Self-Assessment for Grade 9 Math (MTH1W1)

All Grade 9 students are registered for Grade 9 Math (MTH1W) may benefit from a self evaluation and review of the following expectations from Grade 8 Math. The questions in this self-assessment reflect some of the key ideas learned in prerequisite courses.

They do not represent the problem solving approach or the rich experience that students would be exposed to in a classroom. The intention is for students to revisit some key concepts and, if needed, access review materials in an informal environment at a pace that is comfortable for the student.

Concept(s)	Sample Question	How comfortable do you feel with this concept?	Link(s) to explore concept further
I can order rational numbers	1. Write the following numbers in order from least to greatest $3.25 \quad -4.75 \quad -\frac{3}{4} \quad \frac{15}{4} \quad -\frac{11}{4} \quad 3.5$	 ☐ Very comfortable  ☐ Somewhat comfortable  ☐ Not at all comfortable	What are Rational Numbers? Comparing Rational Numbers
I can evaluate expressions that involve integers using the order of operations	2. Evaluate: a) $-3-7+1$ b) $-3-(-5)$ c) $\frac{-20}{5}$ d) $9-8\times 2$ e) $2(1-3^2)+16\div 2$	 ☐ Very comfortable  ☐ Somewhat comfortable  ☐ Not at all comfortable	Adding Integers Subtracting Integers Multiplying Integers Dividing Integers Order of Operations

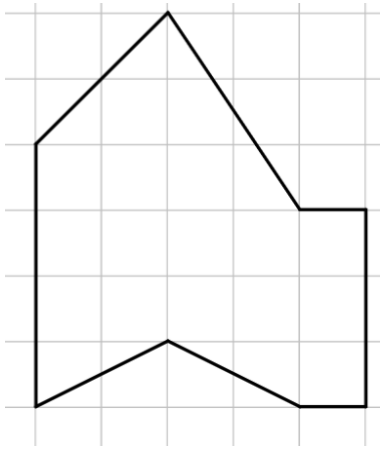
<table>
<tr>
<td>I can convert between fractions, decimals and percents</td>
<td>3. Complete the chart
<table>
<tr><th>Fraction</th><th>Decimal</th><th>Percent</th></tr>
<tr><td>$\frac{3}{5}$</td><td></td><td></td></tr>
<tr><td></td><td>0.85</td><td></td></tr>
<tr><td></td><td></td><td>20%</td></tr>
</table>
</td>
<td>  ☐ Very comfortable
  ☐ Somewhat comfortable
  ☐ Not at all comfortable</td>
<td>Describing Fractions as Decimals</td>
</tr>
<tr>
<td>I can solve problems involving percents</td>
<td>4. A book regularly costs $13.99 but is on sale. The sale price is 20% off the regular price.
a) What is the sale price?
b) If 13% H.S.T. is applied to the sale price, what is the total cost of the book?</td>
<td>  ☐ Very comfortable
  ☐ Somewhat comfortable
  ☐ Not at all comfortable</td>
<td>Percentages</td>
</tr>
<tr>
<td>I can solve problems involving simple fractions</td>
<td>5. Five friends shared two giant chocolate bars. Fran ate $\frac{1}{3}$ of a chocolate bar, Abdul ate $\frac{3}{8}$ of a chocolate bar, Hannah ate $\frac{1}{4}$ of a chocolate bar, and Siva ate $\frac{1}{2}$ of a chocolate bar. What fraction of the chocolate bar remains for Brad?

6. A tank of gas is $\frac{3}{4}$ full. A drive to work and back home uses $\frac{1}{8}$ of a tank. If a person drives to work in the morning and back home in the evening, how many days will the gas last?</td>
<td>  ☐ Very comfortable
  ☐ Somewhat comfortable
  ☐ Not at all comfortable</td>
<td>Adding Fractions

Subtracting Fractions

Multiplying Fractions

Dividing Fractions</td>
</tr>
</table>

I can solve problems involving proportions	7. To make 100 grams of bronze, you need 92 grams of copper. How much copper would you need to make 250 grams of bronze? 8. At one store, A 500 mL bottle of shampoo costs $5.77. A 700 mL bottle of the same shampoo at another store costs $7.99. Which one is the better deal?	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Proportionality Unit Rates
I can solve problems involving the volume of cylinders using a variety of strategies	9. A short cylindrical can has a radius of 10 cm and a height of 5 cm. A tall cylindrical can has a radius of 5 cm and a height of 10 cm. Which can has a greater volume? How much greater?	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Volume and Capacity of a Cylinder
I can solve problems involving the are area of composite shapes.	10. Calculate the area of the composite shape by decomposing the shape into rectangles, parallelograms, trapezoids, and triangles. 	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Area of Composite Shapes Pythagorean Theorem

<table>
<tr>
<td>I can evaluate algebraic expressions with up to three terms by substituting fractions, decimals and integers</td>
<td>11. Evaluate $10a + 3b + 6c$ if

$a = \frac{1}{4}$

$b = -2$

$c = 0.75$</td>
<td>  ☐ Very comfortable
  ☐ Somewhat comfortable
  ☐ Not at all comfortable</td>
<td>Evaluating expressions with two variables: fractions & decimals</td>
</tr>
<tr>
<td>I can model linear relationships using tables of values, graphs and equations

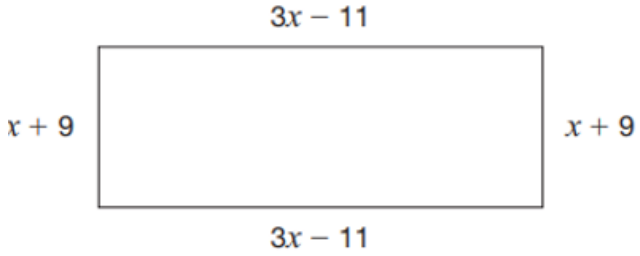
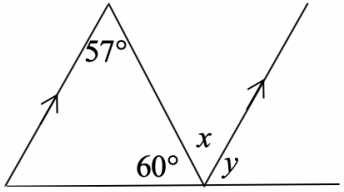
I can determine a term, given its term number in a linear pattern that is represented by a graph or an algebraic equation</td>
<td>12. Consider the following pattern (from visualpatterns.org/)
a) Describe the pattern between the Number of Circles and the Image Number
b) Complete the table
c) Graph the Number of Circles vs. the Image Number
d) Write an equation that represents the relationship between the Number of Circles (C) and the Image Number (n)
e) Determine the number of circles in 43 image
<table>
<tr><th>Image</th><th>Number of Circles</th></tr>
<tr><td>1  </td><td></td></tr>
<tr><td>2  </td><td></td></tr>
<tr><td>3  </td><td></td></tr>
<tr><td>4  </td><td></td></tr>
</table>
</td>
<td>  ☐ Very comfortable
  ☐ Somewhat comfortable
  ☐ Not at all comfortable</td>
<td>Patterns in Sequences

The General Term

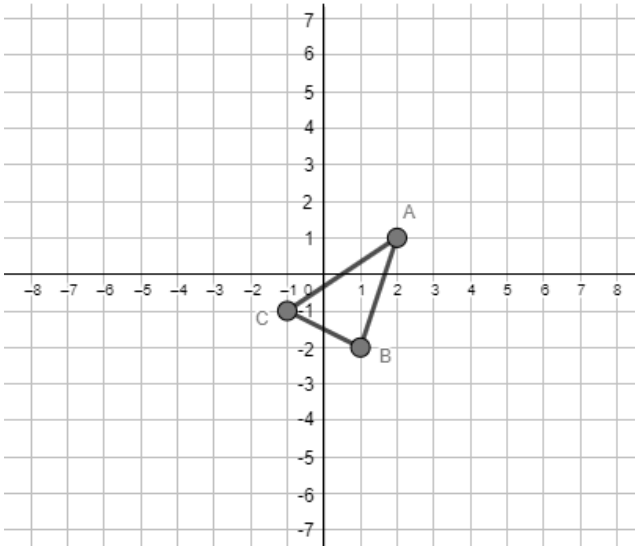
Variables

Graphing Patterns

Bringing it All Together</td>
</tr>
</table>

I can describe what a variable is and collect like terms.	13. A rectangle is pictured with algebraic expressions that represent the lengths of its sides. Determine the simplified form of the expression that represents the perimeter of this rectangle?  	☐ Very comfortable ☐ Somewhat comfortable ☐ Not at all comfortable	Adding and Subtracting Polynomials
I can solve and check linear equations involving a one-variable term, that includes integers	14. Solve $2x+9=7$	☐ Very comfortable ☐ Somewhat comfortable ☐ Not at all comfortable	Solving Equations using Visual Models and by Inspection Solving Equations by Trial and Error Solving One-Step Equations Using Algebra
I can solve angle relationship problems involving triangles, intersecting lines, parallel lines and transversals	15. Find the two unknown angles.  	☐ Very comfortable ☐ Somewhat comfortable ☐ Not at all comfortable	Angles and Intersecting Lines Parallel Lines and Transversals

I can identify if there is a relationship within the data of a scatter plot	16. Consider the following graph.  a) What type of graph is this? b) Why is this type of graph useful for this data? c) Does the graph suggest a relationship between the Annual Salary and the Number of Years of Experience? How do you know? d) What questions do you have? Is this graph misleading?	 ☐ **Very comfortable**  ☐ **Somewhat comfortable**  ☐ **Not at all comfortable**	Scatter Plots Bias in Data Representation

I can plot points and apply transformations to shapes on a cartesian plane.	17. $\Delta ABC$is translated (+5) units in the x-direction and (-4) units in the y-direction. Identify the coordinates of the new triangle.  	☐ **Very comfortable** ☐ **Somewhat comfortable** ☐ **Not at all comfortable**	Plotting Points Translating Shapes Reflections and Rotations
I can describe some advantages and disadvantages of various methods of payment that can be used when dealing with multiple currencies and exchange rates	18. Describe some advantages and disadvantages of various methods of payment that can be used when dealing with multiple currencies and exchange rates	☐ **Very comfortable** ☐ **Somewhat comfortable** ☐ **Not at all comfortable**	Financial Literacy Resources

Question	Solutions to Sample Questions
1. Write the following numbers in order from least to greatest $3.25 \quad -4.75 \quad -\frac{3}{4} \quad \frac{15}{4} \quad -\frac{11}{4} \quad 3.5$	$3.25 \quad -4.75 \quad -\frac{3}{4} \quad \frac{15}{4} \quad -\frac{11}{4} \quad 3.5$ **One way to sort them is to first, write them all as decimals by dividing the numerator by the denominator.** $3.25 \quad -4.75 \quad -0.75 \quad 3.75 \quad -2.75 \quad 3.5$ **Then sort them from least to greatest. One way to represent -4.75 is that you owe $4 dollars and 75 cents. Since you are "richer" if you owe $2.75 than if you owe $4.75, -2.75 is greater than -4.75.** **The decimal numbers in order are** $-4.75 \quad -2.75 \quad -0.75 \quad 3.25 \quad 3.5 \quad 3.75$ **So the original list in order is** $-4.75 \quad -\frac{11}{4} \quad -\frac{3}{4} \quad 3.25 \quad 3.5 \quad \frac{15}{4}$
2. Evaluate: a) $-3-7+1$ b) $-3-(-5)$ c) $\frac{-20}{5}$ d) $9-8\times 2$ e) $2(1-3^2)+16\div 2$	a) $-3-7+1=-9$ b) $-3-(-5)=-3+5$ $=2$ c) $\frac{-20}{5}=-4$ d) $9-8\times 2=9-16$ $=-7$ e) $2(1-3^2)+16\div 2=2(1-9)+16\div 2$ $=2(-8)+16\div 2$ $=-16+16\div 2$ $=-16+8$ $=-8$

3. Complete the chart

Fraction	Decimal	Percent
$\frac{3}{5}$		
	0.85	
		20%

Fraction	Decimal	Percent
$\frac{3}{5}$	**0.6**	**60%**
$\frac{85}{100}$ or $\frac{17}{20}$	0.85	85%
$\frac{20}{100}$ or $\frac{1}{5}$	**0.2**	20%

4. A book regularly costs $13.99 but is on sale. The sale price is 20% off the regular price.
   a. What is the sale price?

   b. If 13% H.S.T. is applied to the sale price, what is the total cost of the book?

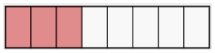
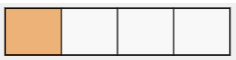
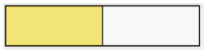
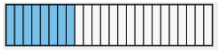
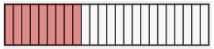
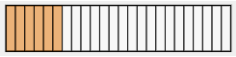
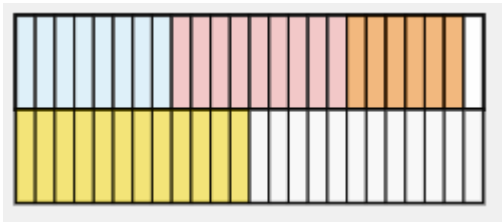
a) What is the sale price?

20% of $13.99=$2.80
So the sale price is $13.99-$2.80=$11.19

b) If 13% H.S.T. is applied to the sale price, what is the total cost of the book?

13% of $11.19=$1.45
So the cost is $11.19+1.45=$12.64

5. Five friends shared two giant chocolate bars. Fran ate $\frac{1}{3}$ of a chocolate bar, Abdul ate $\frac{3}{8}$ of a chocolate bar, Hannah ate $\frac{1}{4}$ of a chocolate bar, and Siva ate $\frac{1}{2}$ of a chocolate bar. What fraction of the chocolate bar remains for Brad?

Fran	Abdul	Hannah	Siva	
				They only bought two chocolate bar so we need to put these together
				We need to divide the chocolate bar up into a number that is divisible by all the portions - 24
				Now we can combine the eaten portions of the chocolate bars
What fraction is left for Brad?	$\frac{13}{24}$ or half a chocolate bar and $\frac{1}{24}$ of a piece.			

Or algebraically

$$\frac{1}{3}+\frac{3}{8}+\frac{1}{4}+\frac{1}{2}+x=2$$

Need a common denominator to add fractions (24 bars)

$$\frac{8}{24}+\frac{9}{24}+\frac{6}{24}+\frac{12}{24}=\frac{35}{24}$$ total bars ate already

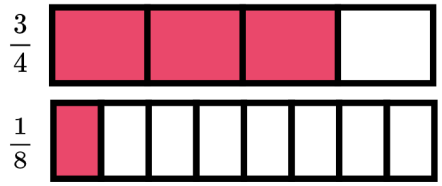
What is left for Ben?

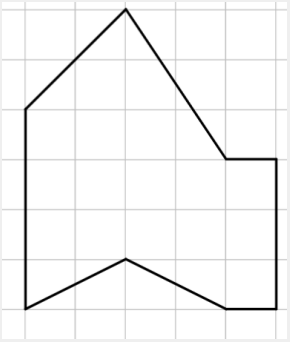
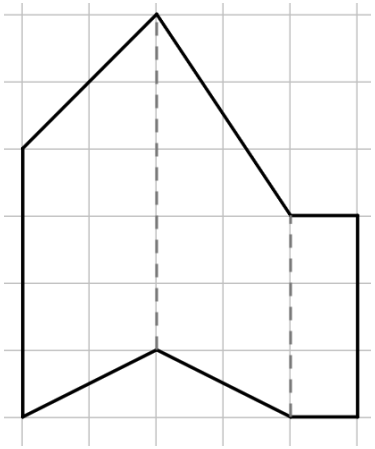
$$2-\frac{35}{24}=?$$

Need a common denominator

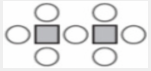
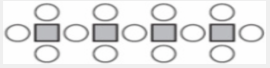
$$\frac{2}{1}-\frac{35}{24}=\frac{48}{24}-\frac{35}{24}=\frac{13}{24}$$

Therefore there are 13/24 bars left or just over half a chocolate bar for Ben.

6. A tank of gas is $\frac{3}{4}$ full. A drive to work and back home uses $\frac{1}{8}$ of a tank. If a person drives to work in the morning and back home in the evening, how many days will the gas last?	 We can see that 6 of the $\frac{1}{8}$ pieces are needed to match the $\frac{3}{4}$ bar. So $\frac{3}{4} \div \frac{1}{8} = 6$ **Since $\frac{3}{4} \div \frac{1}{8} = 6$, if the car is only used to drive to and from work then the gas should last 6 days** **Since $\frac{3}{4} \div \frac{1}{8} = 6$, if the car is only used to drive to and from work then the gas should last 6 days.**
7. To make 100 grams of bronze, you need 92 grams of copper. How much copper would you need to make 250 grams of bronze?	$\frac{\text{copper}}{\text{bronze}} \quad \frac{92}{100} = \frac{x}{250}$ **We need to multiply the denominator in the first ratio by 2.5 so we will also multiply the numerator by 2.5.** $92 \times 2.5 = 230$ **So you will need 230 grams of copper**
8. At one store, A 500 mL bottle of shampoo costs $5.77. A 700 mL bottle of the same shampoo at another store costs $7.99. Which one is the better deal?	**577 cents for 500 mL means** $577 \div 500 = 1.154$ **cents per mL** **799 cents for 700 mL means** $799 \div 700 \doteq 1.141$ **cents per mL** **The 700 mL bottle is a slightly better deal.**
9. A short cylindrical can has a radius of 10 cm and a height of 5 cm. A tall cylindrical can has a radius of 5 cm	$V_{\text{cylinder}} = A_{\text{base}} \times h$ $= \pi r^2 h$

and a height of 10 cm. Which can has a greater volume? How much greater?	$V_{\text{short cylinder}} = \pi(10)^2 \times 5$ $\doteq 1570.75 \text{ cm}^3$ $V_{\text{tall cylinder}} = \pi(5^2) \times 10$ $\doteq 785.38 \text{ cm}^3$ **The short cylinder has a greater volume. It is $1570.75 - 785.38 = 785.37 \text{ cm}^3$ greater in volume. It is double the volume of the tall cylinder.**
10. Calculate the area of the composite shape by decomposing the shape into rectangles, parallelograms, trapezoids, and triangles. 	 $\begin{aligned} A &= A_{\text{trapezoid}} + A_{\text{trapezoid}} + A_{\text{rectangle}} \\ &= \frac{1}{2}(4+5)(2) + \frac{1}{2}(5+3)(2) + (3 \times 1) \\ &= 9 + 8 + 3 \\ &= 20 \text{ units}^2 \end{aligned}$
11. Evaluate $10a + 3b + 6c$ if $a = \frac{1}{4}$ $b = -2$ $c = 0.75$	$10\left(\frac{1}{4}\right) + 3(-2) + 6(0.75)$ $= 2.5 - 6 + 4.5$ $= 1$

12. Consider the following pattern (from visualpatterns.org/)
    a) Describe the pattern between the Number of Circles and the Image Number
    b) Complete the table
    c) Graph the Number of Circles vs. the Image Number
    d) Write an equation that represents the relationship between the Number of Circles (C) and the Image Number (n)
    e) Determine the number of circles in 43 image

Image	Number of Circles
1 	
2 	
3 	
4 	

a) Describe the pattern between the Number of Circles and the Image Number
One way to see it is that In each stage, there is one circle on the left. Each time a square is added, three circles (one on top, one below and one to the right) are added. This means that the number of circles is 3 × the image number plus 1.

b) Complete the table **(See below)**
c) Graph the Number of Circles vs. the Image Number
d) Write an equation that represents the relationship between the Number of Circles (C) and the Image Number (n)
C=1+3n
e) Determine the number of circles in image 43
C=1+3(43)
C=130
There would be 130 circles in image 43.

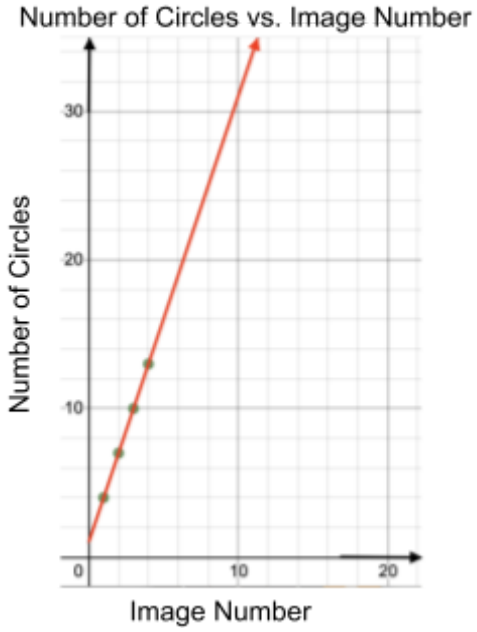
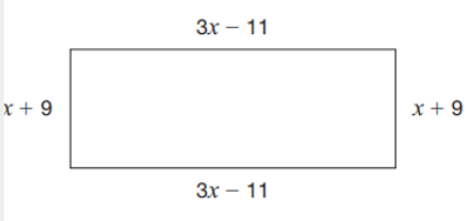
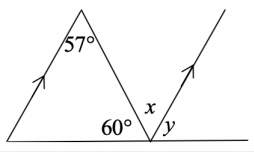
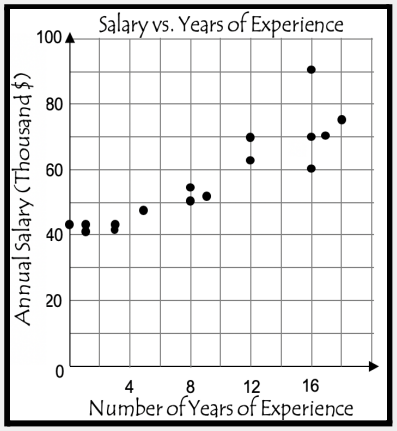


Image	Number of Circles
1 	4
2 	7
3 	10
4 	13

13. A rectangle is pictured with algebraic expressions that represent the lengths of its sides. Determine the simplified form of the expression that represents the perimeter of this rectangle?  	***Perimeter = sum of sides*** $P = (3x - 11) + (x + 9) + (3x - 11) + (x + 9)$ $P = 3x - 11 + x + 9 + 3x - 11 + x + 9$ $P = 8x - 4$
14. Solve $2x + 9 = 7$	$2x + 9 = 7$ $2x + 9 - 9 = 7 - 9$ $2x = -2$ $\frac{2x}{2} = -\frac{2}{2}$ $x = -1$
15. Find the two unknown angles.  	**x=57º - alternate angle** **y=63º - supplementary angle**
16. Consider the following graph.	



a) What type of graph is this?
b) Why is this type of graph useful for this data?
c) Does the graph suggest a relationship between the Annual Salary and the Number of Years of Experience? How do you know?
d) What questions do you have? Is this graph misleading?

a) What type of graph is this? **Scatter Plot**

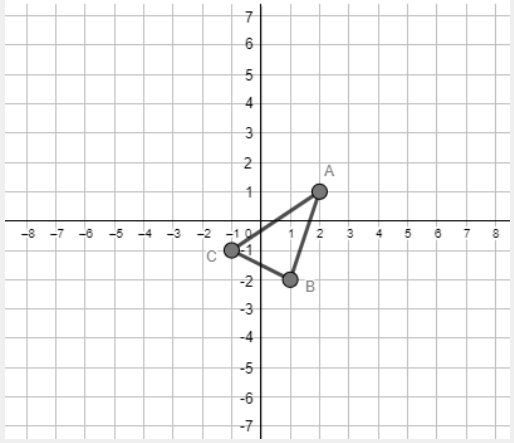
b) Why is this type of graph useful for this data? S**catter plots are useful in determining if there is a relationship between two variables.**

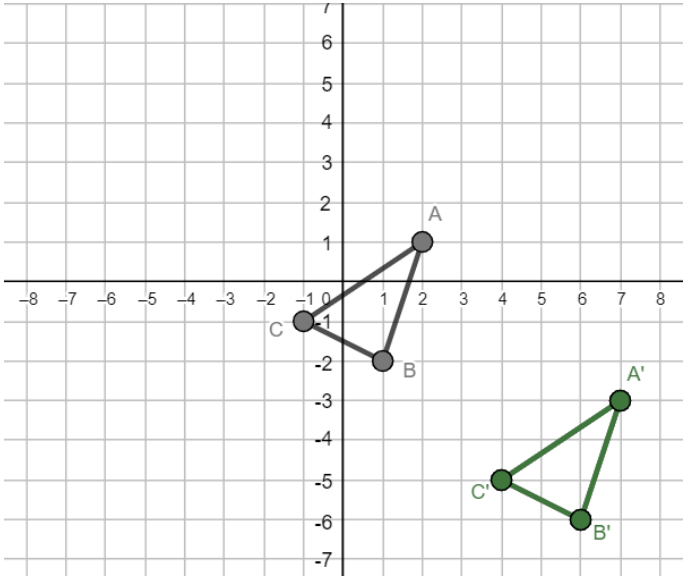
c) Does the graph suggest a relationship between the Annual Salary and the Number of Years of Experience? How do you know? **Yes, you can sketch in a line of best fit.**

d) Questions
- What age of people were surveyed?
- Where types of jobs were people doing?
- Did everyone have university education?
- Are all the people in Canada? Ontario? York Region?

Misleading
- I feel this graph is misleading because it doesn't tell you who was surveyed and where in the world they were surveyed.

17. ΔABC is translated (+5) units in the x-direction and (-4) units in the y-direction. Identify the coordinates of the new triangle.





A'(7,-3)
B'(6, -6)
C'(4, -5)

18. Describe some advantages and disadvantages of various methods of payment that can be used when dealing with multiple currencies and exchange rates

	Advantages	Disadvantages
Cash	• Aware of the exchange rate and how much money you have	• Need to go ahead of time and convert money • A fee is charged to convert funds from one currency to another • Risk involved in carrying large amounts of cash
Cheque	Not possible	
Debit card	• Convenient as it works like a regular payment • Helps maintain a budget because you can not spend more than you have in your account • Can be used as an ATM card if local currency is needed while abroad	• You will likely need a special international debit card to be able to use it in other countries • Extra fees may apply
Credit card	• The exchange rate is calculated automatically • Convenient • More security features than a debit card	• The exchange rate changes so you never know exactly what it is • For many credit cards, a fee is charged for each transaction