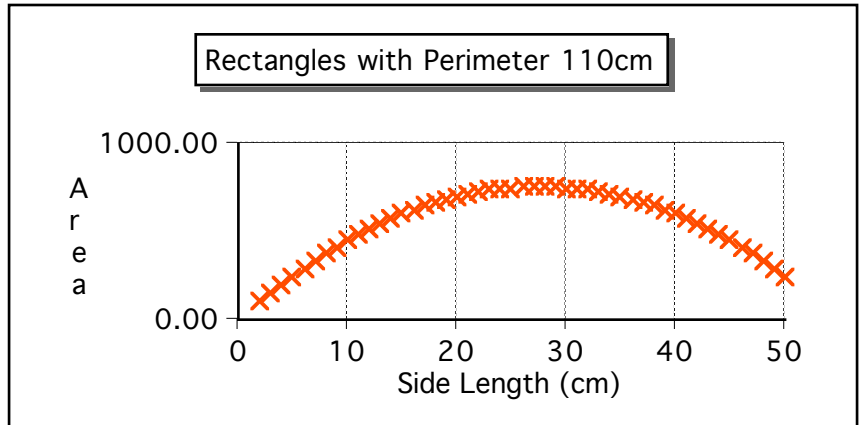


**PRACTICE EXAM
GRADE 10 MATH**

Show all your work.

1. A student was trying to determine the maximum area a rectangle could have if the perimeter was fixed at 110 cm. She chose to graph the relationship between area and side length by setting up a spreadsheet to generate area data. Part of the spreadsheet and the generated graph have been show below.

	A	B
1	Side Length	Area
2	2	106.00
3	3	156.00
4	4	204.00
5	5	250.00
6	6	294.00
7	7	336.00
8	8	376.00
9	9	414.00
10	10	450.00
11	11	484.00
12	12	516.00



- a) Given the above information determine the dimensions that give a maximum area.

2

- b) Determine the exact formula used to generate the area value in cell B3.

2

- c) Find the side length and the maximum area for a rectangle with a perimeter of 250 cm^2 .

2

2. Students in a science lab collected the following data.

Volume of Ethanol (mL)	Mass of Beaker and Ethanol (g)
18	104
26	110
92	162
150	207
175	226

- a) Plot the above data on the attached graph paper and determine an equation that expresses the mass(M) of the beaker and ethanol in terms of the volume(v) of ethanol.

3

- b) What is the slope of the line and what does it represent?

2

c) What is the M-intercept and what does it represent?

2

d) Determine the mass of the beaker and 225 mL of ethanol.

2

3. Find the equation of the line perpendicular to $2x + 3y - 7 = 0$ through the point (2,3)

4

4. The vertices of a triangle are represented by the following coordinates A(0,5) B(7,9) C(6,1).

a) Determine the equation of the line through vertex A, parallel to the side BC.

5

b) Determine the length of side AB.

3

5. Solve the following linear system.

$$3x + 5y = 12$$

$$4x - 7y = 1$$

4

4

6 Find an expression for y in terms of x .

x	y				
-2	8				
-1	3				
0	0				
1	-1				
2	0				
3	3				
4	8				

7. Solve the following using the indicated methods:

a) factor
 $x^2 - 11x - 26 = 0$

b) factor
 $12x^2 - 7x - 10 = 0$

c) complete the square
 $x^2 - 8x = 3$

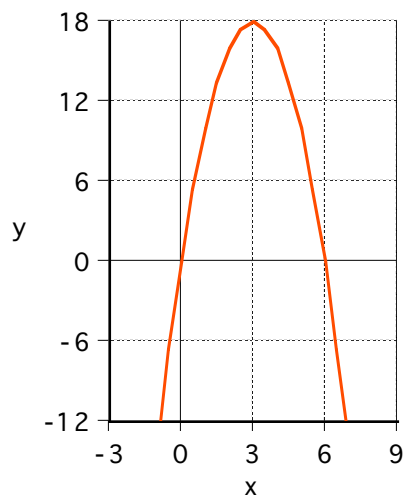
d) quadratic formula
 $3x^2 + 2x - 5 = 0$

8. Show that the roots of $ax^2 + bx + c = 0$ are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

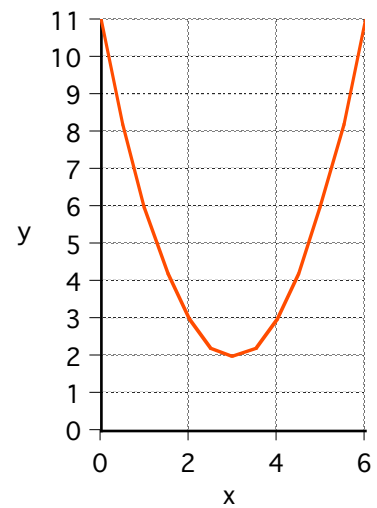
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9. Determine the exact defining equations of the following parabolas:

a) Factored form



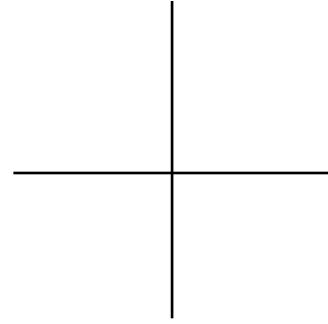
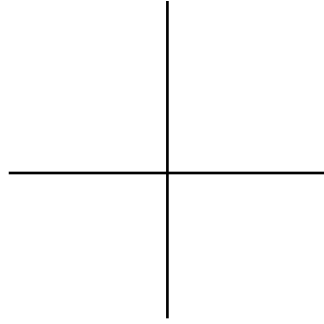
b) Vertex Form



10. Sketch the following functions and indicate i) x intercepts or vertex and ii) y intercepts

a) $y = x^2 - 9x - 36$

b) $y = -2(x - 4)^2 + 7$



11. An arrow was fired straight up with an initial speed of 45 m/s.

a) Determine the time when the arrow hit the ground.

b) Find the time when the arrow reached its maximum height.

c) Determine the maximum height of the arrow.

d) Determine the length of time the arrow was at least 70 meters above the ground.

1

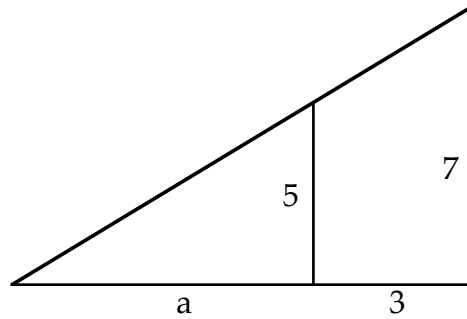
e) Graph the height of the arrow as a function of time for $t \geq 0$, labeling the graph with your solutions to (a), (b), (c) and (d)



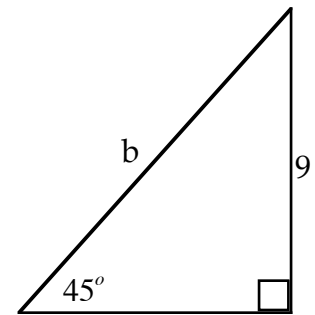
12. Using just a metre stick and knowledge of similar triangles, explain how a student could determine the height of a tree on a sunny day, without climbing the tree.

13. Solve for the following unknowns.

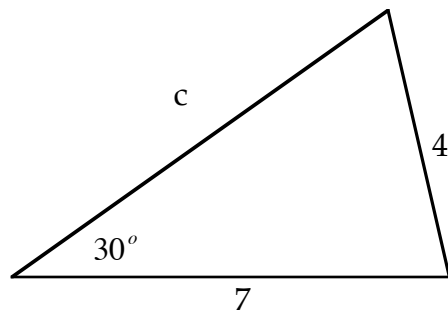
a)



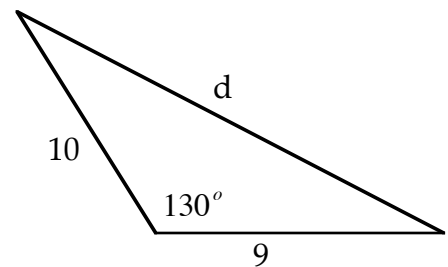
b)



c)



d)



14. A family was watching the launch of the space shuttle, from a distance of 5 kilometers. Determine the exact height of the shuttle when the angle of elevation to the tip of the shuttle is 60 degrees.
15. Two sailboats leave the same harbour in different directions. Sailboat 1 travels due north for 10 kilometers. Sailboat 2 travels on a heading, 60 degrees east of north, for 8 kilometers. How far are the sailboats from one another at their current locations?