Unit One – Linear Systems – Re-Test

Name: Solutions

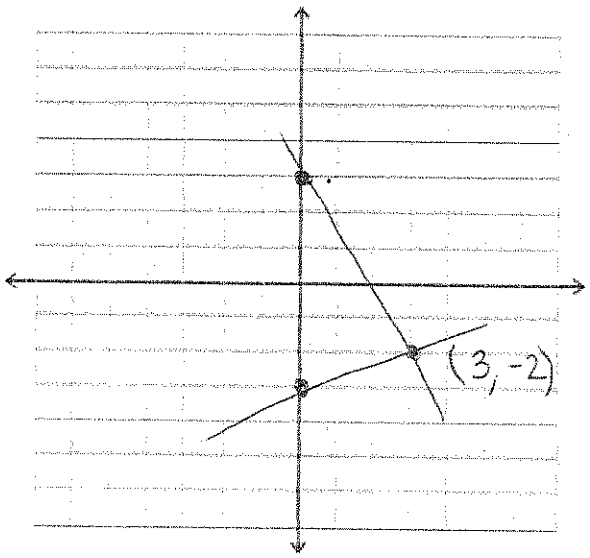
Learning Goals:

- Solve a linear system by the method of substitution.
- Solve a linear system by the method of elimination.
- State how many solutions a linear system has by either inspection or solving the system.
- Give examples of a linear system with one, none, or infinitely many solutions.

Criteria Assessment of Communication	Level			
	1 Rarely	2 Sometimes	3 Frequently	4 Always
Mathematical symbols, labels, units and conventions are used correctly				
Written solutions and conclusions explain and justify ideas with clarity				
Calculations are neatly presented in an organized manner				

/33 X 90%	/10 X 10%	

1. Solve $y = \frac{-5}{3}x + 3$ and $y = \frac{1}{3}x - 3$ by drawing the graph. **[4 marks]**



2. Algebraically check that the point of intersection you found in question 1 is the solution to the system. **[4 marks]**

L.S.	R.S

L.S	R.S

3. Solve by the method of substitution. **[5 marks]**

$x = 2y + 10$

$3x - 2y = 14$

$3(2y+10) - 2y = 14$

$6y + 30 - 2y = 14$

$4y = -16$

$y = -4$

$x = 2(-4) + 10$

$= -8 + 10$

$= 2$

$(2, -4)$

Solve by the method of elimination. **[5 marks]**

$3x - y = -1$
$x + 2y = 16$

$3x - y = -1 \rightarrow 6x - 2y = -2$
$x + 2y = 16 \rightarrow x + 2y = +16$

$7x = 14$
$x = 2$

$y = 1 + 3x$
$y = 1 + 3(2)$
$y = 7$

$(2, 7)$

5. You solve a linear system of equations and get the following solution. What does this tell you about the system of equations for which you are trying to find a solution? **[2 marks]**

$y = 2x - 4$
$2y - 4x = -8$

$2(2x - 4) - 4x = -8$ – same line
$4x - 8 - 4x = -8$ – infinitely many solutions
$0x = -8 + 8$
$0 = 0$

6. Mrs. Hamilton was in charge of ticket sales for the school musical, Beauty and The Beast. On Thursday night, she sold 55 adult tickets and 42 student tickets for a total of $1080 in sales. On Friday night, she sold 70 adult tickets and 51 student tickets for a total of $1350 in sales. **How much did each ticket type (adult and student) cost?**

a) Define your variables and create a system of equations that models this situation. **[4 marks]**

$55a + 42s = 1080$
$70a + 51s = 1350$

a = adult cost
s = student cost

b) Solve the system of equations by the method of your choice. **[4 marks]**

$a = 12$
$s = 10$

c) Check both equations to ensure the solution is correct. **[4 marks]**

d) Make a concluding statement about the cost of the tickets. **[1 mark]**

Unit Two – Analytic Geometry – Re-Test

Name: Solutions

Learning Goals:

- Solve a linear system by the method of substitution.
- Solve a linear system by the method of elimination.
- State how many solutions a linear system has by either inspection or solving the system.
- Give examples of a linear system with one, none, or infinitely many solutions.

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Written solutions and conclusions explain and justify ideas with clarity				
Calculations are neatly presented in an organized manner				

/25 X 90%	/10 X 10%	

1. Given the points A(-2,-6) and B (-8, 12), determine the following:

a) the length of segment AB correct to 2 decimal places. [3 marks]

$$L = \sqrt{(-8+2)^2 + (12+6)^2}$$

$$= \sqrt{(-6)^2 + (18)^2} \qquad = \sqrt{360} \qquad = \sqrt{360}$$

b) the slope of AB. [2 marks]

$$m_{AB} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{18}{-6} = -3$$

c) the slope perpendicular to AB. [1 mark]

$\frac{1}{3}$

d) the midpoint of AB. [2 marks]

$$M = \left(\frac{-2+-8}{2}, \frac{-6+12}{2}\right) = (-5, 3)$$

e) the equation of the perpendicular bisector to AB. [3 marks]

$y = \frac{1}{3}x + b$

$3 = \frac{1}{3}(-5) + b$

$3 = \frac{-5}{3} + b$

$3 + \frac{5}{3} = b$

$\frac{14}{3} = b$

$y = \frac{1}{3}x + \frac{14}{3}$

2. A triangle is formed by the points A (5,-4), B (2,2) and C (8,6).

a) Find the length of all three sides. [3 marks]

$AB = \sqrt{(2-5)^2 + (2+4)^2} = \sqrt{9+36} = \sqrt{45}$

$BC = \sqrt{(2-8)^2 + (2-6)^2} = \sqrt{36+16} = \sqrt{52}$

$CA = \sqrt{(8-5)^2 + (6+4)^2} = \sqrt{9+100} = \sqrt{109}$

b) Find the slope of all three sides. [3 marks]

$m_{AB} = \frac{y_2-y_1}{x_2-x_1} = \frac{2+4}{2-5} = \frac{6}{-3} = -2$

$m_{BC} = \frac{y_2-y_1}{x_2-x_1} = \frac{6-2}{8-2} = \frac{4}{6} = \frac{2}{3}$

$m_{CA} = \frac{y_2-y_1}{x_2-x_1} = \frac{6+4}{8-5} = \frac{10}{3}$

c) Classify the triangle. [1 mark]

Scalene + non-right

3. A circle has a centre at (0,0) and a radius of 7.

a) What is the equation of this circle? [2 marks]

$x^2+y^2=49$

b) State the coordinates of any 2 points on the circle. [2 marks]

(0,7) and (7,0)

c) Does the point (-3,6) lie on, outside, or inside the circle? Clearly show your steps that show how you obtained your answer. [3 marks]

$x^2+y^2=49$

$(-3)^2+(6)^2=45$

$9+36=45$

$45=45$ ✓ ✓ ∴ on circle

Unit 3 – Trigonometry – Re-Test

Name: Solutions

Learning Goals:

- Determine if two triangles are similar and explain your reasoning.
- Given that two triangles are similar, find the missing sides or angles.
- State the primary trig ratios for a given right angle triangle.
- Use the primary trig ratios to solve for a missing side or angle in a right triangle.
- Use sine law and cosine law to solve for missing sides or angles in a non-right angle triangle.
- Use all of the above mentioned skills to solve application problems.

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Mathematical symbols, labels, units and conventions are used correctly				
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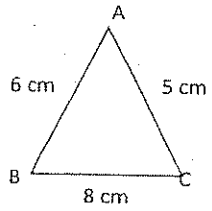
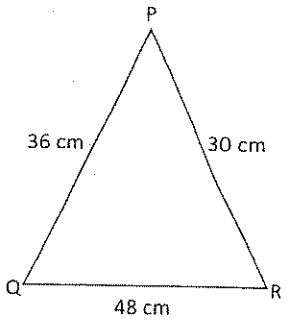
Calculations are neatly presented in an organized manner				

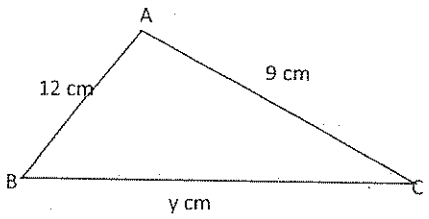
/27 X 90%	/10 X 10%	

1. Is ΔABC similar to ΔPQR? Show your mathematical reasoning. **[3 marks]**



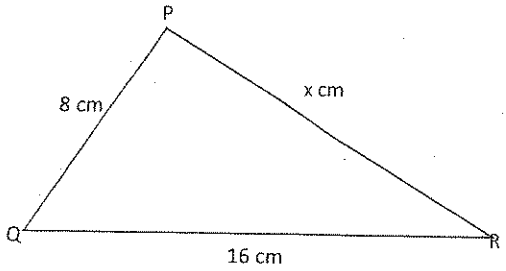


2. Given that ΔABC is similar to ΔPQR, find x and y. **[4 marks]**



$\frac{12}{8} = \frac{y}{16}$

$y = 24$

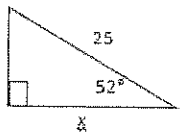


$\frac{12}{8} = \frac{9}{x}$

$x = 6$

3. For each of the triangles below, solve for the unknown. ***Round all lengths to one decimal place and round all angles to the nearest degree.*** **[6 marks]**

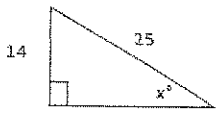
a)



$\cos 52° = \frac{x}{25}$

$x = 15.4$

b)



$\sin x = \frac{14}{25}$

$x = 34°$

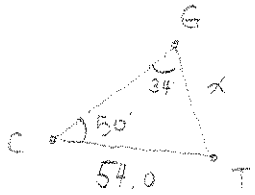
4. From the top of a lighthouse 36.0 m above sea level, the angle of depression of a small boat is 27° How far is the boat from the base of the lighthouse? **[4 marks]**

$\tan 27° = \frac{36}{x}$

$x = \frac{36}{\tan 27°}$

$x = 70.7m$

5. Gloria, Chris and Tyler are standing at the corners of a triangular plot of land. Chris is 54.0 m from Tyler. Using a transit, he sights both Gloria and Tyler and finds the angle between the two sight lines to be 50°. ~~Gaby~~ does the same and finds the angle between her sight lines to Chris and Tyler is 34°. How far is Gloria from Tyler? **[4 marks]**

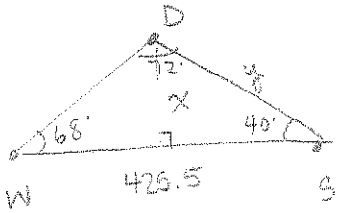


$\frac{\sin 34}{54} = \frac{\sin 50}{x}$

$x = 73.97$

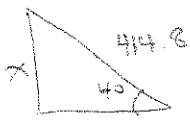
$x = 74.0$

6. Whitney and Sophal are 425.5 m apart. Dayzmara flies overhead in a plane between them. At the same time, they measure the angle of elevation of the plane. Whitney measures the angle of elevation to be 68° and Sophal measures it to be 40°. What is the ALTITUDE of the plane? **[6 marks]**



$\frac{\sin 72°}{425.5} = \frac{\sin 68°}{y}$

$y = 414.8$



$\sin 40° = \frac{x}{414.8}$

$x = 266.6m$

Unit 4 Re-Test - Quadratics in Standard Form

Name: Solutions

Learning Goals:

- Identify a quadratic relationship based on its graph, table of values, and its equation.
- From a quadratic equation in standard form, find the axis of symmetry, the vertex, the zeros and the y-intercept of the associated parabola.
- Accurately graph a parabola given an equation in standard form.
- Solve application problems given equations in standard form.

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Graphs are labeled with axes and scales and are neat.				

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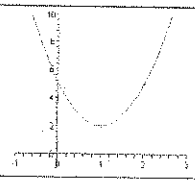
1. For each of the relationships described below by either a table of values, graph, or equation, indicate whether the relationship is linear or quadratic and give a reason for your answer. **[6 marks]**

Relationship	Linear or Quadratic	Reasoning
X | Y 1 | 3 (3) 2 | 6 (5) (2) 3 | 11 (7) (2) 4 | 18	Quadratic	1st differences are not the same - 2nd are
$y = -2x + 5$	Linear	$y = mx + b$
	Quadratic	parabola

2. Fill in the chart below to show your understanding of quadratics in standard form. **[12 marks]**

Equation	Direction of Opening	Axis of Symmetry	Vertex	y-intercept	Number of Zeros
$y = -2x^2 - 8x + 9$	down	$\frac{8}{-4} = -2$	$(-2, 17)$	$(0, 9)$	2
$y = x^2 + 4x$	up	$\frac{-4}{2} = -2$	$(-2, -4)$	$(0, 0)$	2

3. Use the quadratic formula to find the x-intercepts or zeros of $y = 2x^2 + 4x - 16$ **[4 marks]**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-4 \pm \sqrt{4^2 - 4(2)(-16)}}{2(2)}$$

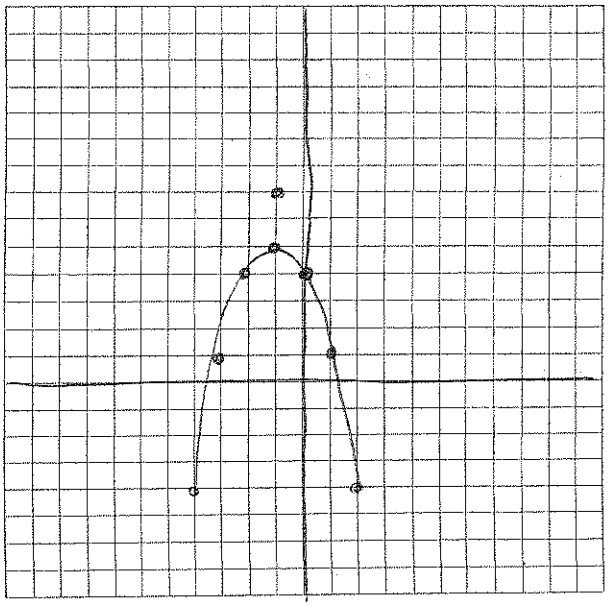
$$= \frac{-4 \pm \sqrt{144}}{4}$$

$$= \frac{-4 \pm 12}{4}$$

$$= -1 \pm 3$$

$x_1 = 2 \qquad x_2 = -4$

4. Graph the equation $y = -x^2 - 2x + 4$ making sure to show the vertex, zeros, and y-intercept. **[4 marks]**



SPACE FOR YOUR WORK:

$\frac{-b}{2a} = \frac{2}{-2} = -1$ axis

(-1, 5) · vertex

(0, 4) yint

5. A firework is launched from a platform and is supposed to explode above the lake nearby. Its motion is modelled by the equation $h(t) = -4.9t^2 + 55t + 3$ where ***h*** is the height of the firework in meters and ***t*** is the time of the flight.

   a. What is the height of the platform from which the firework is launched? **[1 mark]**

   3m

   b. If the firework doesn't explode and just continues along its path, how long is the firework in the air before it lands in the lake? **[4 marks]**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-55 \pm \sqrt{55^2 - 4(-4.9)(3)}}{-9.8}$$

$$= \frac{-55 \pm 55.5}{-9.8}$$

$= -0.05$ and 11.3s

   c. If the firework was designed to explode when the firework is 5s into the flight. At what height above the ground does this occur? **[2 marks]**

$$h(t) = -4.9(5)^2 + 55(5) + 3$$

$$= 155.5\text{m}$$

MPM2D – RE-Test – Quadratics in Factored Form

Name: Solutions

Learning Goals:

1. Given a quadratic expression in standard form, use common factoring, factoring by grouping, MAN factoring, decomposition, and difference of squares to create an expression in factored form.
2. Given an equation in factored form, find the zeros, y intercept, and vertex of the associated parabola.
3. Graph an equation given in factored form.
4. Find the solutions of a quadratic equation by factoring.
5. Problem solve using equations in factored form.

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Part A: Factoring and Solving (17 marks)

1. **Factor COMPLETELY:**

a) $3x^2 - 9xy$ **[2 marks]**

$3x(x-3y)$

b) $3xy - 12x + 4ay - 16a$ **[3 marks]**

$3x(y-4)+4a(y-4)$

$(y-4)(3x+4a)$

c) $x^2 - 12x + 20$ **[2 marks]**

$(x-10)(x-2)$ M 20, A -12, N -10, -2

d) $x^2 - 24x + 144$ **[2 marks]**

$(x-12)^2$ M 144, A -24, N -12, -12

g) $4x^2 + 20x + 25$ **[4 marks]**

$4x^2+10x+10x+25$ M 100, A 20, N 10, 10

$2x(2x+5)+5(2x+5)$

$(2x+5)^2$

3. Find the zeros of the following quadratic equations by factoring.

a) $2x^2 - 10x + 12 = 0$ **[4 marks]**

$2(x^2-5x+6)$ M 6, A 5, N -3, -2

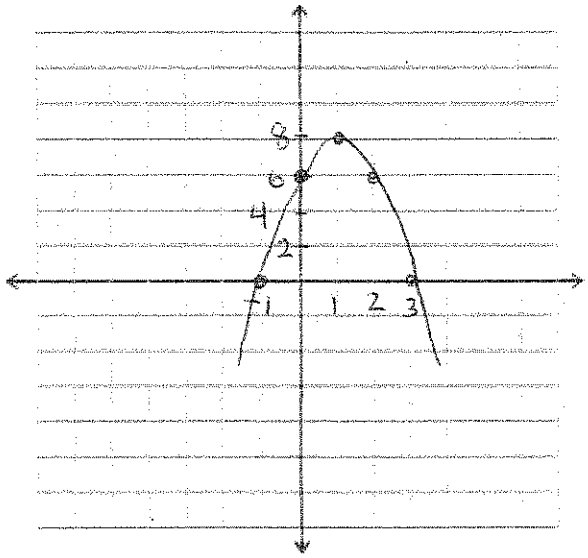
$2(x-3)(x-2)$

Zeros: 3 and 2

Part B: Graphing from Factored Form (4 marks)

For the two equations below, graph the parabola making sure to show the zeros, y-intercept, and vertex.

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



Part C: Problem Solving with Factored Form (6 marks)

6. A pro golfer, hits a golf ball and its height above the ground can be approximated by using the equation $h = -3t^2 + 6t$ where h is the height in metres and t is the time in seconds.

a) How long is the ball in the air? (Find the zeros using factoring!!) **[4 marks]**

$h = -3t^2 + 6t$

$= -3t(t-2)$

zeros: 0 and 2

2s

b) What is the maximum height and when does it occur? **[2 marks]**

Max height at $t = 1$.

$h = -3(1)^2 + 6(1)$

$= -3 + 6$

$= 3\text{m} \longrightarrow$ max height