

Chapter 5A Review (Part 1) Answers:

1) a. $x^2 - 8x + 4 = 0$

$$(-8)^2 - 4(1)(4)$$

$$64 - 16$$

$$48$$

2 real, irrational roots

b. $4x^2 - 12x + 9 = 0$

$$(-12)^2 - 4(4)(9)$$

$$144 - 144$$

$$0$$

1 real, rational root

c. $x^2 - 2x + 4 = 0$

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

$$4 - 16$$

$$-12$$

no real roots /
2 imag. roots

2) a. $7(x-3)^2 - 6 = -4$

$$7(x-3)^2 = 2$$

$$(x-3)^2 = \frac{2}{7}$$

$$x-3 = \pm \sqrt{\frac{2}{7} \cdot \frac{7}{7}}$$

$$x-3 = \pm \frac{\sqrt{14}}{7}$$

$$x = 3 \pm \frac{\sqrt{14}}{7}$$

b. $49x^2 = 28x - 4$

$$49x^2 - 28x + 4 = 0$$

$$(7x-2)(7x-2) = 0$$

$$x = \frac{2}{7}$$

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

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

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

$$x = \frac{-4 \pm \sqrt{16 + 12}}{6}$$

$$x = \frac{-4 \pm \sqrt{28}}{6}$$

$$x = \frac{-4 \pm 2\sqrt{7}}{6}$$

$$x = \frac{-2 \pm \sqrt{7}}{3}$$

d. $10x^2 = 14 - 20x$

$$10x^2 + 20x - 14 = 0$$

$$2(5x^2 + 10x - 7) = 0$$

$$x = \frac{-10 \pm \sqrt{(10)^2 - 4(5)(-7)}}{2(5)}$$

$$x = \frac{-10 \pm \sqrt{100 + 140}}{10}$$

$$x = \frac{-10 \pm \sqrt{240}}{10} \quad \sqrt{16} \sqrt{15}$$

$$x = \frac{-10 \pm 4\sqrt{15}}{10}$$

$$x = -1 \pm \frac{2\sqrt{15}}{5}$$

e. $9x^2 - 11 = 25$

$$9x^2 = 36$$

$$x^2 = \frac{36}{9}$$

$$x^2 = 4$$

$$x = \pm 2$$

f. $12x^2 = 3x$

$$12x^2 - 3x = 0$$

$$3x(4x-1) = 0$$

$$3x = 0 \quad 4x-1 = 0$$

$$x = 0 \quad x = \frac{1}{4}$$

g. $-3x^2 + 8x - 8 = 0$

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

$$x = \frac{-8 \pm \sqrt{64 - 96}}{-6}$$

$$x = \frac{-8 \pm \sqrt{-32}}{-6}$$

no real roots /
2 imag. roots

$$\begin{aligned} \text{h. } 2x^2 &= 5x + 12 \\ 2x^2 - 5x - 12 &= 0 \\ (2x - 3)(x + 4) &= 0 \\ x &= \frac{3}{2}, x = -4 \end{aligned}$$

$$\begin{aligned} \text{i. } 2x^2 - 7 &= 4x \\ 2x^2 - 4x - 7 &= 0 \\ x &= 4 \pm \frac{\sqrt{(-4)^2 - 4(2)(-7)}}{2(2)} \\ x &= 4 \pm \sqrt{16 + 56} \\ x &= 4 \pm \sqrt{72} = 4 \pm 6\sqrt{2} \\ x &= 1 \pm 3\sqrt{2} \end{aligned}$$

$$\begin{aligned} 3) \text{ a. } (x-4)(x+2) &= 0 \\ y &= x^2 - 2x - 8 \end{aligned}$$

$$\begin{aligned} \text{b. } x &= 7 \pm \sqrt{3} \\ (x-7)^2 &= (\pm\sqrt{3})^2 \\ x^2 - 14x + 49 &= 9 \\ x^2 - 14x + 40 &= 0 \\ y &= x^2 - 14x + 40 \end{aligned}$$

$$\begin{aligned} \text{c. } x &= -2/5, x = 1/2 \\ 5x &= -2 \quad 2x = 1 \\ 5x + 2 &= 0 \quad 2x - 1 = 0 \\ (5x + 2)(2x - 1) &= 0 \\ 10x^2 - x - 2 &= 0 \\ y &= 10x^2 - x - 2 \end{aligned}$$

$$\begin{aligned} 4) \text{ a. } h(x) &= 5x^2 - 20x + 9 \\ -9 &= 5x^2 - 20x \\ -9 &= 5(x^2 - 4x) \\ -9 + 20 &= 5(x^2 - 4x + 4) \\ 11 &= 5(x-2)^2 \\ y &= 5(x-2)^2 - 11 \\ &\quad v(2, -11) \end{aligned}$$

$$\begin{aligned} \text{b. } f(x) &= -3x^2 - 6x + 7 \\ -7 &= -3x^2 - 6x \\ -7 &= -3(x^2 + 2x) \\ -7 - 3 &= -3(x^2 + 2x + 1) \\ -10 &= -3(x+1)^2 \\ y &= -3(x+1)^2 + 10 \\ &\quad v(-1, 10) \end{aligned}$$

$$c. g(x) = 3x^2 - 6x - 15$$

$$15 = 3x^2 - 6x$$

$$15 = 3(x^2 - 2x)$$

$$15 + 3 = 3(x^2 - 2x + 1)$$

$$18 = 3(x-1)^2$$

$$y = 3(x-1)^2 - 18$$

$$V(1, -18)$$

5) on graph paper!

$$b) a. f(x) = x^2$$

$$y = x^2$$

$$y = 5(x-4)^2 + 6$$

$$b. f(x) = x^2$$

$$y = x^2$$

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

$$c. f(x) = x^2$$

$$y = x^2$$

$$y = -3(x-2)(x+b)$$

$$y = -3(x^2 + 4x - 12)$$

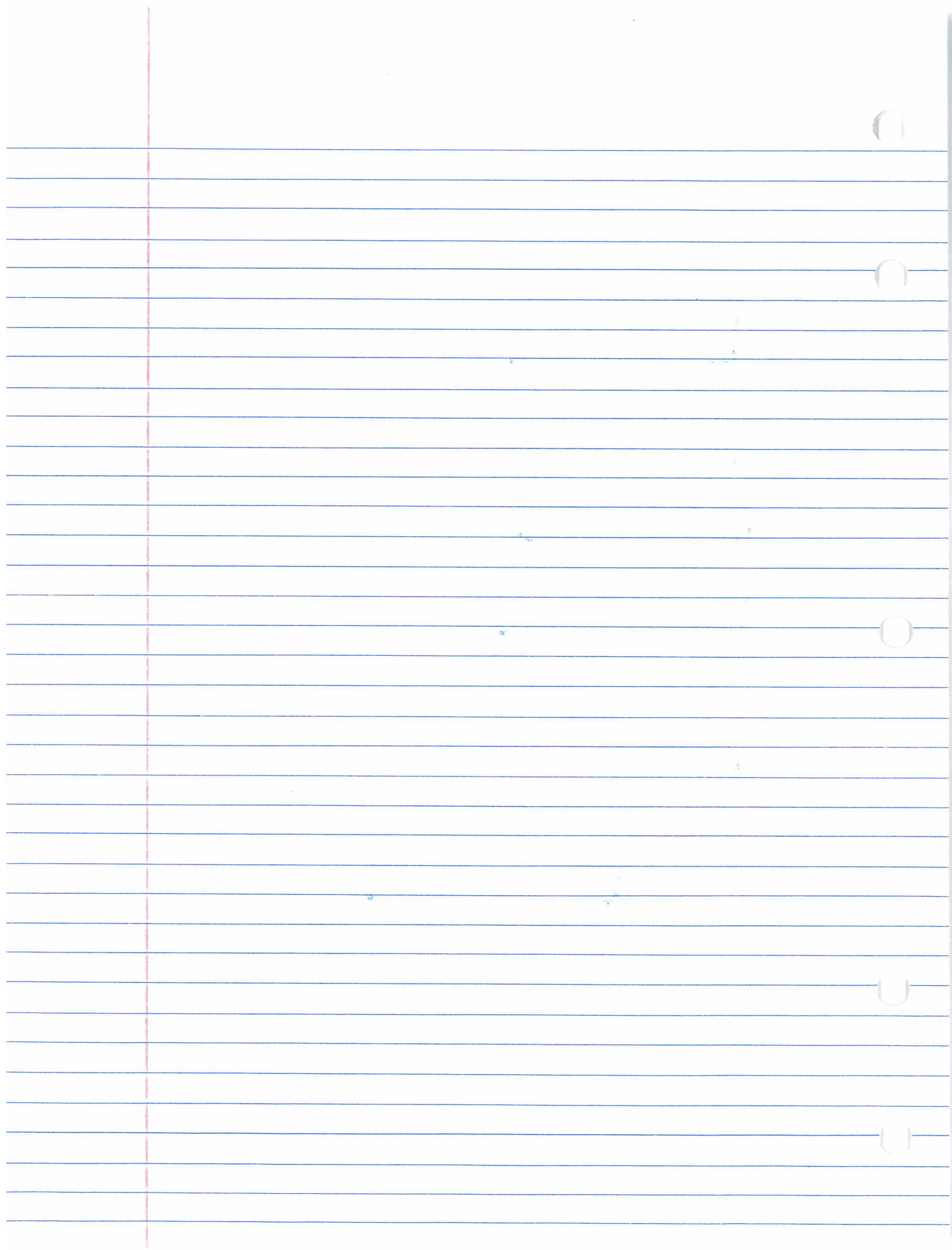
$$* y = -3x^2 - 12x + 36$$

$$y - 36 = -3(x^2 + 4x)$$

$$y - 36 - 12 = -3(x^2 + 4x + 4)$$

$$y - 48 = -3(x+2)^2$$

$$y = -3(x+2)^2 + 48$$



5) a. $h(x) = 30 + x - x^2$
 $y = -x^2 + x + 30$

D: $(-\infty, \infty)$

R: $(-\infty, 12\frac{1}{4}]$

V: $(\frac{1}{2}, 12\frac{1}{4})$

max @ $12\frac{1}{4}$

QOS: $x = \frac{1}{2}$

yint: $(0, 30)$

Zeros: $(-5, 0), (6, 0)$

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

$y = -(\frac{1}{2})^2 + \frac{1}{2} + 30$

$y = -\frac{1}{4} + \frac{1}{2} + 30$

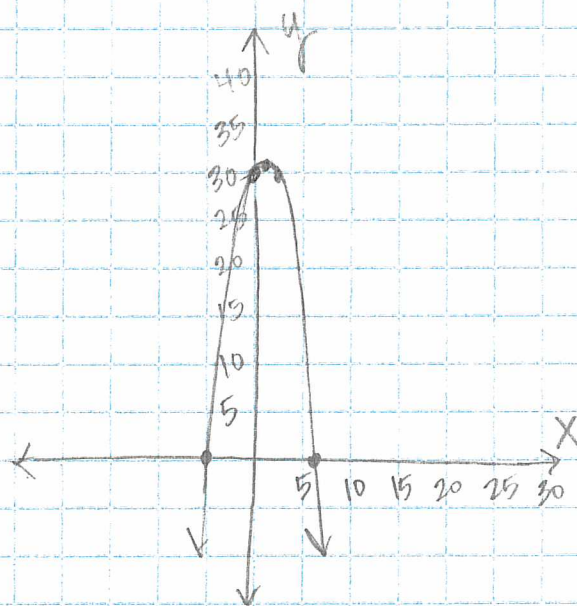
$y = 30\frac{1}{4} = 12\frac{1}{4}$

$0 = -x^2 + x + 30$

$0 = -(x^2 - x - 30)$

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

$x = -5, x = 6$



b. $f(x) = 2x^2 + 18x + 28$
 $y = 2x^2 + 18x + 28$

D: $(-\infty, \infty)$

R: $(-\infty, -25\frac{1}{2}]$

V: $(-\frac{9}{2}, -25\frac{1}{2})$

min @ $-25\frac{1}{2}$

QOS: $x = -\frac{9}{2}$

yint: $(0, 28)$

Zeros: $(-7, 0), (-2, 0)$

$x = \frac{-18}{2(2)} = \frac{-18}{4} = -\frac{9}{2}$

$y = 2(-\frac{9}{2})^2 + 18(-\frac{9}{2}) + 28$

$y = 2(\frac{81}{4}) - \frac{162}{2} + 28$

$y = \frac{162}{4} - \frac{162}{2} + 28$

$y = \frac{162}{4} - \frac{324}{4} + 28$

$y = -\frac{162}{4} + 28$

$y = -\frac{162}{4} + \frac{112}{4}$

$y = -\frac{50}{4} = -25\frac{1}{2}$

$0 = 2x^2 + 18x + 28$

$0 = 2(x^2 + 9x + 14)$

$0 = 2(x+7)(x+2)$

$x = -7, x = -2$

