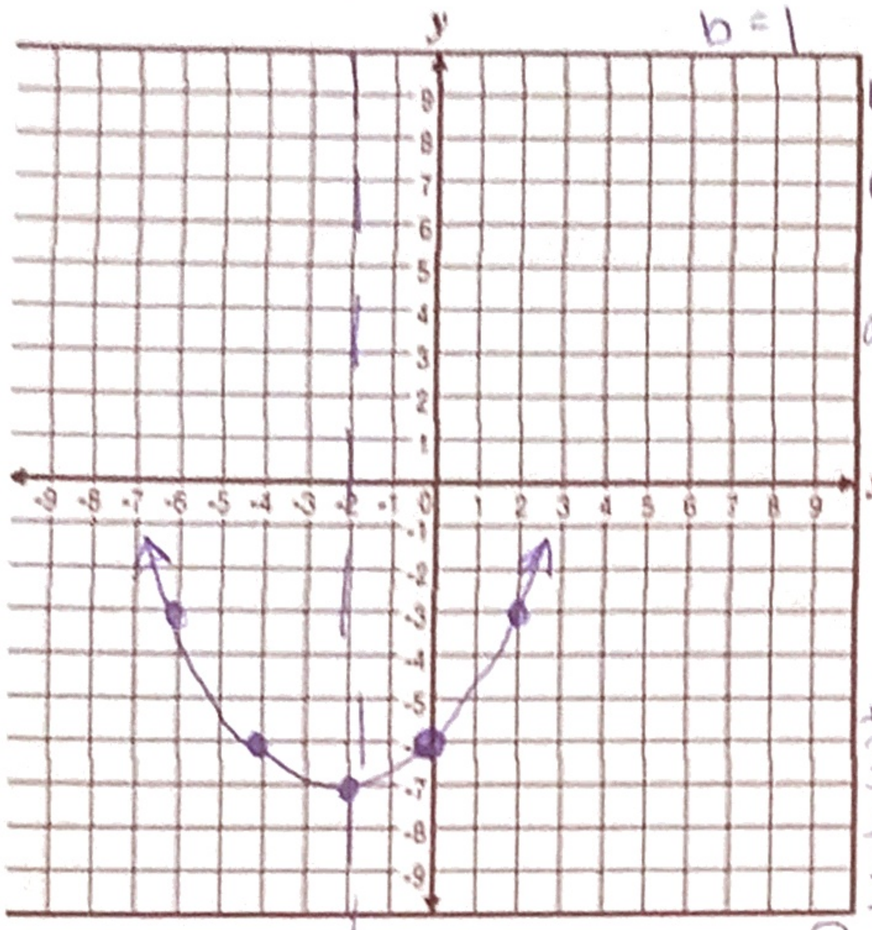
Name: _____ **Date:** _____ **#69 Stnd form so far...**

1. Show all work to graph the following function.

a. $f(x) = \frac{1}{4}x^2 + x - 6$ $a=\frac{1}{4}$ $b=1$ $c=-6$ b. $g(x) = -x^2 + 6x - 4$ $a=-1$ $b=6$ $c=-4$ y int $(0,-4)$



y int $(0,-6)$

addit. pt. $f(2)$

$f(2) = \frac{1}{4}(2)^2 + 2 - 6$

$= \frac{1}{4}(4) + 2 - 6$

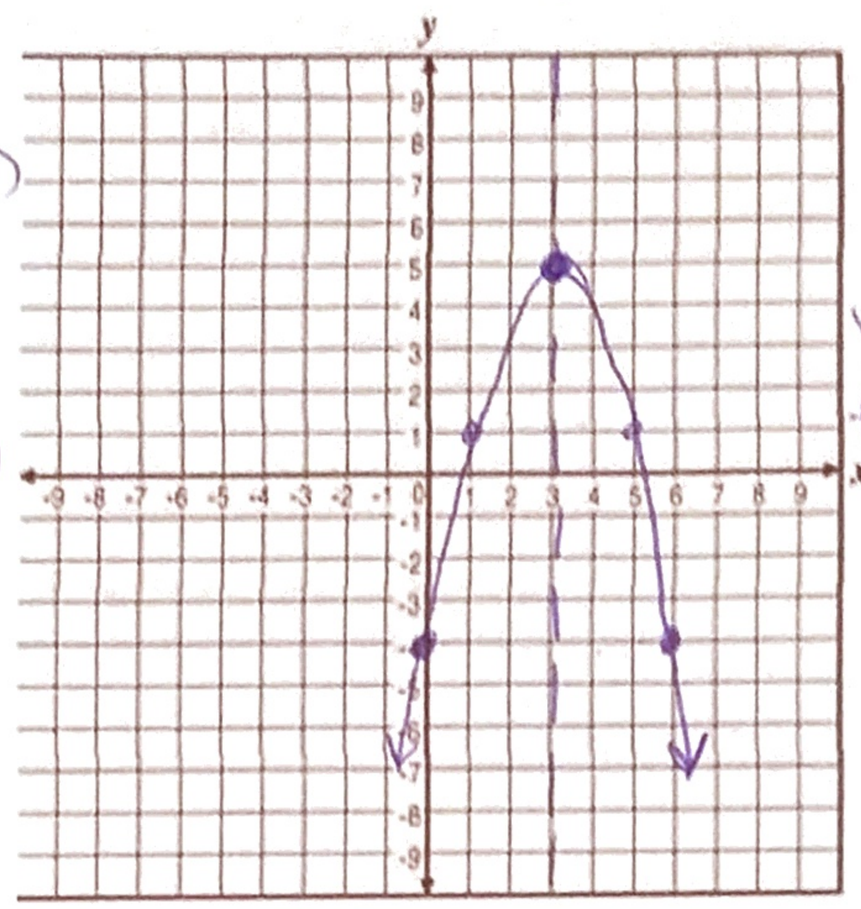
$= 1 + 2 - 6$

$= -3$ $(2,-3)$

A.O.S. $x = \frac{-1}{2(\frac{1}{4})} \Rightarrow \frac{-1}{(\frac{1}{2})}$ $x = -2$

Vertex $f(-2) = \frac{1}{4}(-2)^2 + (-2) - 6$

$= \frac{1}{4}(4) - 8 \rightarrow 1 - 8$ $(-2,-7)$



A.O.S. $x = \frac{-6}{2(-1)} \Rightarrow \frac{-6}{-2}$

$x = 3$

Vertex

$f(3) =$

$-(3)^2 + 6(3) - 4$

$-9 + 18 - 4$

$= 5$

$(3,5)$

additional pt. $f(1) = -(1)^2 + 6(1) - 4$

$= -1 + 6 - 4$

$= 1$ $(1,1)$

2. Use the discriminant to determine the number and type of solutions

a. $f(x) = 3x^2 - 8x + 2$ $b^2 - 4ac$ b. $g(x) = -\frac{1}{2}x^2 + x - 6$ $a=-\frac{1}{2}$ $b=1$ $c=-6$

$a=3$ $(-8)^2 - 4(3)(2)$

$b=-8$ $64 - 24$

$c=2$ $\boxed{40}$

$40 > 0$ so two real irrational

$1^2 - 4(-\frac{1}{2})(-6)$

$1 - 12$

$\boxed{-11}$

$-11 < 0$ so two complex

3. Find the axis of symmetry and x intercepts for each function below.

a. $f(x) = 4x^2 + 5x + 1$ b. $g(x) = x^2 + 4x - 21$

A.O.S. $x = \frac{-b}{2a}$

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

See next pages for work

4. A baker has modeled the monthly operating cost for making wedding cakes by the function $T(c) = \frac{1}{2}c^2 - 12c + 150$ where T stands for total operating cost and c is the number of cakes prepared.

a. How many cakes orders should the baker take on to yield the minimum operating cost?

vertex

x part of vertex (or a.o.s.) $x = \frac{+12}{2(\frac{1}{2})} \Rightarrow \frac{12}{1}$

12 wedding cakes

b. What is the minimum operating cost?

vertex y

y part of vertex

$T(12) = \frac{1}{2}(12)^2 - 12(12) + 150$

$= \frac{1}{2}(144) - 144 + 150$

$= 72 + 6$

$78

c. Will the baker ever have no operating cost? Use the discriminant to explain.

$b^2 - 4ac$

$(12)^2 - 4(\frac{1}{2})(150)$

$144 - 300$

-156

b/c the discriminant $-156 < 0$ the x intercepts (or no operating cost) are imaginary.

5. The path that a motocross dirt bike rider follows during a jump is given by $h(d) = -0.4d^2 + 4d + 10$ where d is the horizontal distance (in feet) from the edge of the ramp and h is the height (in feet).

a. What is the maximum height of the rider during the jump?

20ft

vertex y

y part of vertex

a.o.s. $x = \frac{-4}{2(-0.4)} \Rightarrow \frac{-4}{-0.8}$ $x = 5$

$h(5) = -0.4(5)^2 + 4(5) + 10$

$= -0.4(25) + 20 + 10$

$= -10 + 30$

$= 20$

b. What is the height of the ramp?

~~h(0) = -0.4(0)~~

duh Ms. Millett it's just c

start jump

y int

10ft

c. How far from the ramp does the motocross dirt bike land?

farther x int

$a = -0.4$

$b = 4$

$c = 10$

$b^2 - 4ac$

$4^2 - 4(-0.4)(10)$

$16 + 16$

32

$x = \frac{-4 \pm \sqrt{32}}{2(-0.4)}$ $x \approx \frac{-4 \pm 5.66}{-0.8}$

≈ 12.075 ft

$x \approx \frac{-4+5.66}{-0.8}$ $x \approx \frac{-4-5.66}{-0.8}$

$x \approx \frac{1.66}{-0.8}$ $x \approx \frac{-9.66}{-0.8}$

$x \approx -2.075$ $x \approx 12.075$

rode back on to building

away from building

HW #69

(3a) $f(x)=4x^2+5x+1$

$0=4x^2+5x+1$

$a=4$

$b=5$ $\quad b^2-4ac$

$c=1$ $\quad 5^2-4(4)(1)$

$25-16$

9

a.o.s. $x=\frac{-5}{2(4)}$ $\quad \boxed{x=\frac{-5}{8}}$

$x=\frac{-5\pm\sqrt{9}}{2(4)} \Rightarrow \frac{-5\pm 3}{8}$

$x=\frac{-5+3}{8}$ or $x=\frac{-5-3}{8}$

$x=\frac{-2}{8}$ $\quad x=\frac{-8}{8}$

$\boxed{x=\frac{1}{4}}$ $\quad \boxed{x=-1}$

x intercepts: $(\frac{1}{4},0)$ & $(-1,0)$

(3b) $g(x)=x^2+4x-21$

$0=x^2+4x-21$

$a=1$

$b=4$ $\quad b^2-4ac$

$c=-21$ $\quad 42-4(1)(-21)$

$16+84$

100

a.o.s $x=\frac{-4}{2(1)} \Rightarrow \frac{-4}{2}$ $\quad \boxed{x=-2}$

$x=\frac{-4\pm\sqrt{100}}{2(1)} \Rightarrow \frac{-4\pm 10}{2}$

$x=\frac{-4+10}{2}$ or $x=\frac{-4-10}{2}$

$x=6/2$ $\quad x=\frac{-14}{2}$

$\boxed{x=3}$ $\quad \boxed{x=-7}$

x intercepts: $(3,0)$ and $(-7,0)$