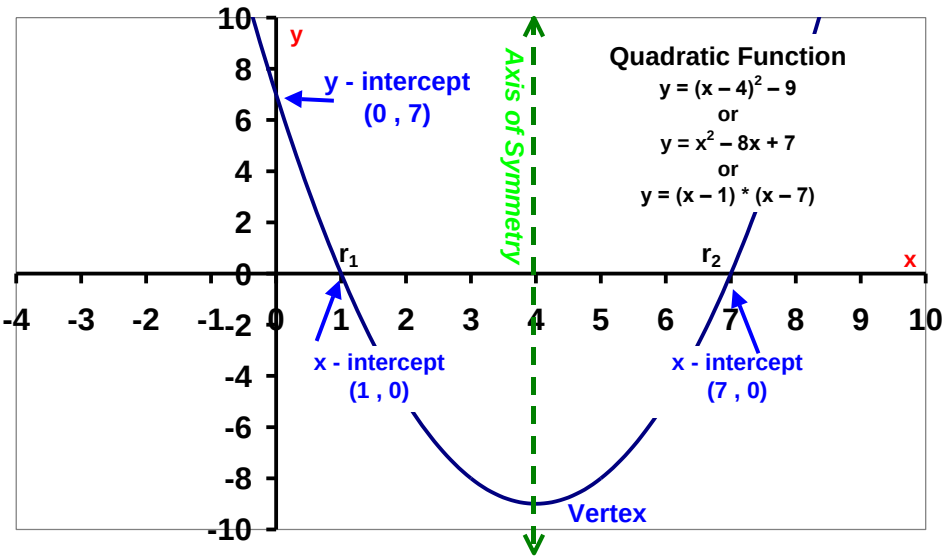
GRADE 11 APPLIED
UNIT A QUADRATICS
ASSIGNMENT – SIGNIFICANT POINTS

Name: _____
Date: _____

1. There are lots of significant points to a quadratic function. The characteristic shape of the related curve is called a 'parabola'.

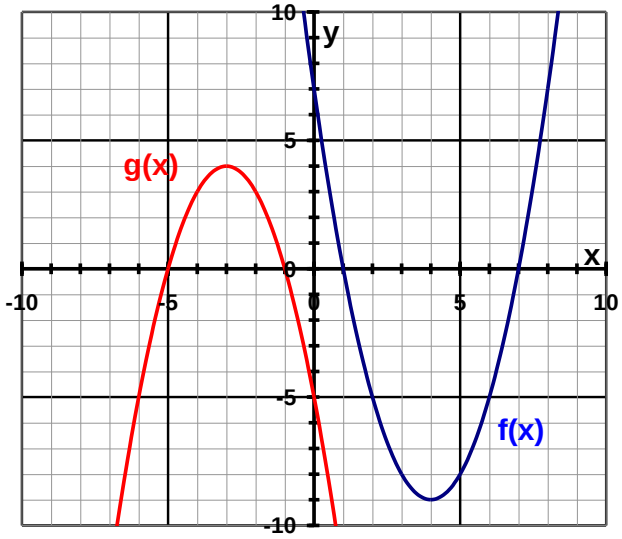


2. There is **always** a single y-intercept, *up to* two x-intercepts, and **always** a vertical line of symmetry that runs down through the vertex of the parabola.

3. For the graphs of the two quadratic functions at the right give their significant points:

a. **f(x)**
y-intercept: (0, ___)
x-intercept(s): (___, 0)
and (___, 0)
vertex: (____, ____)
axis of symmetry: x = _____

b. **g(x)**
y-intercept: (0, ___)
x-intercept(s): (___, 0)
and (___, 0)
vertex: (____, ____)
axis of symmetry: x = _____

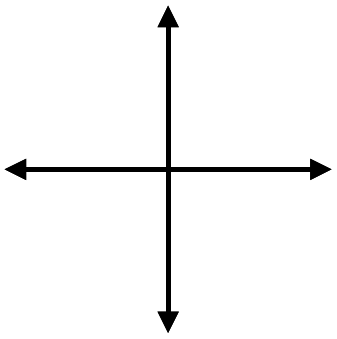


assume the significant points are at integer values

4. Given the following quadratic functions use the Desmos Graphing App (on-line or downloaded) to graph the given function(s). Use the Graphing App to determine the Significant Points. Round values to two decimal places if necessary. (or wow me with fractions!) Sketch the given function. By sketch we mean a representative graph with significant points in the correct relative positions on axis and in the correct graph quadrants.

a. **$y = 3x^2$**

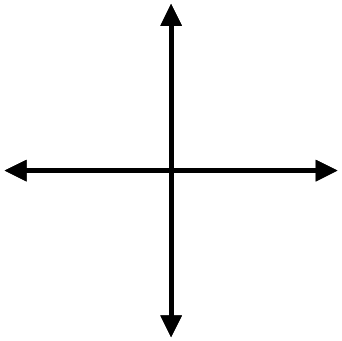
y-intcpt: _(0,)__
x-intcpt(s): (_____, 0) ; ~~(___, 0)~~
axis of symmetry: x = _____
vertex point: (_____, _____)
Domain: _{ _____ }
Range: { }



(sketch only)

b. **$f(x) = x^2 + 8x$**

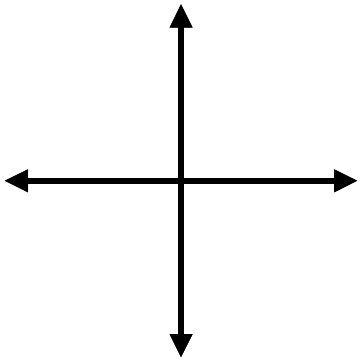
y-intcpt: (0,)__
x-intcpt(s): (_____, 0) ; (_____, 0)
axis of symmetry: x = _____
vertex point: (_____, _____)
Domain: { }
Range: { }



(sketch only)

c. **$y = -3x^2 + 9x - 8$**

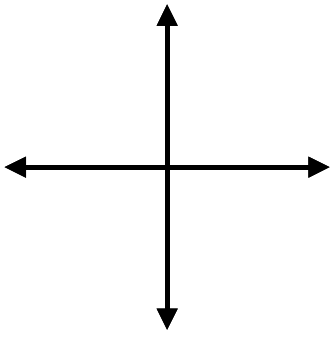
y-intcpt: __(0,)__
x-intcpt(s): (_____, 0) ; (_____, 0)
axis of symmetry: x = _____
vertex point: (_____, _____)
Domain: _{ }
Range: { }



(sketch only)

d. **$g(x) = (x - 2)(x - 8)$**

y-intcpt: (0,)__
x-intcpt(s): (_____, 0) ; (_____, 0)
axis of symmetry: x = _____
vertex point: (_____, _____)
Domain: { }
Range: { }



(sketch only)

d. **$y = (x + 2)(x + 5)$**

y-intcpt: __(0,)__

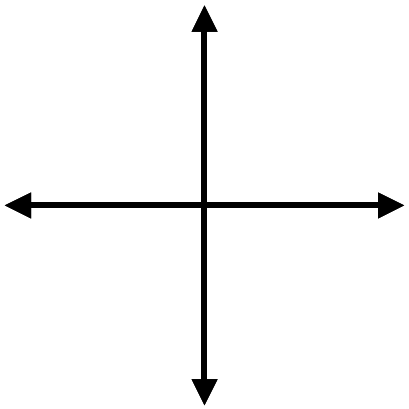
x-intcpt(s): (_____, 0) ; (_____, 0)

axis of symmetry: x = _____

vertex point: (_____, _____)

Domain: { }

Range: { }



(sketch only)

Factored Functions. Recall Grade 9 Factoring? How is it that **$y = (x + 2)(x + 5)$** is the same as $y = x^2 + 7x + 10$?? Graph them, see they are the same!

e. **$y = -(x + 2)^2$**

y-intcpt: __(0,)__

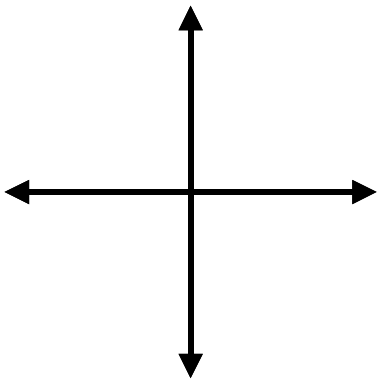
x-intcpt(s): (_____, 0) ; (_____, 0)

axis of symmetry: x = _____

vertex point: (_____, _____)

Domain: { }

Range: { }



(sketch only)

f. **$y = (x - 3)^2 + 2$**

y-intcpt: _(0,)__

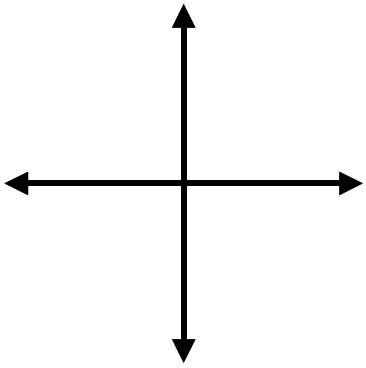
x-intcpt(s): (____, 0) ; (___, 0)

axis of symmetry: x = _____

vertex point: (____, ____)

Domain: { }

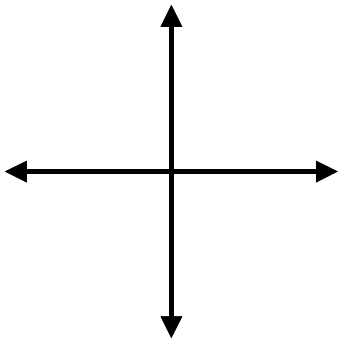
Range: { }



(sketch only)

Can you start to see some patterns? In pre-Calc you would learn the patterns, in Applied Math is it only necessary to use the graphing tool.

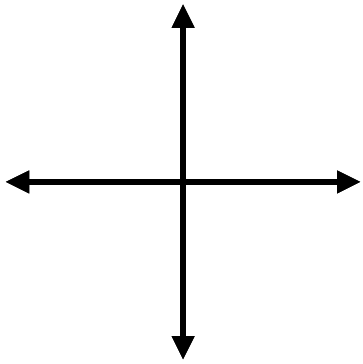
g. **$y = -(x - 3)^2 + 2$**
y-intcpt: _ (0,)__
x-intcpt(s): (____, 0) ; (___, 0)
axis of symmetry: x = _____
vertex point: (____, ____)
Domain: { }
Range: { }



(sketch only)

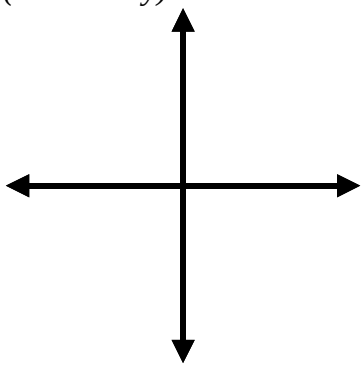
FOIL! Remember your Grade 9 FOIL? How is it that **$y = -(x - 3)^2 + 2$** differs from the general form, $y=ax^2 + bx + c$, we have been studying. Here is how you FOIL:

h. **$y = 2(x + 4)^2 - 10$**
y-intcpt: __(0,)__
x-intcpt(s): (____, 0) ; (___, 0)
axis of symmetry: x = _____
vertex point: (____, ____)
Domain: { }
Range: { }



(sketch only)

i. **$h(t) = -5t^2 + 30t + 2$**
y-intcpt: __(0,)__
x-intcpt(s): (____, 0) ; (___, 0)
axis of symmetry: x = _____
vertex point: (____, ____)
Domain: { }
Range: { }



(sketch only)

5. **Word Problem**. We often use mathematical functions to 'model' real life.

City traffic at Higgins and Main in the morning rush hour is modeled pretty well by the quadratic equation $\mathbf{n(t) = -10t^2 + 165t - 600}$ where **n(t)** is the number of cars per minute as a function of the time of the morning ***t***.

a. what is the vertex of the traffic function? _____

b. the vertex represents the peak traffic flow at the peak time.

(1) what is the peak time of traffic: _____ (hours: mins AM)

(2) what is the flow of traffic at the peak time? _____ (cars per min)

c. according to this 'formula' that 'models' traffic flow at morning rush hour when is traffic flow at zero cars per minute? _____