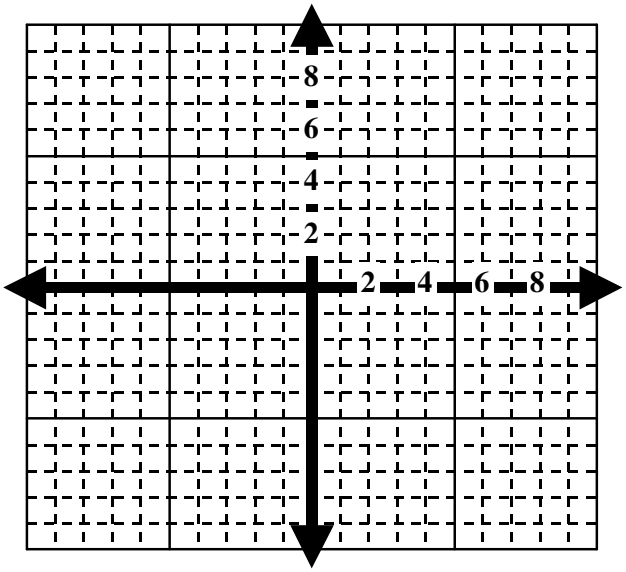
MA30S APPLIED
UNIT A: QUADRATIC FUNCTIONS
PRACTICE

Name: _____
Date: _____

1. **Review of Gr 10 Linear Functions**.
Manually graph and label the two linear functions given the equations:



a. **3x – 4y = 12**

b. **y = –2x + 6**

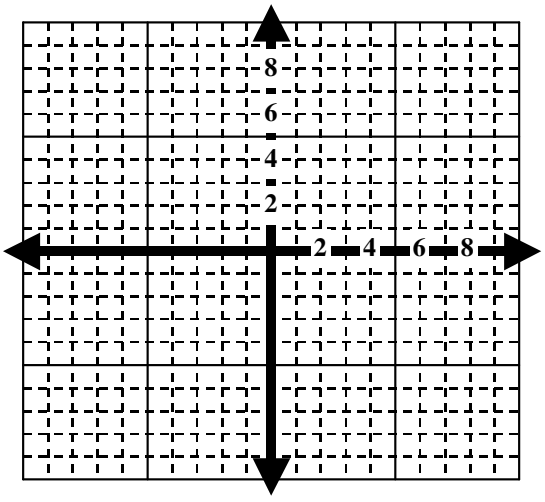
c. **y = –3**

2. Graph the above equations using a graphing tool, especially the TI-83 or one of the many on-line graphing tools to which you have access.

3. Manually graph the quadratic function:

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

x	y
–1	
0	
1	
2	
3	
4	
5	



a. Find the vertex point:
(____, ____)

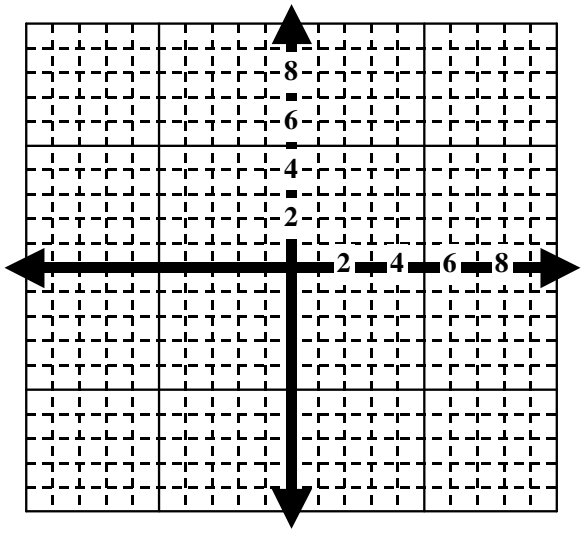
b. Find the **x–intercepts**:

c. Find the **y–intercept**:

d. Find the equation of the axis of symmetry:

4. Is it possible for a quadratic equation to have no 'y' intercept? Explain!

5. Graph the following two quadratic functions and label them **f** and **g.** (Just cheat and read the table from the graphing calculator to get the points on the parabola):



a. $\mathbf{f(x) = x^2 + 6x + 9}$

b. $\mathbf{g(x) = -x^2 + 7x} + 2$

(plot the function on the y-axis as normal)

6. For the above functions find:

Vertex:	f(x): (,)	g(x): (,)
Domain:	f(x):	g(x):
Range:	f(x):	g(x):
y-intercept:	f(x):	g(x):
x-intercept(*s*):	f(x):	g(x):

7. **Advanced Thinking**. In the above question with functions **f** and **g**, can you find the vertex without actually graphing? This is really a ***Pre-Calculus*** math question so you do not really need to know how to do it in Applied where everything is supposedly done on a calculator! But you can find the vertex pretty easily!

a. **Find the vertex of f(x)**: Take the co-efficient on the '**x**' term, **6**, make it negative, **–6**, now divide the **–6** by twice the co-efficient on the $\mathbf{x^2}$ term (2*1). So the line of symmetry is given by **–6 / 2**. Or **–3**! Easier than graphing eh!! So know you know the function has a vertex where the **x = –3**. So what is **f(–3)**? $\mathbf{f(-3) = (-3)^2 + 6(-3) + 9 = 0.}$ So the vertex is at **(-3, 0).**

b. Using this advanced thinking information can you calculate the vertex of function **g**

without graphing? (if you don't like this approach do *not* do Pre-Calculus!)

8. **Trajectory example**. On the earth the '***trajectory***' (the *path*) of **every** thrown object thrown straight up from ground level at **20 meters per sec** (*about 40 miles per hour*) is given by the function: **$h(t) = -5t^2 + 20t$**.

The meaning of this formula if you were taking science class is that the height, **h**, of the object is a function of time, **t**. So we say that the function is **h(t)**. Thus the height of an object **h(t)** in meters is given by the function **$h(t) = -5t^2 + 20t$,** where **t** is given in units of seconds.

But don't worry about the science and physics, just trust the equation I gave you.

Use a graphing calculator (or just math or logic if you can) find:

a. the vertex (the time and height when the object reaches its peak)

b. the equation of the line of symmetry

c. the time it takes to reach the vertex

d. the time it takes to get down to earth again after it reaches its peak

e. the two x-intercepts (or rather t-intercepts in this case)

f. the total time the ball is in the air.

g. how high is the object after 1 second?

h. how high is the object after 1.5 seconds?

i. how high is the object after 0.5 seconds?

j. at what time, **t**, is the object 10 meters up?

The following are some more to have fun with. Optional unless otherwise told!

9. Manually graph the quadratic function:

$y = x^2 + 4x + 4$.

a. Find the vertex point:
(____, ____)

b. Find the **x–intercepts**:

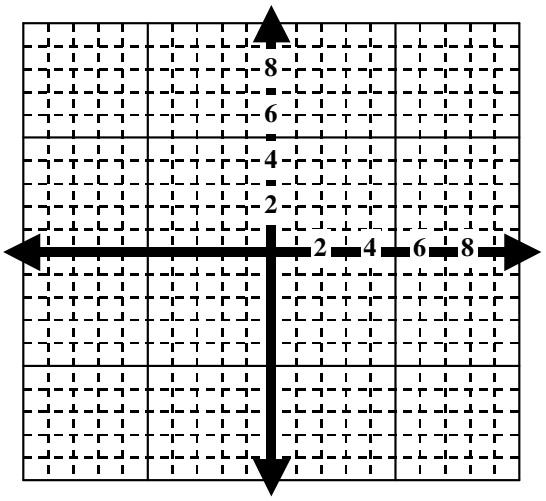
c. Find the **y–intercept**:

d. Find the equation of the axis of symmetry:

e. Domain:

f. Range:

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



Check with a graphing tool!

10. Manually graph the quadratic function:

y = 2*(x – 4)*(x + 6)

a. Find the vertex point:
(____, ____)

b. Find the **x–intercepts**:

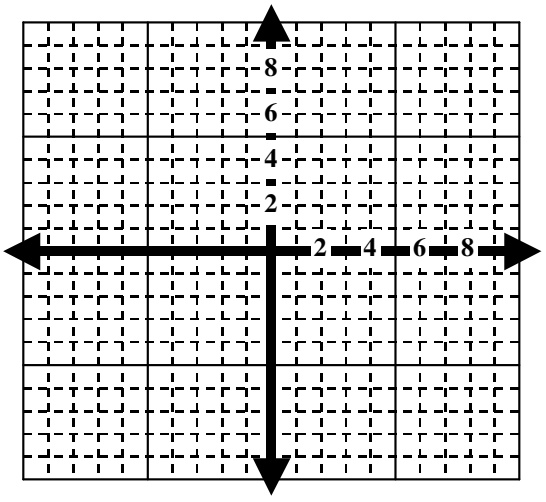
c. Find the **y–intercept**:

d. Find the equation of the axis of symmetry:

e. Domain:

f. Range:

x	y



Check with a graphing tool!