Course: MFM2P Gr. 10 Applied **Lesson: 4 - 4**

Unit: Linear Equations **Topic: Modeling with Formulas**

- ***homework check:*** **Lesson 4 - 3**

- ***note:*** **Modeling with Formulas**

Formulas can be rearranged much the same way as equations. You might choose to substitute the numbers given first, then rearrange or you might choose to rearrange first, then substitute. You need to choose the method that works best for you. For example, rearrange the given formulas for the variable indicated.

a)

$s = \dfrac{w - 10e}{t}, \quad t$

$st = w - 10e$

$t = \dfrac{w - 10e}{s}$

b)

$E = mc^2, \quad c$

$\dfrac{E}{m} = c^2$

$\sqrt{\dfrac{E}{m}} = c$

c)

$P = 2(l + w), \quad w$

$\dfrac{P}{2} = l + w$

$\dfrac{P}{2} - l = w$

- ***homework assignment:*** **Lesson 4 - 4**

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Lesson 4 – 4: Modelling with Formulas

1. Rearrange each formula for the variable indicated.

a) $A = lw$, solve for w **b)** $P = 2l + 2w$, solve for l **c)** $y = mx + b$, solve for b

d) $C = 2\pi r$, solve for r **e)** $V = lwh$, solve for h **f)** $A = \frac{bh}{2}$, solve for b

2. a) A car travels at 45 km/h for 2.5h. How far does the car travel?

b) Rearrange the formula $d = st$ to solve for *s*. Use your formula to find the speed of a truck that travels 262.5 km in 3.5 h.

c) Rearrange the formula $d = st$ for *t*. Use this formula to find how long it would take a boat to travel 59.5 km at a speed of 34 km/h.

3. The formula for simple interest is $I = Prt$ where *I* is the interest earned, *P* is the principal invested, *r* is the interest rate as a decimal (not a percentage), and *t* is the time in years. Find the amount of interest earned on an investment of $4000 at 0.85% interest for 4 years.

4. Graham and Colin leave the restaurant at the same time and drive in opposite directions. Colin drives 10 km/h faster that Graham.
a) If Graham drives *x* km/h, write an expression that represents Colin's speed.

b) Write expressions to represent the distance each man has driven after 2 hours. Remember that $d = st$.

Graham: **Colin:**

c) If after 2 h, they are 200 km apart, determine how fast each man driving?

5. Jenna and Maya have a walkie-talkie with a range of 5 km. They leave the park on their bikes, at the same time but in opposite directions. Jenna rides at 14 km/h and Maya rides at 12 km/h. After half an hour, will they be able to communicate with the walkie-talkies? Show your work.

6. The equation $s = \frac{w - 10e}{t}$ models the speed in words per minute, *s*, at which someone types. The *w* represents the number of words typed, the *e* represents the errors made, and the *t* is time in minutes. If Alex types 525 words in 5 min. with 10 errors, what is his typing speed?

7. The formula $F = \frac{9}{5}C + 32$ is used to change Celcius to Fahrenheit temperatures.
a) Rearrange the formula for F.

b) Use the formula to convert 88 degrees Fahrenheit to degrees Celcius.