h} \]
   b) The speed limit is 100 km/h. Approximately how much time does Darlene save by driving faster than the speed limit?
   \[ \frac{624 \text{ km}}{100 \text{ km/h}} = 6.24 \text{ hours} - 5 \text{ hours} = 1.24 \text{ hours} \]

3. Len earns $86 for 8 hours of work at his new job.
   a) Calculate Len’s hourly wage. \[ \frac{86}{8} = 10.75 \]
   b) Write a formula that Len can use to figure out his pay with any number of hours.
   \[ \text{Pay} = \text{hours} \times 10.75 \]

4. Len gets a new job that pays $9.00 an hour but he gets a bonus of $5.00 for showing up for work!
   a) Write a formula that will calculate Len’s pay for any number of hours.
   \[ \text{Pay} = \text{hours} \times 9.00 + 5.00 \]
   b) How many hours can Len work before he gets paid less than $10.00 an hour?
   \[ \frac{1 \text{ hr}}{14} = \frac{2 \text{ hrs}}{11.50} = \frac{3 \text{ hrs}}{10.67} = \frac{4 \text{ hrs}}{10.25} \]
   \[ 5 \text{ hrs} = 10 \]
   \[ 6 \text{ hrs} = 9.83 \]

5. Bob is building a doghouse. The roof rises 1 foot for every 3 feet of width.
   a) Express the doghouse roof slope as a percent.
   \[ \frac{\text{rise}}{\text{run}} = \frac{1}{3} = 0.333 \]
   b) Express the doghouse roof slope as a pitch.
   \[ \frac{1}{3} = \frac{x}{12} \]
   \[ x = 4 \]
   \[ \frac{4}{12} \]
6. Bob’s friend Dave lives in Arizona and says he built his doghouse with a slope of zero. Describe the roof on Dave’s doghouse.

Flat roof.

7. Vern is a retired carpenter. Knowing you are a mathematician, he mentions that he once built a house with a roof slope of 0.4167.

a) Express the slope as a percent.

\[ 0.4167 \times 100 = 41.67\% \]

b) Express the slope as a fraction.

\[ \frac{41.67}{100} = \frac{42}{100} \]

\[ x = 5.04\text{ so } \frac{5}{12} \]

c) Express the slope as a pitch

\[ \frac{42}{100} = \frac{x}{12} \]

8. When Sandra was born, her parents deposited $2000 in the bank. Sandra has just turned 16 years old.

\[ I = \frac{P \times r \times t}{100} \]

a) Using the simple interest formula \( I = Prt \) and assuming the interest rate was 2%, approximately how much money will be in the bank account now?

\[ 2000 \times 0.02 \times 16 = \$640 \text{ added to } 2000 = \$2640 \]

b) Will the amount of interest added to Sandra’s account be more, less, or equal to the amount calculated in a)? Why?

It is actually more because it is calculated every year and then added to the balance. The principal increases every year.

9. Abe wants to buy a car when he turns 18. His bank is offering 2.75% interest, compounded annually.

\[ I = Prt \]

a) If Abe invests $1000, how long will it take him to have a balance of $3000 in his bank account? Use the simple interest formula. \( I = 2000 \times 0.0275 = 55 \) years.

b) If Abe is 16 now, how old will he be when he gets his car?

About 87 years old!

c) Abe needs some advice. How can he increase his $1000 to $3000 in two years?

Add money to his account every month \( 10 \times \frac{3000}{1000} \text{ of his pay} \)

10. Julie is mixing punch for her grandmother’s birthday party. The container says to mix 3 cans of water with 1 can of juice. If Julie wants to keep the same proportion of water to juice, calculate:

a) If a can is 10 ounces, how many ounces of juice will 2 cans make?

\[ \frac{1}{2} = \frac{10 \text{ ounces}}{30 \text{ ounces}} \]

\[ 2 \text{ cans} = \frac{20 \text{ ounces}}{60 \text{ ounces}} = \frac{1}{3} \text{ of juice} \]
b) What percentage of a pitcher of juice is juice concentrate?
\[ \frac{1 \text{ cup}}{4 \text{ total juice}} = 25\% \]

11. Roger is filling his wading pool with water. He reads the capacity on the side of the pool and it says 375 litres. He estimates it takes his garden hose 3 hours to fill the pool.

a) What is the flow rate of his garden hose per hour?
\[ \frac{375 \text{ L}}{3 \text{ hr}} = 125 \text{ L/hr} \]

b) If Roger buys a larger pool (4999 litres), how much time will it take to fill it?
\[ 4999 \div 125 = 39.99 \text{ hr} \approx 40 \text{ hours} \]

12. Merle has just purchased a treadmill for his wife at Sonic Sports. The promotional offer is as follows:

Buy now, pay later! An administration fee of $175 is payable now when you take the treadmill home. The balance owing of $1299 is due two years from now.

a) How much "interest" does Merle pay if he takes advantage of this promotional offer?
\[ r = \frac{I}{P+I} \]

b) What interest rate is Merle getting on this "loan"?
\[ r = \frac{I}{P+I} \]

13. Jillian receives her MasterCard statement in the mail. Her balance is $2,016.84. Her minimum payment due is $61.00.

a) Calculate Jillian’s new balance after making the minimum payment.
\[ 2016.84 - 61 = 1955.84 \]

b) Jillian does not make any more purchases this month. Calculate her balance owing next month if the credit card company charges 19.99% interest, compounded daily. Assume 31 days in the month.
\[ 1955.84 \times 1.1999 \times (31/31) = 27.79 \text{ reduction} \]

(c) Estimate how long it will take Jillian to pay off her balance if she continues making only the minimum payment.
\[ 2016.84 \div 27.79 = 72.57 \text{ months} \]
\[ \frac{72.57}{12} = 6.05 \text{ years} \]
14. In the question above, what percent of Jillian’s balance ($2016.84) is the minimum payment ($61.00)?
\[
\frac{61}{2016.84} = 0.03 \times 100 = 3\%
\]

15. George just moved to Altona. When deciding where to bank, what kind of factors should he take into consideration? List and explain three factors that would help George decide where to bank. Hint: Think about the banking pamphlet you created at the start of the semester.

interest rates, hours, atm, loan rates, service charge/fees.

16. Marge has no money in her bank account and needs to pay her rent today. She gets paid in two weeks. Payday Loan charges a fee of $23 for every $100 borrowed. After two weeks, you must pay back what you owe plus the fee.

a) If Marge borrows $750 to pay her rent, how much will she need to pay back in two weeks?
\[
\text{Fee} \left(\frac{23}{100}\right) \times 750 = \frac{172.50}{\text{Fees}} + \frac{750}{\text{Fee}} = 992.50
\]

b) What percent interest did Mary pay when borrowing money from Payday Loan?
\[
172.50 = \frac{172.50}{750} \times 100
\]

17. Jeff has purchased a small shark (about 3 feet long) on Ebay and wants to build a large shark tank in his bedroom. He needs to build a tank that is 8 feet long by 6 feet wide and 4 feet high.

a) Draw a net of the shark tank.

b) Calculate the surface area of the glass needed to build the tank.
\[
8 \times 6 = 48 \quad \text{Sides} \quad 4 \times 8 \times 2 = 64 \quad \text{Ends} \quad 6 \times 4 \times 2 = 48
\]
\[
160 \text{ ft}^2
\]

c) Calculate the price of the glass plus taxes. Glass is sold for $11.99 a square foot. PST is 7% and GST is 5%.
\[
160 \times 11.99 = 1918.40 + \text{GST} 95.92 = 2114.32
\]

18. Ben’s truck box is 6.5 feet long, 4 feet wide, and 20 inches deep. He wants to make a portable swimming pool. How many litres of water will it take to fill up the entire box?
\[
6.5 \times 12 \times 2.5 = 198\text{?}\text{ft}^3 \quad 4 \times 12 \times 2.5 = 121.92 \text{?}\text{cm}^3 \quad 20 \times 2.5 = 50.8 \text{?}\text{cm}
\]
Remember that there are 12 inches in a foot and that 1 inch is 2.54 cm.
\[
\text{Volume} = 198 \times 121.92 \times 50.8 = 1.22706335 \text{?m}^3 = 1000 \text{?L.pts}
\]

19. Are there any factors that might be taken into account when estimating the capacity of the truck box swimming pool?

wheel wells, were measurements inside box or outside box?
20. Marley has the following expenses every month:
apartment rent $475
cell phone bill $60
groceries $325
eating out $30
gasoline $65

a) Which expenses will remain the same every month? apartment rent ($475)
b) Why do some expenses change every month? grocery prices vary, gas goes up and down.
c) How much money does Marley have to make every month to have a balanced budget? $475 + 60 + 325 + 30 + 65 = $955
d) If Marley earns $10.50 per hour, how many hours does he need to work at a minimum each month if he wants to put $200 into savings plus pay for all his expenses? $955 + 200 = $1155 / $10.50 = 110 hours

21. Susan earns $3200 every month before deductions.
a) If her deductions are 33% of her pay, calculate the amount of her deductions. $3200 x .33 = $1056
b) What is Susan's gross pay? $3200

c) What is Susan's net pay? $3200 - 1056 = $2144
d) How much money should Susan put aside every month for savings if she follows the recommended guidelines? 10% of $3200 = $320
10% of $2144 = $214.40

22. Bob buys a sandwich every day for lunch at the factory cafeteria. Instead of buying a sandwich every day for $2.75, he wants to make his own.

A jar of sandwich spread is $3.29 and should last 8 weeks.
A container of margarine is $4.99 and should last 8 weeks.
A package of sandwich meat is $3.99 and should last one week.
A loaf of bread is $3.49 and should last one week.

Assume a week is a work week with 5 days.
a) Calculate the cost of a sandwich if Bob makes it on his own.

\[ 2.75 - 1.70 = \$1.05 \text{ per sandwich} \]

Assuming no holidays

\[ 52 \times 5 \text{ days} = 260 \times 1.05 = \$273 \]

b) How much money does Bob save in a year if he makes his own sandwiches?

23. Mike is hiking. After an hour hike he finds himself on top of a cliff. The cliff is 300 feet tall. He spots his backpack far below and needs to know how much rope he would need to reach the pack if he could somehow throw the rope over the cliff, snag the backpack, and then lift it up. He estimates his angle of depression to be 39 degrees.

\[
\sin 39^\circ = \frac{300}{\text{rope}}
\]

\[ \sqrt{476.7} \text{ ft} \]
24. A ladder is needed to climb up to the next floor in a newly built house. For safety reasons, assume the ladder must extend 2 feet beyond the floor.

a) Calculate the length of ladder needed.

\[ a^2 + b^2 = c^2 \]

\[ 9^2 + 5^2 = x^2 \]

\[ 81 + 25 = x^2 \]

\[ \sqrt{106} = x = 10.3 \]

\[ \text{ladder} = 2 \times 10.3 + 12.3 = 24.6 \text{ ft} \]

b) What is the slope of the ladder?

\[ \frac{\text{rise}}{\text{run}} = \frac{9}{5} = 1.8 \]

\[ \tan^{-1} \left( \frac{9}{5} \right) \]

25. Rachelle is installing a drain pipe so she can drain the water far away from her house. She needs the drain pipe to drop 1 in. for every 3 feet of length so the water will drain properly.

a) Express the slope as a fraction.

\[ \frac{1}{36} \]

b) Express the slope as a percentage.

\[ \frac{1}{36} = 0.02777 \times 100 = 2.78\% \]
26. Ralph is building a toboggan slide for his children. The slide is 120 feet long and needs to drop 8 inches per foot.

a) Calculate the necessary slope for the slide.

b) How high does the end of the slide need to be to achieve the necessary drop?
27. Sam surveys his graduating class and finds out the following:

23 graduates will be wearing a rented tuxedo for grad
32 graduates will be wearing a suit
54 graduates will be wearing a gown
5 graduates will be wearing something other than a tuxedo, suit, or gown.

a) Calculate the percentages and degrees necessary to create a circle graph.

<table>
<thead>
<tr>
<th>Clothing</th>
<th>Count</th>
<th>Percentage</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rented tuxedo</td>
<td>23</td>
<td>20%</td>
<td>73°</td>
</tr>
<tr>
<td>Suit</td>
<td>32</td>
<td>28%</td>
<td>101°</td>
</tr>
<tr>
<td>Gown</td>
<td>54</td>
<td>47%</td>
<td>171°</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>4%</td>
<td>16°</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>114</td>
<td><strong>100%</strong></td>
<td><strong>360°</strong></td>
</tr>
</tbody>
</table>

b) Sketch a circle graph, approximating the size of the slices. You may use a protractor if you wish. Give your graph an appropriate title.

28. John wants to build an ice fishing shack. The shack will be 4 feet wide, 6 feet long, and 7 feet high. The roof is flat. The shack has a door on the front. Choose an appropriate scale and label your oblique sketch with the dimensions and the scale. Use graph paper and a ruler.

29. If plywood sheets are 4 feet by 8 feet, how many sheets would be needed to build this ice fishing shack? Assume you are covering the walls, roof, and the floor. Draw a component parts diagram to assist you.
30. Data has been collected the past 10 years. MCC has been keeping track of the number of bicycles donated to them from the residents of Altona.

<table>
<thead>
<tr>
<th>Year</th>
<th>Bicycles Donated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>12</td>
</tr>
<tr>
<td>2004</td>
<td>16</td>
</tr>
<tr>
<td>2005</td>
<td>12</td>
</tr>
<tr>
<td>2006</td>
<td>18</td>
</tr>
<tr>
<td>2007</td>
<td>24</td>
</tr>
<tr>
<td>2008</td>
<td>32</td>
</tr>
<tr>
<td>2009</td>
<td>38</td>
</tr>
<tr>
<td>2010</td>
<td>30</td>
</tr>
<tr>
<td>2011</td>
<td>40</td>
</tr>
<tr>
<td>2012</td>
<td>48</td>
</tr>
</tbody>
</table>

a) Draw a line graph of the number of donated bicycles.

b) Are there any noticeable trends when viewing the graph? 
   
   increases for the most part.

31. The workers at MCC have also kept track of bicycle sales for the past 10 years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Bicycles Donated</th>
<th>Bicycles Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>2004</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>2005</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>2006</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>2007</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>2008</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>2009</td>
<td>38</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>2011</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>2012</td>
<td>48</td>
<td>42</td>
</tr>
</tbody>
</table>

a) Draw a bar graph of some sort that displays the above data.

b) Is a bar graph the best way to display the above data? Comment.

   seems okay. 
   easy to see donations vs sales.
<table>
<thead>
<tr>
<th>Side</th>
<th>Side</th>
<th>Roof</th>
<th>Floor</th>
<th>Front</th>
<th>Back</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'x7'</td>
<td>4'x7'</td>
<td>4'x6'</td>
<td>4'x6'</td>
<td>6'x7'</td>
<td>6'x7'</td>
</tr>
</tbody>
</table>

2 sheets of plywood.

Ice Fishing Shack

2 square = 1 foot
Bike Donations

Year


#
MCC Bike Sales

Year:

- 2010: 0
- 2011: 1
- 2012: 1
- 2013: 2
- 2014: 0
- 2015: 1
- 2016: 2
- 2017: 2
- 2018: 0
- 2019: 0

Legend:
- Open box: Donated
- Solid box: Sold