

## MPM2D – Practice Exam

Name: \_\_\_\_\_

### SECTION A: LINEAR SYSTEMS

Solve the following systems of equations using the method of your choice. Name your method!

a)

$$y = x + 3$$

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

b)

$$3a + b = 5$$

$$2a + 3b = -6$$

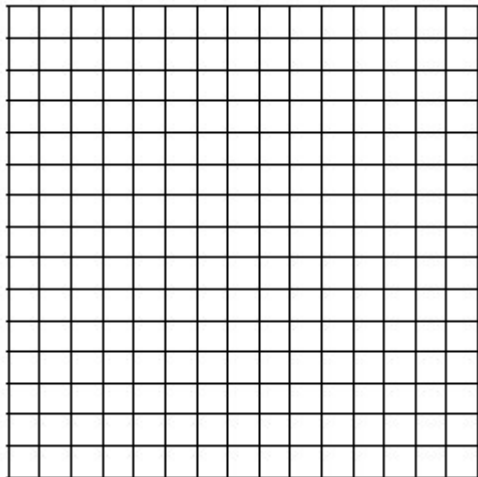
2. Mrs. Hamilton is trying to plan a party for her math classes and receive two quotes. The Hypotenuse Hall charges \$100 for a damage deposit and \$6 per person for snacks. The Pi Place charges only \$20 for a damage deposit but \$10 per person for snacks. Mrs. Hamilton needs your help!
- a) Create a linear system of equations to model this situation. Make sure to include statements that clearly identify any variables.
- b) Solve the system, clearly identifying your method.

- c) Explain in a sentence the meaning of this intersection point in context.
  
  
  
  
  
  
  
  
  
  
- d) If 35 students can attend the party, which hall provides the cheaper option?

**SECTION B: ANALYTIC GEOMETRY**

1. A circle with centre at  $(0,0)$  passes through the point  $(-12,5)$ .

- a) Find the radius of this circle.
  
  
  
  
  
  
  
  
  
  
- b) State the equation of this circle.
  
  
  
  
  
  
  
  
  
  
- c) Sketch the graph. Label clearly the intercepts on the graph.



- d) State any 2 other points that lie on the circle.

2. Given the points A (-4, 6) and B(-5, -2), determine the following:

a) the length of AB

b) the distance of A from the origin

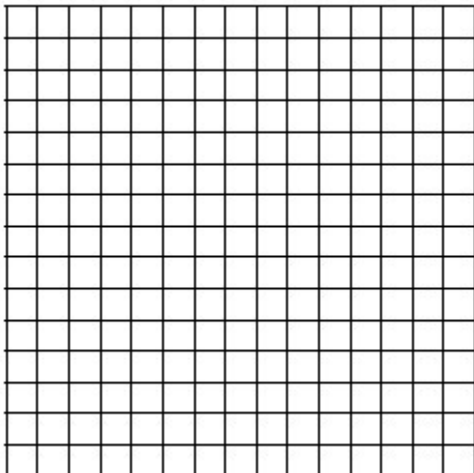
c) the midpoint of AB

d) the slope of AB

e) the perpendicular slope of AB.

3. Given triangle with vertices; A(-5,2), B(-1,6), C(5,0),

a) Sketch the triangle on the Cartesian plane.



b) Find the lengths and the slopes of each of the sides of *triangle ABC*.

c) What type of triangle is *ABC*?

### SECTION C: QUADRATIC EQUATIONS AND FUNCTIONS

1. Expand and simplify the following:

a)  $3x^2(3x^2 - 4x) - 2(x - 5)$       b)  $(2x - 4y)(3x - 6y)$       c)  $-2(x + 4)^2 - 3$

2. Factor completely.

a)  $20p^2q^5 - 15p^3q^7$       b)  $3x(x - 2) - 8(x - 2)$       c)  $n^2 + 11n + 28$

d)  $x^2 + 4x - 21$

e)  $8a^2 - 32b^2$

f)  $3x^2 - 8x + 4$

g)  $25x^2 - 10x + 1$

h)  $16x^2 + 24x + 9$

i)  $6x^2 - 19x + 15$

3. Solve the following quadratic equations, correct to 2 decimal places where necessary.

a)  $x^2 - 3x + 1 = 0$

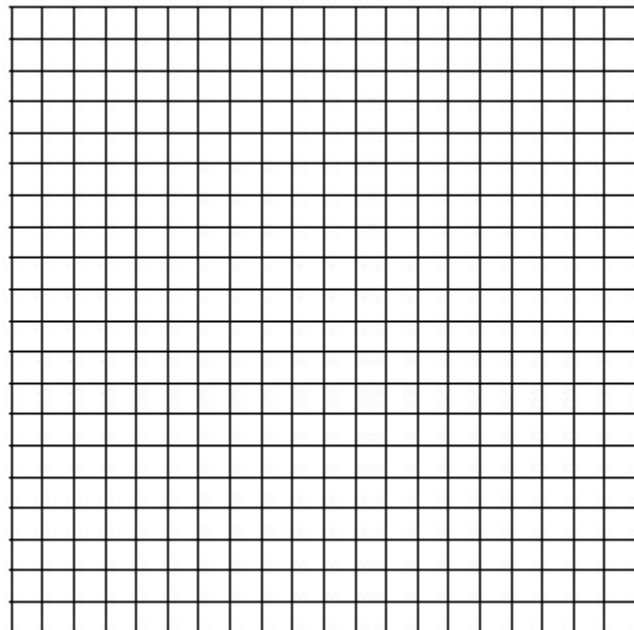
b)  $3x^2 - 2x - 8 = 0$

4. For the quadratic function

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

State:

- a) the vertex:
- b) The axis of symmetry:
- c) direction of opening:
- d) is the vertex is a maximum or a minimum value
- e) Graph the function using the vertex and at least 4 other points.

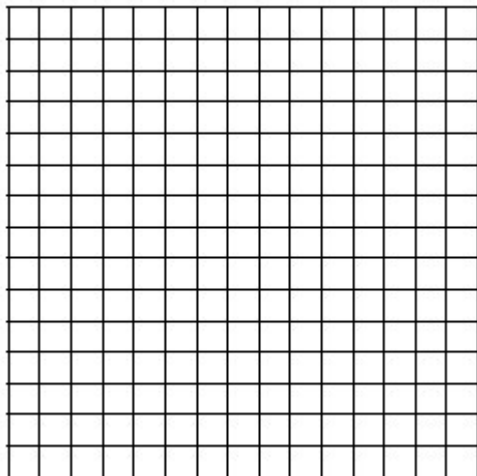


5. Given the function  $y = x^2 - 6x - 7$  in standard form.

a) Find the x intercepts of this function using factoring.

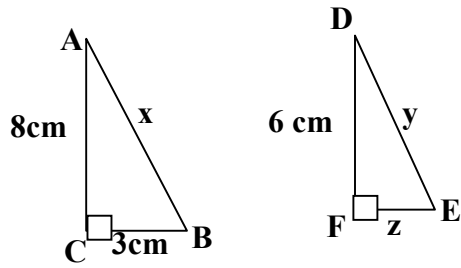
b) Change the function to VERTEX FORM.

c) Sketch the graph, clearly labelling the vertex and the x intercepts.



**SECTION D: SIMILAR TRIANGLES & TRIGONOMETRY**

1. Given that  $\triangle ABC$  is similar to  $\triangle DEF$  and that both are right angled, solve for  $x$ ,  $y$  and  $z$ . Show all work.



2. To find the height of a tree, Lawlor measures the shadow of a metre stick to be 0.58 m long. At the same time, the shadow of the tree is 4.63 m long. Using similar triangles, find the height of the tree.

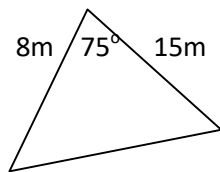
3. Solve for the indicated unknowns in the following triangles. Give length measurements correct to 1 decimal place and angles correct to the nearest degree.

<p>a)</p>	<p>b)</p>
<p>c)</p>	<p>d)</p>

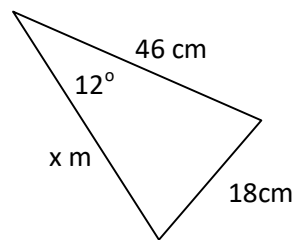
4. From the top of a 21.5 m high building, the angle of depression to the bottom of another building is  $28^\circ$ . Find the distance between the two buildings correct to one decimal place. Include a diagram.

5. Which trigonometric formula would you use to solve for the unknown side in each triangle? Explain your reason. DO NOT ACTUALLY SOLVE FOR THE UNKNOWN!

a)



b)



6. Given  $\triangle ABC$  with  $a = 15.5$  cm and  $c = 18.5$  cm and  $\angle B = 68^\circ$ . Sketch the triangle showing the given information and then solve for ALL unknown sides and angles.