Quadratics
EOC Practice - Day 2 Solutions

1. $x^2 + 3x - 54$
$(x+9)(x-6)$

2. $x^2 + 10x + 24$
$(x+6)(x+4)$

3. $x^2 - 36$
$(x+6)(x-6)$

4. $x^2 - 9x - 36$
$(x-12)(x+3)$

5. $x^2 - 15x + 56$
$(x-7)(x-8)$

6. $25x^2 + 70x + 49$
$(5x+7)(5x+7)$ or $(5x+7)^2$

7. $7x^2 - 20x - 3$
$(7x+1)(x-3)$

8. $5x^2 + 23x - 10$
$(5x-2)(x+5)$

9. $\frac{1}{4}x^2 - 4$
$\frac{1}{4}(x^2 - 16) = \frac{1}{4}(x+4)(x-4)$

10. $x^2 - 6x - 16$
$(x-8)(x+2)$

11. $4x^2 + 12x + 40$
$4(x^2 + 3x + 10)$
↑ Not factorable any further

12. $4x^2 - 6x + 9$
Not factorable

13. $h = -16t^2 + 40t + 5$

a) max height = vertex

$t = -\frac{40}{2(-16)} = 1.25$

$h = -16(1.25)^2 + 40(1.25) + 5$

$h = 30$

max height is 30 ft.

b) $5 = -16t^2 + 40t + 5$

$-5 \qquad -5$

$0 = -16t^2 + 40t$

$0 = -8t(2t - 5)$

$-8t = 0 \qquad 2t - 5 = 0$

$t = 0 \qquad \frac{2t}{2} = \frac{5}{2}$

2.5 seconds $\qquad t = 2.5$

14. $h = -16t^2 + 64t$

$48 = -16t^2 + 64t$

$0 = -16t^2 + 64t - 48$ between 1 and 3 seconds

$0 = -16(t^2 - 4t + 3)$

$0 = -16(t-3)(t-1)$

$t = 3 \quad t = 1$

EOC Practice – Quadratics

1. $f(x) = -2x^2 - 12x - 13$

$f(x) = -2(x+3)^2 + 5$

Vertex form

$x = \frac{12}{2(-2)} = \frac{12}{-4} = -3$

$f(-3) = -2(-3)^2 - 12(-3) - 13$

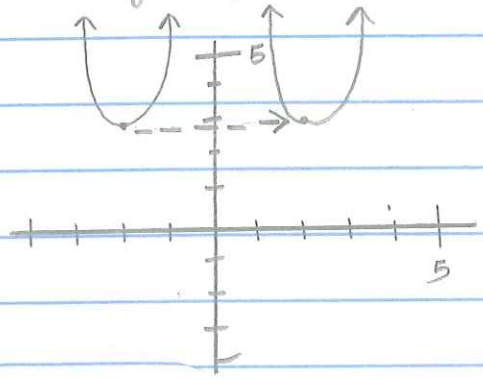
$= 5$

Vertex at $(-3, 5)$

Left 3, Up 5
Reflect across x-axis
Stretch by 2.

C.

2.




D. (2, 3)

3. shade above ↑

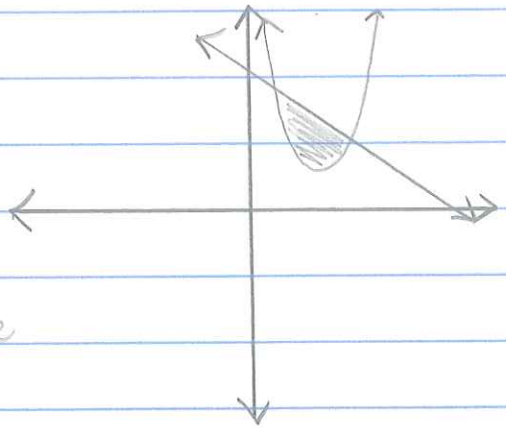
$y \geq x^2 - 2x + 3$

$x + 2y \leq 12$

$2y \leq -x + 12$

$y \leq -\frac{1}{2}x + 6$

↑ shade below line



4. $y = (x+3)^2$ R: $[0, \infty)$ D.

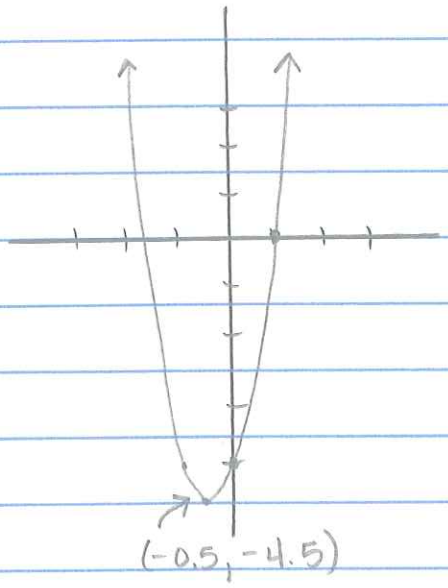
~~A~~. $y = (x+3)^2 - 2$ R: $[-2, \infty)$

~~B~~. $y = x^2 + 9$ R: $[9, \infty)$

~~C~~. $y = 2(x-3)^2 + 1$ R: $[1, \infty)$

✓D. $y = (x-5)^2$ R: $[0, \infty)$

5.




D: $(-\infty, \infty)$ = all real #s

R: $[-4.5, \infty)$ = $y \geq -4.5$

} D.

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

$y = -1(x^2 - 4x + 3)$

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

7. $y_1 \geq x^2 - 3x - 5$ ← shade up (inside)

$y_2 \geq -x^2 + 4x + 1$ ← shad up (outside) } A.

8. $y = 3x^2 - 2x + 5$

$x = \frac{2}{2(3)} = \frac{1}{3}$

Vertex: $\left(\frac{1}{3}, \frac{14}{3}\right)$

$3\left(\frac{1}{3}\right)^2 - 2\left(\frac{1}{3}\right) + 5 = \frac{14}{3}$

Range: $\left[\frac{14}{3}, \infty\right)$ or $y \geq \frac{14}{3}$ B.

9. Add 5 to all x-values. D.

10. $y \geq x^2 + 6x - 5$ ← shade up (inside) B.

$y \leq -x^2 - 2x + 3$ ← shade down (inside)

11. $y \geq x^2$ ← shade up (inside) D.

$y \leq -(x+1)^2 + 3$ ← shade down (inside)

For 10 & 11 can graph on calculator too!

12. $f(x) = |x-1|-2$ $\quad y = f(x+2) - 1$ ← −1 @ end of eqn

↑ plug in for x

$f(x) = |(x+2)-1|-2-1$

$f(x) = |x+1|-3$

$(-1, -3)$ B.

13. $y \geq -(x-3)^2-2$ → shade up (outside) B.

$y \leq (x+1)^2-1$ → shade down (outside)

Can graph on calculator too!

14. * We didn't learn this. Guess ☺

15. Two parabolas. → So eliminate A & C.

They are both shifted to the right so you can eliminate B.

D.

EOC Practice - Solving Quadratics

1. $f(x) = x^2 + 3x + 1$

$$x = \frac{-3 \pm \sqrt{9-4(1)(1)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{5}}{2} = \text{A.}$$

2. If a quadratic has imaginary/complex roots, the discriminant ($b^2-4ac$) is negative (less than 0).

$b^2-4ac<0$

$4^2-4(1)c<0$

$16-4c<0$

$-4c<-16$

$c>4$ D.

3. $5t^2+6=8t$

$5t^2-8t+6=0$

$t=\frac{8\pm\sqrt{64-4(5)(6)}}{2(5)}=\frac{8\pm\sqrt{-56}}{10}$

$=\frac{8\pm i\sqrt{56}}{10}=\frac{8\pm 2i\sqrt{14}}{10}$

$=\frac{4\pm i\sqrt{14}}{5}$ or

$=\frac{4}{5}\pm\frac{i\sqrt{14}}{5}$ D.

4. $h(t)=-16t^2+vt+s$ $\quad v=80$

$0=-16t^2+80t+64$ $\quad s=64$

$0=-16(t^2-5t-4)$

$t=\frac{5\pm\sqrt{25-4(1)(-4)}}{2}$

$t=\frac{5\pm\sqrt{41}}{2}=5.7$ & ~~$-0.7$~~

↳ no negative time

D.

5. $L = 3 + 2w$

$A = L \cdot w$

$A = (3+2w)(w)$

$50 = 3w + 2w^2$

$0 = 2w^2 + 3w - 50$

$w = \dfrac{-3 \pm \sqrt{9 - 4(2)(-50)}}{2(2)}$

$w = 4.3 \quad w = -5.8$

$L = 3 + 2(4.3)$

$L = 3 + 8.6 = 11.6$ C.

6. $x^2 + 2x + 12 = 0$

$x = \dfrac{-2 \pm \sqrt{4 - 4(1)(12)}}{2} = \dfrac{-2 \pm \sqrt{-44}}{2}$

$= \dfrac{-2 \pm 2i\sqrt{11}}{2} = -1 \pm i\sqrt{11}$ A.

7. $x^2 - 4x + 4 = 9$

$x^2 - 4x - 5 = 0$

$b^2 - 4ac \rightarrow$ Discriminant

$(-4)^2 - 4(1)(-5)$

$16 + 20 = 36$ D.

8. $\left(\dfrac{2}{3}x^2 - x + \dfrac{3}{2} = 0\right) 6$

$4x^2 - 6x + 9 = 0$

$x = \dfrac{6 \pm \sqrt{36 - 4(4)(9)}}{2(4)}$

$x = \dfrac{6 \pm \sqrt{-108}}{8}$ $\quad \sqrt{108}$ ^ $36 \cdot 3$

$x = \dfrac{6 \pm 6i\sqrt{3}}{8}$

$x = \dfrac{3 \pm 3i\sqrt{3}}{4}$ A.

9. $x^2 = -4x + 7$

$x^2 + 4x - 7 = 0$

$x = \frac{-4 \pm \sqrt{16 - 4(1)(-7)}}{2(1)}$

$x = \frac{-4 \pm \sqrt{44}}{2} = \frac{-4 \pm 2\sqrt{11}}{2} = -2 \pm \sqrt{11}$ A.

10. $L = 0.1s^2 - 3s + 27$

$2400 = 0.1s^2 - 3s + 22$

$0 = 0.1s^2 - 3s - 2378$

$s = \frac{3 \pm \sqrt{9 - 4(0.1)(-2378)}}{2(0.1)}$

$= \frac{3 \pm \sqrt{960.2}}{0.2} = \frac{3 \pm 30.9}{0.2} =$ 169.5 & ~~-133.5~~ D.

can't have neg. speed

11. If the discriminant is negative, the quadratic has non-real zeros/solutions.

$b^2 - 4ac < 0$

$b^2 < 4ac$ B.

12. $4x^2 - 3x + 2 = 0$

$x = \frac{3 \pm \sqrt{9 - 4(4)(2)}}{2(4)} = \frac{3 \pm \sqrt{-23}}{8} = \frac{3 \pm i\sqrt{23}}{8}$ D.