PRE-CALCULUS 11

ACTIVATION ASSIGNMENT

Welcome to Pre-calculus 11! This assignment will help you review some topics from your previous math courses. You will also have an opportunity to provide your teacher with information about your previous experiences in math.

Student Name: ____

Date Submitted: ____

Complete the following ***Pre-calculus 11*** Activation Assignment independently and return it to the school prior to meeting with your teacher. A scientific calculator is permitted for use on this assignment; otherwise no external resources are required.

There are five parts to this assignment:

Part 1: Linear Relations and Graphing		10 marks
Part 2: Factoring		12 marks
Part 3: Solving Equations		10 marks
Part 4: Trigonometry		13 marks
Part 5: About You		5 marks
	Total	50 marks

Contents:

14 pages

Assignment time:

2 hours

Part 1: Linear Relations and Graphing (10 marks)

You have a part-time job and earn $9.00 an hour. This is a linear relation and can be represented in many ways.

In words: For every hour you work, you earn $9.00.

In a table:

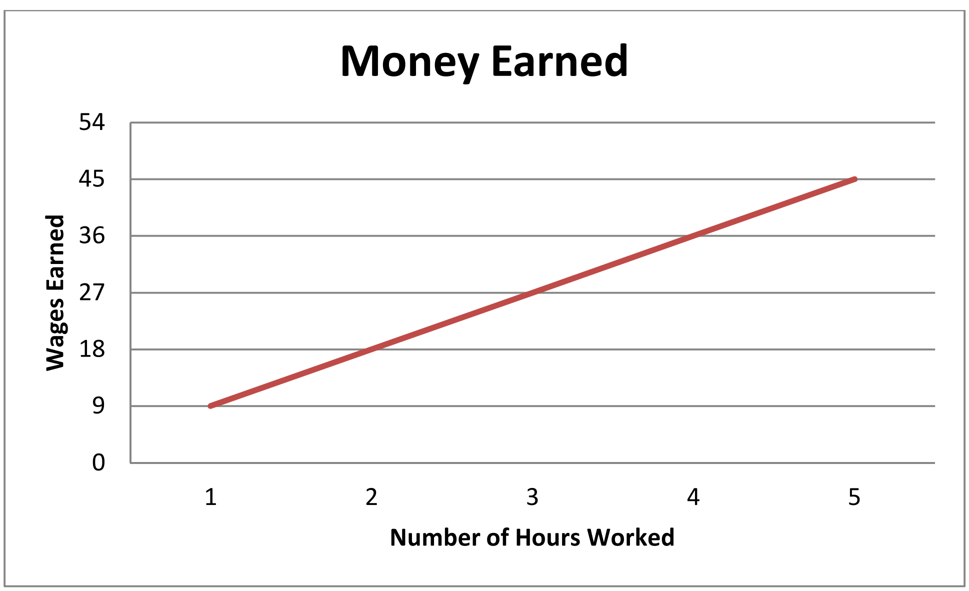
Number of hours worked	Amount of money earned
1	$ 9.00
2	$ 18.00
3	$ 27.00
4	$ 36.00
5	$ 45.00

As ordered pairs:

(# of hours worked, $ earned)

(1, 9)
(2, 18)
(3, 27)
(4, 36)
(5, 45)

In a graph:



As an equation: $W = 9h$, where W represents wages earned and h represents the number of hours worked.

Okay, it's your turn! You will be provided a situation and you will be asked to express this situation in each of the other 5 formats.

Situation: *A plumber comes out to fix your kitchen sink. She charges a fixed rate of $30 an hour, plus a call-out fee of $15.*

Represent this situation (2 marks each)

In words: ____

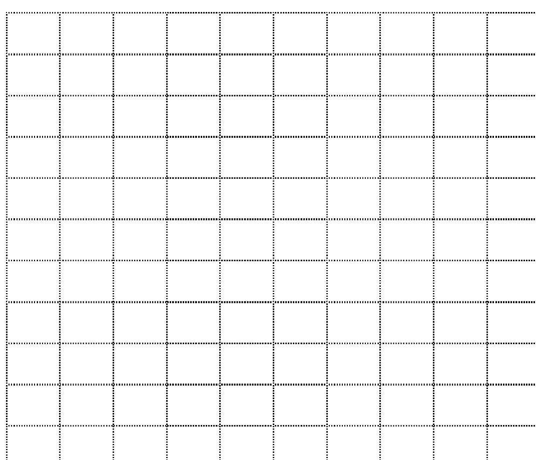
In a table:

As ordered pairs:

(,)

(,)
(,)
(,)
(,)
(,)

In a graph:



As an equation:

Part 2: Factoring (12 marks)

Here are some examples to remind you about factoring. Please answer the questions that follow each type of factoring.

Common Factoring

You can factor out a Greatest Common Factor (G.C.F.) from polynomials involving two or more terms. Always ensure you factor the whole polynomial completely (regardless of whether the question asks you to "factor" or "factor completely").

Example 1: Factor $4x + 8$

Solution: The GCF in this expression is 4. Therefore $4x + 8 = 4(x + 2)$

Example 2: Factor $2x^2 - 10x$

Solution: The GCF in this expression is $2x$. Therefore $2x^2 - 10x = 2x(x - 5)$

Factor (1 mark each).

1. a. $30x + 8$

   b. $64ab - 32bc$

Factoring Trinomials

Always look to see if you can factor out a GCF. After that, there are three types of trinomials you can factor:

Difference of Squares ($ax^2 - c$)

An example of these special trinomials would be in the form $ax^2 - c$, where a and c are perfect squares and there is no middle x term. In this case, the factored form would be $(\sqrt{a}x + \sqrt{c})(\sqrt{a}x - \sqrt{c})$.

Example 3: Factor $x^2 - 9$

Solution: This is a difference of squares. So $x^2 - 9 = (x+3)(x-3)$

Example 4: Factor $24x^4 - 54y^2$

Solution: Factor out the common factor of 6 to get
$24x^4 - 54y^2 = 6(4x^4 - 9y^2)$
Then square root the first term to get $2x^2$. Square root the second term to get $3y$.
So $32x^4 - 64y^2 = 6(2x^2 + 3y)(2x^2 - 3y)$

Factor (2 marks each).

1. a. $16x^2 - 1$ b. $12b^2 - 27c^2$

Trinomials of the type $x^2 + bx + c$

To help understand how these polynomials are formed, let's look at multiplying binomials using the distributive property. You may have heard this referred to as "FOILing." Let's see what happens when we multiply $(x+5)(x-3)$.

		F	O	I	L
$(x+5)(x-3)$	$= x^2 - 3x + 5x - 15$	x^2	$-3x$	$+5x$	-15
	$= x^2 + 2x - 15$ ← gather like terms				

In the trinomial $x^2 + 2x - 15$, the middle term is a result of the addition of factors and the last term is a result of the multiplication of factors. When we factor trinomials of this type, we need to find the correct factors. Let's factor the trinomial we just calculated.

Example 5: Factor $x^2 + 2x - 15$

Solution: We need to find two factors that will multiply to get a product of -15 and will add to a sum of $+2$. Let's create a table of factors. Since we want only those factors that will create a product of -15, we do not have to include this column in our table.

Factor 1	Factor 2	Sum of factors
+1	-15	-14
+3	-5	-2
-1	+15	+14
-3	+5	+2

The last line in our table shows the successful factors for this trinomial!

So $x^2 + 2x - 15 = (x - 3)(x + 5)$.

Notice that these are the factors that we originally started with (see the previous page).

Factor (2 marks each).

2. a. $a^2 - 25a + 24$ b. $k^2 - 2k - 80$

Trinomials of the type $ax^2 + bx + c$

Trinomials of this type can be factored using the same methods as trinomials of the type $x^2 + bx + c$ with one additional step. Let's multiply $(3x + 5)(2x + 1)$ to see what happens.

		F	O	I	L
$(3x + 5)(2x + 1)$	$= 6x^2 + 3x + 10x + 5$	$6x^2$	$+3x$	$+10x$	$+5$
	$= 6x^2 + 13x + 5$ ← gather like terms				

The difference with this trinomial is the "6" in front of the x^2 term. This numerical coefficient is the result of the multiplication of the 'x' terms in the original factors. Let's now factor this trinomial.

Example 6: Factor $6x^2 + 13x + 5$

Solution: Multiply the numerical coefficient in front of the x^2 term (6) with the constant $(+5)$ to get a product of $+30$. This is the product we will use for our factors chart. We are still looking for our factors to add to a sum of $+13$ (from the middle term)

Factor 1	Factor 2	Sum of factors
+1	+30	+31
+2	+15	+17
+3	+10	+13
+5	+6	+11
-1	-30	-31
-2	-15	-17
-3	-10	-13
-5	-6	-11

The circled line in our table shows the successful factors for this trinomial! Use these factors to replace the +13x term in our trinomial to get

$$6x^2 + 13x + 5 \quad = 6x^2 + 3x + 10x + 5$$

Now, find the Greatest Common Factor (GCF) of the first two terms and the GCF of the last two terms and factor.

$6x^2 + 13x + 5 \quad = 6x^2 + 3x \quad +10x + 5$

factor out GCF

$= 3x(2x + 1) \quad +5(2x + 1)$

Notice that $(2x + 1)$ is common to both terms. This is another example of a GCF. Factor to get your final answer.

$6x^2 + 13x + 5 \quad = 6x^2 + 3x \quad +10x + 5$

$= 3x(2x + 1) \quad +5(2x + 1)$

$= (2x + 1)(3x + 5)$

Factor (2 marks).

3. $10a^2 - 11a - 6$

Part 3: Solving Equations (10 marks)

Some equations can be solved by inspection; others by guessing and checking. However, you should be using proper equation solving techniques. Remember: "what you do to one side of the equation, you must also do to the other side of the equation" and "do the opposite" to help you solve these equations.

You will be given some examples to help refresh your memory about solving equations. Then please solve the equations that follow the examples.

Example: Solve $x + 5 = 9$

Solution: Since 5 was added to x in the equation, we will do the opposite and subtract 5 from both sides to solve.

$$x + 5 = 9$$
$$\underline{\quad -5 \ \ -5}$$
$$x \qquad = 4$$

Example: Solve $6x + 17 = 65$

Solution:

$$6x + 17 = 65$$
$$\underline{\quad -17 \ -17}$$
$$6x \qquad = 48$$
$$\frac{6x}{6} \qquad = \frac{48}{6}$$
$$x \qquad = 8$$

Example: Solve $5x - 18 = 2x + 6$

Solution:

$$5x - 18 = 2x + 6$$
$$\underline{-2x + 18 - 2x + 18}$$
$$3x \qquad = \qquad 24$$
$$\frac{3x}{3} \qquad = \qquad \frac{24}{3}$$
$$x \qquad = \qquad 8$$

Example: Solve $2(x+2)=-6$

Solution:

$$2(x+2)=-6$$

$$2x+4=-6$$

$$\underline{\quad -4 \quad -4}$$

$$2x=-10$$

$$\frac{2x}{2}=\frac{-10}{2}$$

$$x=-5$$

Example: Solve $\frac{x-2}{3}+\frac{x+1}{2}=4$

Solution: $\frac{x-2}{3}+\frac{x+1}{2}=4$

$$6\times\left(\frac{x-2}{3}\right)+6\times\left(\frac{x+1}{2}\right)=6\times(4)$$

$$2(x-2)+3(x+1)=24$$

$$2x-4+3x+3=24$$

$$5x-1=24$$

$$\underline{\quad +1 \quad +1}$$

$$5x=25$$

$$\frac{5x}{5}=\frac{25}{5}$$

$$x=5$$

Now it's your turn! Solve the following equations. Show all of your work. (2 marks each)

1. $4+\frac{b}{3}=-1$

2. $2.9+6x=1.1$

3. $3x-4=8-x$

4. $7+5(x-3)=3(x+2)$

5. $\frac{2y+1}{3}-\frac{y+4}{5}=7$

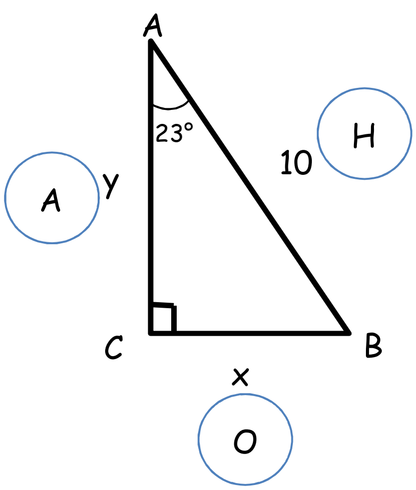
Part 4: Trigonometry (13 marks)

Sine, cosine, and tangent ratios are useful for solving (finding the measure of the sides and angles of) right triangles. For each triangle:

- draw and label your right triangle (**O***pposite*, **A***djacent*, **H***ypotenuse*) and fill in any known values
- write out the correct trigonometric ratio
- solve the equation
- write the correct answer with applicable units

Example:

Find all of the unknown sides and angles of the following triangle.



Solution: label the triangle with O, A, and H

Finding x: $\sin 23° = \frac{O}{H} = \frac{x}{10}$

$\sin 23° = \frac{x}{10}$

$x = 10 \times \sin 23° = 3.9$

Finding y: $\cos 23° = \frac{A}{H} = \frac{y}{10}$

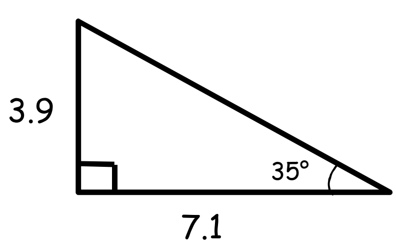
$\cos 23° = \frac{y}{10}$

$y = 10 \times \cos 23° = 9.2$

Since all angles in a triangle will add up to 180°, angle B = $180 - 90 - 23 = 67°$

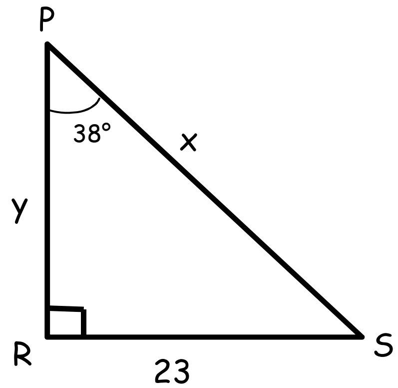
Now it's your turn!

1. Label the following triangle with O, A, and H (1 mark).

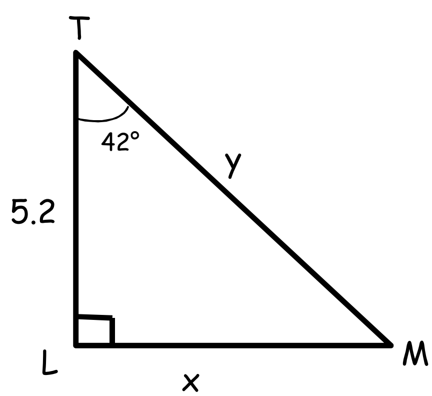


2. Solve the following triangles. Show all work. (6 marks each)

a.



b.



Part 5: About You (5 marks)

This is your opportunity to provide information about your past interactions with math, as well as your strengths and weaknesses. In a short paragraph, please provide the following information:

- The last math course you took, when you finished it, and how well you did in it
- The part of the course that you enjoyed the most or was the easiest for you
- The part of the course that you disliked or was difficult for you
- The mark you expect to achieve in this course
- Any other information you think will help me help you in this course