

Alg 2 Section 5.3, 5.5-5.7 Quiz Review

Answer Key

Section 5.3

Factor a Polynomial

- $3x^2 + 6x = 3x(x+2)$ --- use a GCF!
- $9x^2 - 16 = (3x+4)(3x-4)$ --- difference of Squares
- $x^2 - 5x - 24 = (x+3)(x-8)$
- $3x^2 + 13x + 4 = \underline{3x^2 + 12x + x + 4}$ --- use A·C method
 $= 3x(x+4) + 1(x+4)$
 $= (3x+1)(x+4)$

Solve by factoring

1. $5x^2 - 30x = 0$

$$5x(x-6) = 0$$

$$5x = 0 \quad x - 6 = 0$$

$x = 0$	$x = 6$
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4. $x^2 + 9x + 20 = 0$

$$(x+5)(x+4) = 0$$

$$x+5 = 0 \quad x+4 = 0$$

$x = -5$	$x = -4$
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2. $x^2 - 100 = 0$

$$(x-10)(x+10) = 0$$

$$x-10 = 0 \quad x+10 = 0$$

$x = 10$	$x = -10$
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3. $2x^2 + 7x - 10 = 5$

$$2x^2 + 7x - 15 = 0$$

$$2x^2 + 10x - 3x - 15 = 0$$

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

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

$$x+5 = 0 \quad 2x-3 = 0$$

$x = -5$	$2x = 3$
	$x = \frac{3}{2}$

Section 5.5

Solve \rightarrow Square Root Property

1. $x^2 = 25$

$$\sqrt{x^2} = \sqrt{25}$$

$$\boxed{x = \pm 5}$$

2. $x^2 - 64 = 0$

$$x^2 = 64$$

$$\sqrt{x^2} = \sqrt{64}$$

$$\boxed{x = \pm 8}$$

3. $5x^2 + 80 = 0$

$$\frac{5x^2}{5} + \frac{80}{5} = \frac{0}{5}$$

$$x^2 + 16 = 0$$

$$\sqrt{x^2} = \sqrt{-16}$$

$$\boxed{x = \pm 4i}$$

4. $x^2 + 27 = 0$

$$\sqrt{x^2} = \sqrt{-27}$$

$$\boxed{x = \pm 3i\sqrt{3}}$$

$$\begin{array}{c} \sqrt{27} \\ \wedge \\ 9 \quad 3 \\ \wedge \\ \textcircled{3} \quad 3 \end{array}$$

Complete the square

1. $x^2 + 4x + c$

$$c = \frac{4}{2} = 2 \rightarrow 2^2 = \boxed{4}$$

$$\boxed{(x+2)^2}$$

2. $x^2 - 6x + c$

$$c = \frac{-6}{2} = -3 \rightarrow (-3)^2 = \boxed{9}$$

$$\boxed{(x-3)^2}$$

3. $x^2 + 7x + c$

$$c = \frac{7}{2} \rightarrow \left(\frac{7}{2}\right)^2 = \boxed{\frac{49}{4}}$$

$$\boxed{\left(x + \frac{7}{2}\right)^2}$$

4. $2x^2 + 6x + c$

Section 5.5 continued

Solve by completing the square

1. $x^2 + 2x - 3 = 0$

$$x^2 + 2x + \underbrace{1} = 3 + \underbrace{1}$$

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

$$x+1 = \pm 2$$

$$x = -1 \pm 2$$

$$\boxed{x = 1, -3}$$

2. $x^2 - 8x + 20 = 0$

$$x^2 - 8x + \underbrace{16} = -20 + 16$$

$$\sqrt{(x-4)^2} = \sqrt{-4}$$

$$x-4 = \pm 2i$$

$$\boxed{x = 4 \pm 2i}$$

3. $3x^2 + 4x + 1 = 0$

$$\frac{3x^2 + 4x}{3} = -\frac{1}{3}$$

$$x^2 + \frac{4}{3}x + \frac{16}{36} = -\frac{1}{3} + \frac{16}{36}$$

$$\sqrt{\left(x + \frac{4}{6}\right)^2} = \sqrt{\frac{4}{36}}$$

$$x + \frac{4}{6} = \pm \frac{2}{6}$$

$$x = -\frac{4}{6} \pm \frac{2}{6}$$

$$x = -\frac{2}{6}, -\frac{6}{6}$$

$$\boxed{x = -\frac{1}{3}, -1}$$

$$\frac{4}{3} \cdot \frac{1}{2} = \frac{4}{6} \quad \left(\frac{4}{6}\right)^2 = \frac{16}{36}$$

$$\frac{1}{3} = \frac{12}{36}$$

$$-\frac{12}{36} + \frac{16}{36} = \frac{4}{36}$$

Section 5.6

Discriminant to det # + type of roots

1. $x^2 + 12x + 20 = 0$

$$b^2 - 4ac = 144 - 4(1)(20) = 144 - 80 = \underline{64} \quad \boxed{2 \text{ Rational}}$$

2. $x^2 - 3x = -5 \Rightarrow x^2 - 3x + 5 = 0$

$$b^2 - 4ac = (-3)^2 - 4(1)(5) = 9 - 20 = \underline{-11} \quad \boxed{2 \text{ complex}}$$

3. $9x^2 + 6x + 1 = 0$

$$b^2 - 4ac = 36 - 4(9)(1) = 36 - 36 = 0 \quad \boxed{1 \text{ Rational}}$$

Solve using quadratic Formula:

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

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

$$= \frac{-4 \pm \sqrt{16 + 28}}{2}$$

$$= \frac{-4 \pm \sqrt{44}}{2}$$

$$= \frac{-4 \pm 2\sqrt{11}}{2}$$

$$= \boxed{-2 \pm \sqrt{11}}$$

2. $2x^2 + 15x - 3 = 4$

$$2x^2 + 15x - 7 = 0$$

$$x = \frac{-15 \pm \sqrt{(15)^2 - 4(2)(-7)}}{2(2)}$$

$$= \frac{-15 \pm \sqrt{225 + 56}}{4}$$

$$= \boxed{\frac{-15 \pm \sqrt{281}}{4}}$$

Section 5.6 continued

3. $x^2 + 2x + 1 = 0$

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

$$x = \frac{-2 \pm 0}{2}$$

$$x = -\frac{2}{2} = \boxed{-1}$$

4. $3x^2 + 7x + 2 = 0$

$$x = \frac{-7 \pm \sqrt{49 - 4(3)(2)}}{2(3)}$$

$$x = \frac{-7 \pm \sqrt{25}}{6}$$

$$x = \frac{-7 \pm 5}{6} = -\frac{2}{6} \text{ or } -\frac{12}{6}$$

$$\boxed{x = -\frac{1}{3} \text{ or } -2}$$

Section 5.7

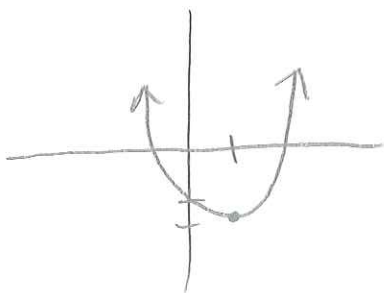
Graph a $f(x)$ in vertex form

1. $y = (x-1)^2 - 2$

vertex = $(1, -2)$

opens up

same width as parent

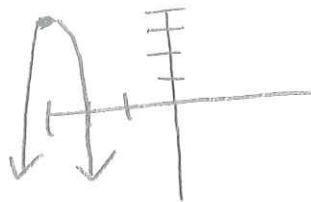


2. $y = -2(x+3)^2 + 4$

vertex = $(-3, 4)$

opens down

narrower

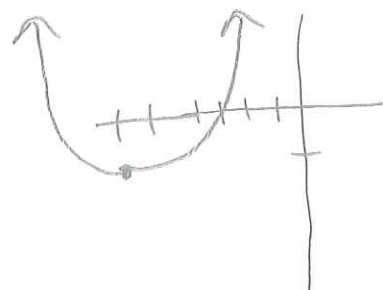


3. $y = \frac{1}{2}(x+6)^2 - 1$

vertex = $(-6, -1)$

opens up

wider



Section 5.7

Analyse char. of graph

1. $y = (x-1)^2 + 3$
vertex = (1, 3)
AOS: $x = 1$
opens up
same width

2. $y = -3(x+2)^2 - 10$
vertex (-2, -10)
AOS: $x = -2$
opens down
narrower

3. $y = \frac{1}{4}(x+7)^2 + 8$
vertex (-7, 8)
AOS: $x = -7$
opens up
wider

write a quad $f(x)$ in vertex form

1. $y = x^2 + 4x + 9$
 $y = (x^2 + 4x + 4) + 9 - 4$
 $y = (x+2)^2 + 5$

2. $y = -2x^2 - 10x + 3$
 $y = -2(x^2 + 5x + \frac{25}{2}) + 3 - \frac{25}{2}(-2)$
 $y = -2(x + \frac{5}{2})^2 + 28$

$$-\frac{4}{4} - \frac{75}{4} = -\frac{79}{4}$$

$$\begin{aligned} 3. \quad y &= 3x^2 + 15x - 1 \\ y &= 3\left(x^2 + 5x + \frac{25}{4}\right) - 1 - \frac{25}{4}(3) \\ y &= 3\left(x + \frac{5}{2}\right)^2 - \frac{79}{4} \end{aligned}$$

$$4. \quad \text{Vertex} = (-3, -4), (1, 12)$$

$$\begin{aligned} y &= a(x+3)^2 - 4 \\ 12 &= a(1+3)^2 - 4 \\ 12 &= a \cdot 16 - 4 \\ 16 &= 16a \\ 1 &= a \end{aligned}$$

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

$$5. \quad \text{Vertex} = (0, -6); (2, 2)$$

$$\begin{aligned} y &= a(x-0)^2 - 6 \\ 2 &= a(2)^2 - 6 \\ 8 &= 4a \\ 2 &= a \end{aligned}$$

$$y = 2(x)^2 - 6$$