

ANALYZING QUADRATIC FUNCTIONS

ADDITIONAL EXAMPLES

Find: (a) vertex, (b) axis of symmetry, (c) direction of parabola, (d) extrema, (e) domain and range, (f) intervals of inc/dec, (g) solve, and (h) graph.

Ex. 1 $y = (x + 3)^2 - 2$

- (a) $(-3, -2)$
- (b) $x = -3$
- (c) up
- (d) minimum
- (e) $D: (-\infty, \infty)$
 $R: [-2, \infty)$
- (f) dec $(-\infty, -3)$
inc $(-3, \infty)$
- (g) To solve, we need standard form!

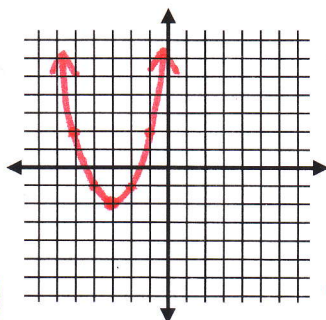
$$y = x^2 + 6x + 9 - 2$$

$$y = x^2 + 6x + 7$$

$$\text{So } x = \frac{-6 \pm \sqrt{36 - 28}}{2}$$

$$= \frac{-6 \pm \sqrt{8}}{2} = \frac{-6 \pm 2\sqrt{2}}{2}$$

$$= -3 \pm \sqrt{2}$$



If we estimate $\sqrt{2} \approx 1.4$, then we get -3 ± 1.4 so our answers are -1.6 and -4.4

cool!

We can see that the parabola crosses the x-axis at -1.6 and -4.4 !!

Ex. 2 $y = 3x^2 - 18x + 15$

- (a) $(3, -12)$
- (b) $x = 3$
- (c) up
- (d) minimum
- (e) $D: (-\infty, \infty)$
 $R: [-12, \infty)$
- (f) dec $(-\infty, 3)$
inc $(3, \infty)$
- (g) To solve, we can factor this one!

$$\frac{18}{6} = 3$$

$$y = 27 - 54 + 15 = -12$$

This parabola will be thin - since the $a = 3$!

$$3x^2 - 18x + 15 = 0$$

$$3(x^2 - 6x + 5) = 0$$

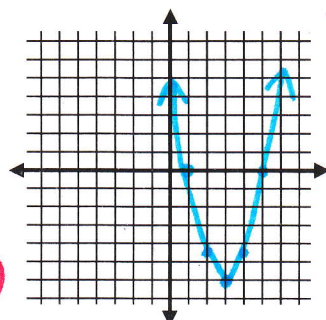
$$3(x - 5)(x - 1) = 0$$

$$\boxed{x = 5, 1}$$

cool!

We can see that the parabola crosses

the x-axis at 5 and 1!!



Wow!

*Solving tells you where the parabola hits the x-axis!!