

MFM2PI – Exam Review

Unit 1 – Equations

1. Solve each equation.

a) $12 = 3x$

b) $s + 5 = 11$

c) $y - 3 = 14$

d) $\frac{x}{11} = 3$

e) $x + 3 = 5$

f) $2l = 3t$

2. Solve each equation.

a) $3 = 3x - 3$

b) $2x - 6 = 12$

c) $11 = 5x + 6$

d) $2w - 3 = 11$

3. Solve each equation.

a) $3w - 2 = 2w + 3$

b) $5q + 6 = 4q - 9$

c) $6t - 7 = 2t + 5$

d) $-2x + 4 = 3x - 2$

e) $5c = 6c + 7$

f) $6 - 5k = 4 + 3k$

4. Solve each equation.

a) $\frac{2r}{7} = -4$

b) $\frac{3x}{4} = 15$

c) $14 = \frac{7k}{5}$

d) $9 = -\frac{3y}{11}$

e) $\frac{5r}{9} = 10$

f) $\frac{4t}{3} = -8$

g) $-6 = -\frac{2g}{5}$

h) $\frac{2w}{9} = -10$

5. Solve each equation.

a) $3(x + 6) = 2(x - 1)$

b) $2y - 3(-1) = 6 - 4y$

c) $1 - (2 + w) = w + 5$

d) $3(2 - k) = 10 + k$

e) $3(j + 1) = 5(j - 3)$

f) $4(3g - 5) = -2(46 + 3g)$

6. Solve the following word problem.

Alan takes a taxi from his house to his friend Drew's home. Their homes are 6 km apart. The taxi driver charges a flat fee of \$10 plus \$0.25/km. This can be modelled using the equation $C = 0.25x + 10$, where x represents the distance travelled in kilometres, and C represents the cost in dollars. How much will the taxi ride cost?

Unit 2 – Measurement

Circumference of a Circle	
Area of a Rectangle	
Area of a Triangle	—
Area of a Circle	
Surface Area of a Rectangular Prism	
Surface Area of a Cylinder	
Surface Area of a Pyramid	
Volume of a Rectangular Prism	
Volume of a Triangular Prism	—
Volume of a Cylinder	
Volume of a Cone	—
Volume of a Sphere	—

1 foot	12 inches
1 yard	3 feet
1 mile	1760 yards
1 mile	5280 feet
1 gallon	4 quarts
1 pound	16 ounces
1 inch	2.54 cm
1 foot	30.48 cm
1 yard	0.9144 m
1 mile	1.609 km

1. Convert the following measures.

(a) 3 m = _____ cm

(d) 7 yd = _____ ft

(g) 5 IIII = _____ KIII

(b) 2.5 m = _____ km

(e) 2 ft = _____ in

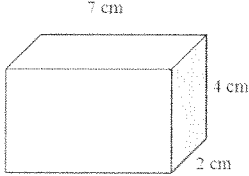
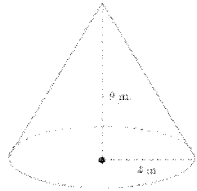
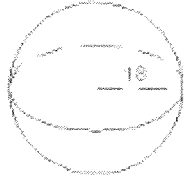
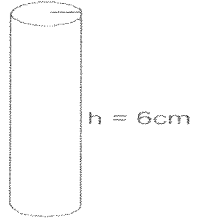
(h) 8 in = _____ cm

(c) 8.3 cm = _____ mm

(f) 75 in = _____ ' _____ "

(i) 2 m = _____ yd

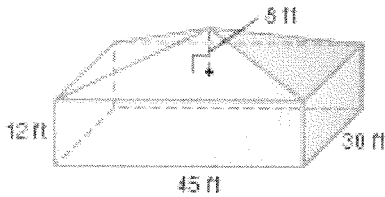
2. Calculate the following measurements.

<p style="text-align: center;">Surface Area</p> 	<p style="text-align: center;">Volume</p> 
<p style="text-align: center;">Volume</p> 	<p style="text-align: center;">Surface Area</p> 

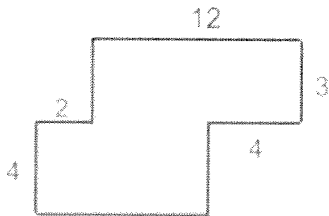
3. How much ice cream will fill a cone with radius 3" and height 6"? Draw a diagram.

5. What is the minimum cost for you to fill a box of dimensions 2 m by 4m by 3m with sand if the cost of sand is \$2.50 per cubic metre ?

6. The Monroes are calculating the volume of their home to determine how much space their furnace is heating. Find the volume of their home.



7. Calculate the area of the following shape.

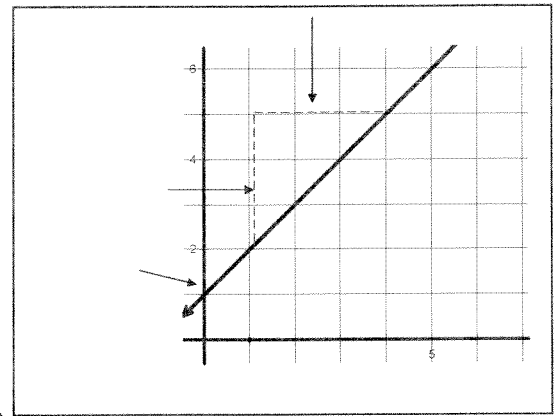
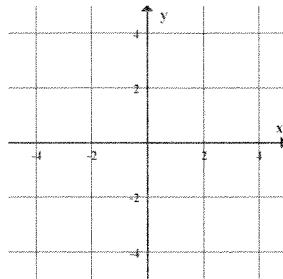


Unit 3 – Equations of Lines

Every ordered pair is made up of 2 coordinates – an x and a y coordinate. x is always listed first. (x, y)

Plot the following points

- A (4, 5)
- B (-2, 5)
- C (3, -4)
- D (-3, 0)
- E (0, -4)
- F (-4, -3)

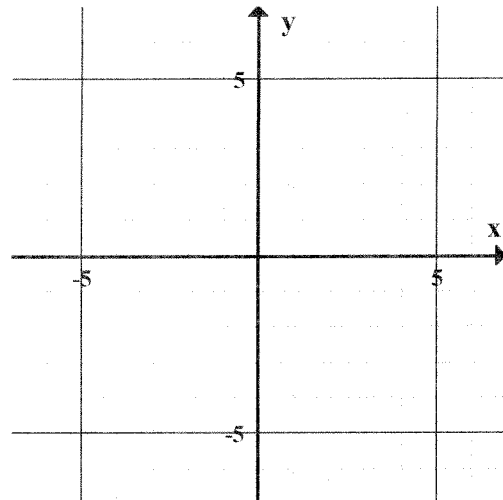


represents the slope of the line

represents the y-intercept

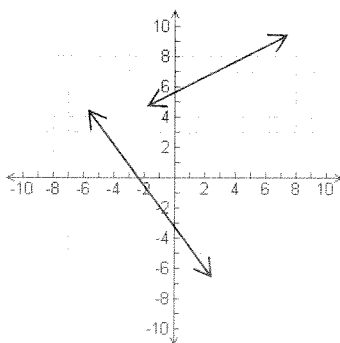
For each of the following, identify the slope and y-intercept.

EQUATION	SLOPE	Y-INTERCEPT
$y = \frac{2}{3}x + 2$		
$y = \frac{-1}{5}x + 2$		
$y = 2x - 4$		



Use the information above to graph each of the lines on the grid to the right.

Write the equation for each of the following lines in $y = mx + b$ form.



Write an equation to represent each of the following situations.

- a) A banquet hall charges a flat rate of \$250, plus \$25 per person. _____
- b) Allie earns \$15 per hour. _____
- c) A cell phone provider charges \$15 per month, plus \$0.07 per minute used. _____
- d) You are given 50 minutes of cell phone air time each month. You use 10 minutes each day. _____

a) Calculate her earnings after 8 hours.

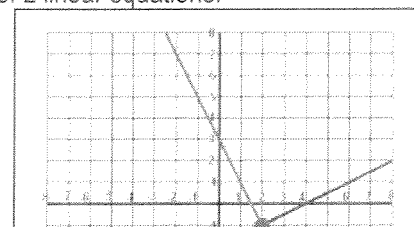
b) If she earns \$45, how many hours did she work?

Unit 4 – Systems of Equations

When we solve a system, we are identifying the point of intersection (POI) of 2 linear equations.

1. Given the following system, identify the point of intersection and complete a left side / right side check.

- 1) $y = -2x + 3$
- 2) $y = \frac{1}{2}x - 2$



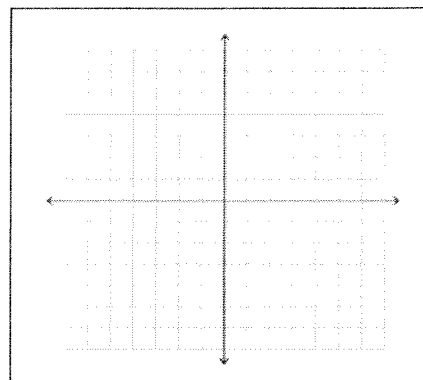
$$\text{POI} = (\underline{\hspace{1cm}}, \underline{\hspace{1cm}})$$

2. Solve the system by graphing the two lines.

1) $y = 2x + 1$

2) $y = x - 2$

POI = (,)



3. Solve the following systems using substitution.

$$x = -4y + 6$$

$$2x - 3y = 1$$

$$2x + 3y = 5$$

$$x - 4y = -14$$

4. Solve by comparison.

$$y = 2x + 7$$

$$y = -3x + 2$$

$$C = 16n - 12$$

$$C = 8n + 12$$

5. Solve the following systems using elimination.

$$\begin{aligned}3x + 2y &= 19 \\5x - 2y &= 5\end{aligned}$$

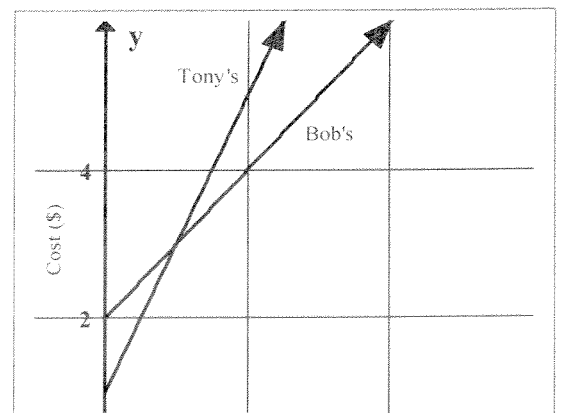
$$\begin{aligned}2m - 3n &= 12 \\5m - 3n &= 21\end{aligned}$$

$$\begin{aligned}x - y &= 3 \\x + y &= 7\end{aligned}$$

$$\begin{aligned}3x + 2y &= 2 \\4x + 5y &= 12\end{aligned}$$

6. The graph to the right shows the cost of 2 bike company rental costs. Tony's bike shop charges \$1 per day, and an additional \$2 per hour. Bob's bicycles rents his bikes for \$2 per day, and an additional \$1 per hour.

a) What is the point of intersection?



b) What does the point of intersection represent in the context of the question?

c) Which rental shop has the best deal? Explain.

Unit 5 – Similar Triangles

When 2 triangles are similar:

1) _____

2) _____

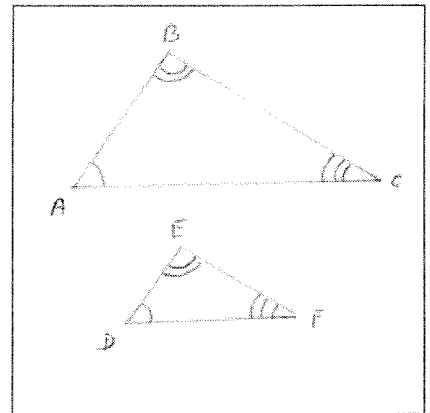
For the triangles shown to the right, $\triangle ABC \sim \triangle DEF$

$\angle A =$ _____

$\angle B =$ _____

$\angle C =$ _____

$\frac{AB}{EF} = \frac{AC}{DF} = \frac{BC}{DE}$



Ex. 1: To solve for missing sides, you must be able to solve proportions. To do this, you need to remember how to cross multiply.

a) $\frac{x}{3} = \frac{12}{15}$

b) $\frac{14}{9} = \frac{y}{27}$

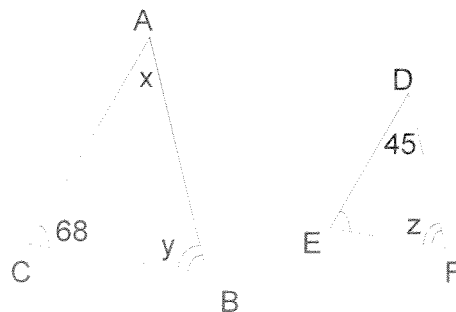
c) $\frac{4}{x} = \frac{6}{12}$

Ex. 2: For the two similar triangles, find the missing angles.

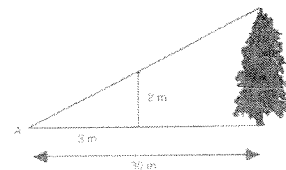
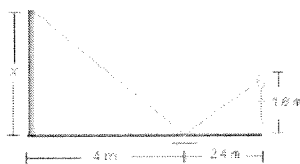
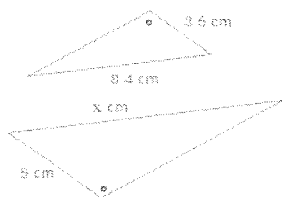
(a) $x =$ _____

(b) $y =$ _____

(c) $z =$ _____

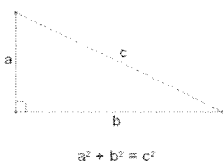


Ex. 3: Solve for each missing side (to 1 decimal).



Unit 6 – Trigonometry

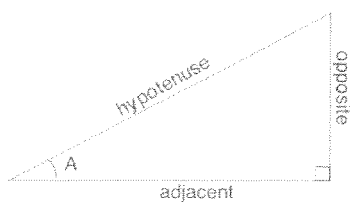
Pythagorean Theorem:



The hypotenuse is always _____
and is _____

Ex 1. Solve for the missing side:

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SOH CAH TOA

$$\sin A = \frac{\text{opposite}}{\text{hypotenuse}} \quad \cos A = \frac{\text{adjacent}}{\text{hypotenuse}} \quad \tan A = \frac{\text{opposite}}{\text{adjacent}}$$

To solve problems involving trigonometry, remember the steps to CLASS

C – Circle the angle of reference.



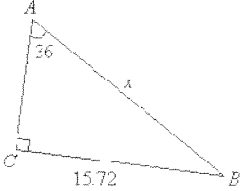
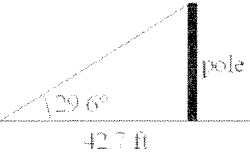
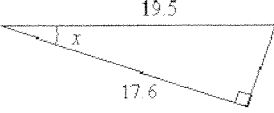
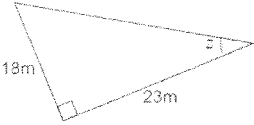
L – Label the sides (opp, adj, hyp).

A – Choose the appropriate ratio.

×

S – Substitute the numbers into the ratio.

S – Solve the question.

<p>Solve for x to 1 decimal.</p> 	<p>Using the angle of elevation, calculate the height of the pole to 1 decimal.</p> 	<p>Find the unknown angle to the nearest degree.</p> 
<p>Find the missing angle</p> 	<p>A flagpole is 10 m high. How far away do you have to stand for your angle of elevation to the top to be 50°? Include a diagram and round your answer to 1 decimal.</p>	

Unit 7 – Algebraic Expressions

1. Expand each of the following and write the equation in standard form to identify the y-intercept.

a) $y = (x + 3)(x + 1)$

b) $y = (x + 2)(x + 5)$

c) $y = x(x + 5)$

y-intercept _____

y-intercept _____

y-intercept _____

d) $y = (x - 6)(x - 2)$

e) $y = (x + 6)(x - 6)$

f) $y = (x + 1)^2$

y-intercept _____

y-intercept _____

y-intercept _____

2. Write each equation in factored form to identify the x-intercepts.

a) $y = x^2 + 8x + 7$

b) $y = x^2 - x - 12$

c) $y = x^2 + 5x - 14$

x-int = _____ and _____

x-int = _____ and _____

x-int = _____ and _____

d) $y = x^2 - 49$

e) $y = x^2 + 7x$

f) $y = 2x^2 - 14x + 20$

x-int = _____ and _____

x-int = _____ and _____

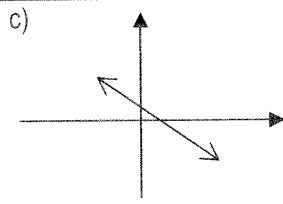
x-int = _____ and _____

Unit 8 – Introduction to Quadratics

1. State whether the following relations are linear, quadratic or neither.

a) $y = 4x + 5$

b) $y = -2x^2 - 4$



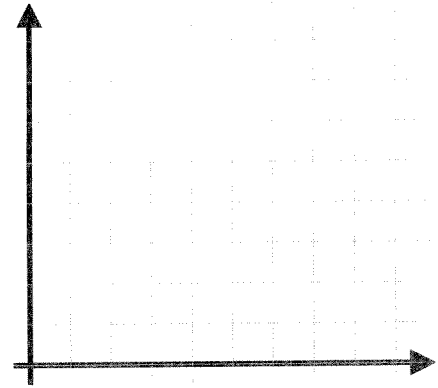
d)

x	y
-1	-4
0	0
1	4
2	8

2. Given the table representing the height of a golf ball compared with time, complete the following.

a) Graph the information from the table. Label the axes.

Time (sec)	Height (m)
0	0
2	14
4	20
6	14
8	0



b) What is the maximum height of the ball?

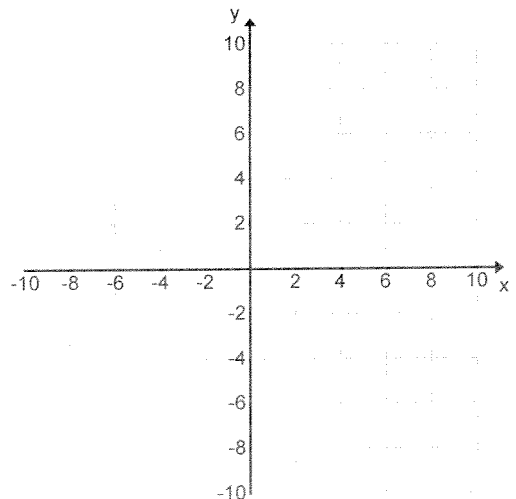
c) When was the ball at its maximum height?

d) How long was the golf ball in the air?

3. Plot the following function using the tables of values provided.

a) $y = -x^2 + 2$

x	$y = -x^2 + 2$
-3	
-2	
-1	
0	
1	
2	
3	



4. Label the five key features of the following parabola.

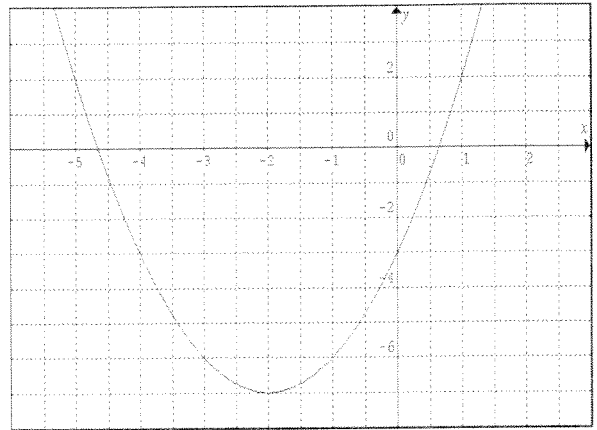
Zeroes

Axis of Symmetry

Maximum/Minimum

Vertex

y-intercept



5. Identify each of the following key features for the parabola.

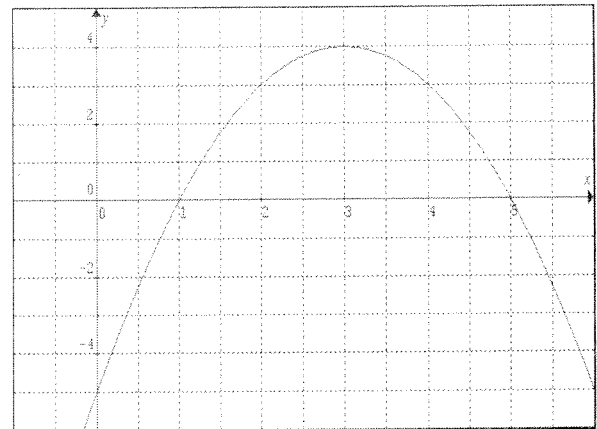
Zeroes

Axis of Symmetry

Maximum/Minimum

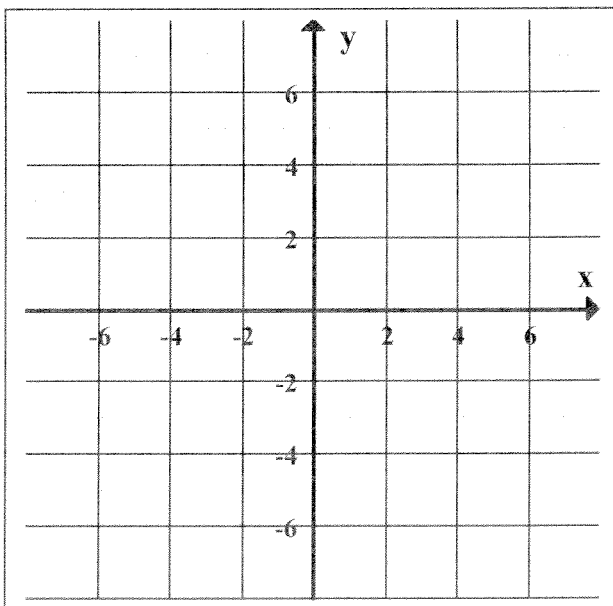
Vertex

y-intercept

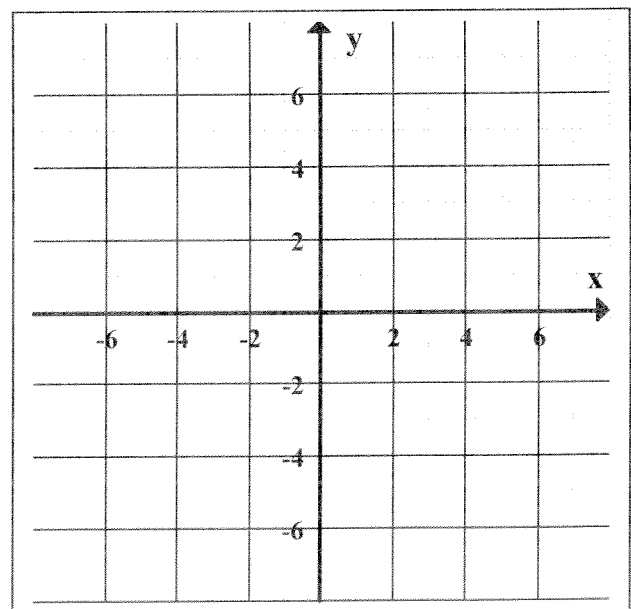


6. Using the given information, sketch each of the following parabolas.

a) Vertex at (5,1) with zeros at 3 and 7

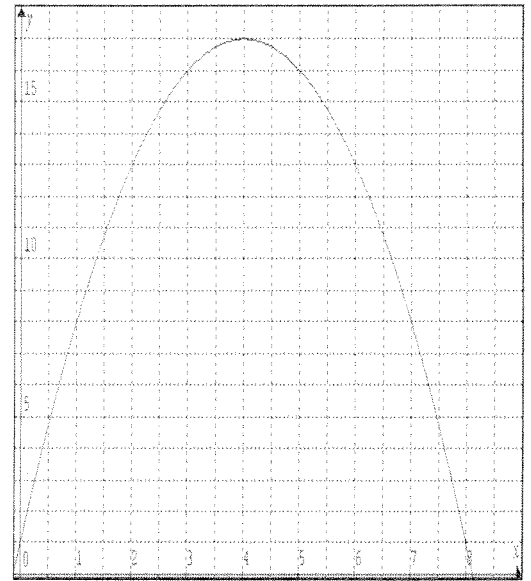


b) vertex at (2, -1), y-intercept at (0,3), zero at (1,0)



7. The graph below shows the height, in meters, of an arrow being shot into the air versus time, in seconds.

- a) What is the initial height of the arrow? _____
- b) What is the maximum height of the arrow? _____
- c) At what time does the maximum height occur? _____
- d) When is the arrow 11 m above the water? _____
- e) What height is the arrow after 5 seconds? _____
- f) How long is the arrow at least 13m above the ground? _____
- g) When does the arrow hit the water? _____



8. Find the x - and y -intercepts for each quadratic relation and use the information, along with the axis of symmetry, to make a sketch on the grid provided.

a) standard form:

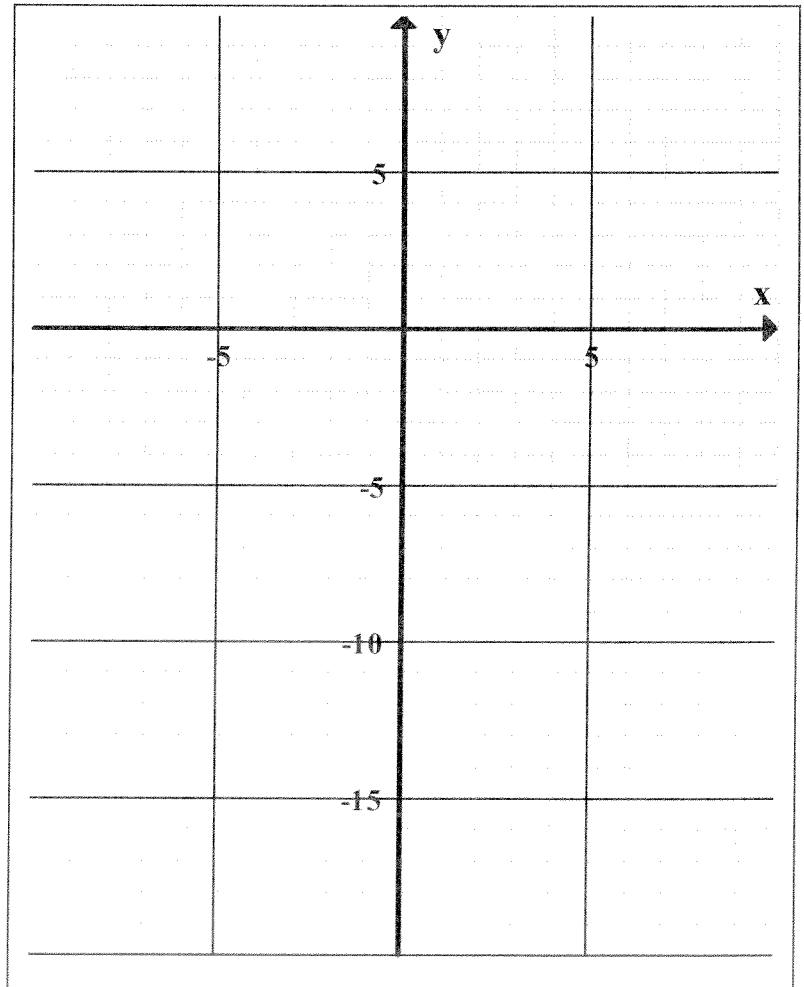
Factored form:

y -intercept:

x -intercepts:

axis of symmetry

vertex



Unit 1 – Equations

Unit 2 – Measurement

Unit 3 – Linear Relations

Unit 4 – Linear Systems

Unit 5/6 – Similar Triangles and Trigonometry

Unit 7/8 – Algebraic Expressions and Quadratics