Warm-Up Review

Sketch $y = x^2 + 7x + 12$ $\qquad (7/2)^2 = 49/4$

$y = (x^2 + 7x + 49/4 - 49/4) + 12$

$y = (x^2 + 7x + 49/4) + 48/4 - 49/4$

$y = (x + 7/2)^2 - 1/4$

method 1 (must be in vertex form)

x int = $0 = (x + 7/2)^2 - 1/4$

$\pm\sqrt{1/4} = \sqrt{(x + 7/2)^2}$

$\pm\sqrt{1/4} = x + 7/2$

$-7/2 \pm \sqrt{1/4} = x$

$-7/2 \pm 1/2 = x$

$-4, -3 = x$

y int = $y = (0 + 7/2)^2 - 1/4$

$y = 49/4 - 1/4$

$y = 48/4$

$y = 12$

Direction of Opening: Up

Vertex: $(-7/2, -1/4)$

x int: $(-4,0)(-3,0)$

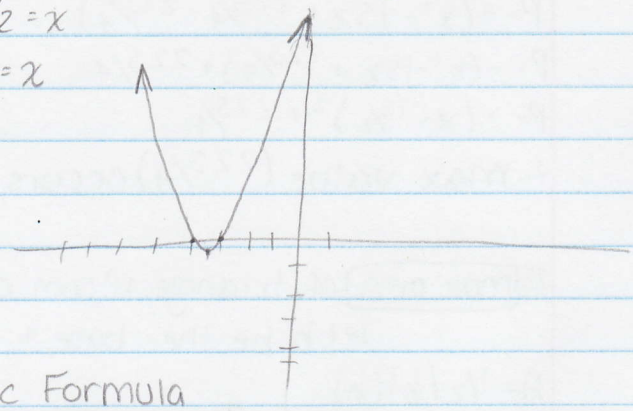
y int: $(0,12)$

Eq of axis of sym: $-7/2$

Min = $-1/4$

Domain = $\{x \mid x \in \mathbb{R}\}$

Range = $\{y \mid y \geq -1/4, y \in \mathbb{R}\}$



Method 3 for x, y int - quadratic Formula

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

x-int

$0 = x^2 + 7x + 12$

(a) (b) (c)

$a = 1 \quad b = 7 \quad c = 12$

$$\frac{-7 \pm \sqrt{7^2 - 4(1)(12)}}{2(1)}$$

$$\frac{-7 \pm \sqrt{49 - 48}}{2}$$

$$\frac{-7 \pm \sqrt{1}}{2}$$

$x = \frac{-7 + 1}{2}$ or $x = \frac{-7 - 1}{2}$

$x = -3 \qquad x = -4$

Solving Quadratic Equations

April 4/14

x-int
roots
solutions
zeros

2 methods → factor
→ quadratic Formula

1) $10x^2 = 33x + 7$

$10x^2 - 33x - 7 = 0$

$(5x+1)(2x-7)$

$5 \quad 2$
$1 \quad -7$
$2 \quad -35$

$5x + 1 = 0 \qquad 2x - 7 = 0$

$\boxed{x = -1/5} \qquad \boxed{x = 7/2}$

2) $5x^2 - 11x + 3 = 0$ $\qquad \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $\qquad a = 5 \quad b = -11 \quad c = 3$

$\dfrac{11 \pm \sqrt{(-11)^2 - 4(5)(3)}}{2(5)}$

$\dfrac{11 \pm \sqrt{121 - 60}}{10}$

$\dfrac{11 \pm \sqrt{61}}{10}$ } exact form

$\boxed{x = 1.88} \quad \boxed{x = .32}$

What if the answer was $x = \dfrac{2 \pm \sqrt{12}}{2}$ } break down

$x = \dfrac{2 \pm \sqrt{4}\sqrt{3}}{2}$

$x = \dfrac{\cancel{2} \pm 2\sqrt{3}}{\cancel{2}}$ – factor

$x = \dfrac{2(1 \pm \sqrt{3})}{2}$

$x = 1 \pm \sqrt{3}$

What if $x = \dfrac{-3 \pm \sqrt{50}}{3}$

$x = \dfrac{-3 \pm \sqrt{25}\sqrt{2}}{3}$

$x = \dfrac{-3 \pm 5\sqrt{2}}{3}$ ☆ done