

4.3 Pre-Calculus Math II

page 240 # 4-7 (do at least 4 of each)

4. a) $x^2 = 64$
 $x = \pm 8$

no linear term, so solve using algebra - isolate the variable

b) $2s^2 - 8 = 0$
 $2s^2 = 8$
 $s^2 = 4$
 $s = \pm 2$

c) $\frac{1}{3}t^2 - 1 = 11$

multiply by denominator

$\frac{1}{3}t^2 = 12$
 $3 \cdot \frac{1}{3}t^2 = 3 \cdot 12$

$t^2 = 36$
 $t = \pm 6$

d) $-y^2 + 5 = -6$
 $-y^2 = -11$
 $y^2 = 11$
 $y = \pm \sqrt{11}$

divide by -1

5. a) $(x-3)^2 = 4$
 $x-3 = \pm 2$
 $x = 3 \pm 2$
 $x = 3+2$ or $x = 3-2$
 $x = 5$ or $x = 1$

b) $(x+2)^2 = 9$
 $x+2 = \pm 3$
 $x = -2 \pm 3$
 $x = -2+3$ or $x = -2-3$
 $x = 1$ or $x = -5$

c) $(d+\frac{1}{2})^2 = 1$
 $d+\frac{1}{2} = \pm 1$
 $d = -\frac{1}{2} \pm 1$
 $d = -\frac{1}{2} + 1$ or $d = -\frac{1}{2} - 1$
 $d = \frac{1}{2}$ or $d = -\frac{3}{2}$

find a common denominator

d) $(h-\frac{3}{4})^2 = \frac{7}{16}$
 $h-\frac{3}{4} = \pm \frac{\sqrt{7}}{4}$
 $h = \frac{3}{4} \pm \frac{\sqrt{7}}{4}$
 $h = \frac{3 \pm \sqrt{7}}{4}$

page 240 cont.

5. e) $(s+6)^2 = \frac{3}{4}$

$$s+6 = \pm \frac{\sqrt{3}}{2}$$

$$s = -6 \pm \frac{\sqrt{3}}{2}$$

$$s = \frac{-12 \pm \sqrt{3}}{2}$$

$$s = \frac{-12 \pm \sqrt{3}}{2}$$

f) $(x+4)^2 = 18$

$$x+4 = \pm \sqrt{18}$$

$$x = -4 \pm \sqrt{18}$$

$$x = -4 \pm \sqrt{9 \cdot 2}$$

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

find a perfect square that divides into 18

this answer is acceptable

this is the answer in the text

6. a) $x^2 + 10x + 4 = 0$

$$x^2 + 10x = -4$$

$$x^2 + 10x + 25 = 25 - 4$$

$$(x+5)^2 = 21$$

$$x+5 = \pm \sqrt{21}$$

$$x = -5 \pm \sqrt{21}$$

b) $x^2 - 8x + 13 = 0$

$$x^2 - 8x = -13$$

$$x^2 - 8x + 16 = 16 - 13$$

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

$$x-4 = \pm 3$$

$$x = 4 \pm 3$$

c) $3x^2 + 6x + 1 = 0$

$$3x^2 + 6x = -1$$

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

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

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

$$x+1 = \pm \sqrt{\frac{2}{3}}$$

$$x = -1 \pm \sqrt{\frac{2}{3}}$$

d) $-2x^2 + 4x + 3 = 0$

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

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

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

$$(x-1)^2 = \frac{5}{2}$$

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

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

divide each term by 3

divide each term by -2

$1 + \frac{3}{2} = \frac{5}{2}$
 $\frac{2}{2} + \frac{3}{2} = \frac{5}{2}$

Note: there is a difference between $\frac{\sqrt{1}}{3}$ and $\sqrt{\frac{1}{3}}$ so be careful with your notation

page 240 cont.

6. e) $-0.1x^2 - 0.6x + 0.4 = 0$

divide all terms by -0.1 $\rightarrow x^2 + 6x = 4$

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

$$(x+3)^2 = 13$$

$$x+3 = \pm\sqrt{13}$$

$$x = -3 \pm \sqrt{13}$$

f) $0.5x^2 - 4x - 6 = 0$

$$0.5x^2 - 4x = 6$$

$$x^2 - 8x = 12$$

$$x^2 - 8x + 16 = 16 + 12$$

$$(x-4)^2 = 28$$

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

$$x = 4 \pm \sqrt{28}$$

$$x = 4 \pm \sqrt{4 \cdot 7}$$

$$x = 4 \pm 2\sqrt{7}$$

divide all terms by 0.5

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

$$x^2 - 8x = 4$$

$$x^2 - 8x + 16 = 4 + 16$$

$$(x-4)^2 = 20$$

$$x-4 = \pm\sqrt{20}$$

$$x = 4 \pm \sqrt{20}$$

$$x = 4 + \sqrt{20} \text{ or } x = 4 - \sqrt{20}$$

$$x = 8.5$$

$$x = -0.5$$

b) $-3x^2 + 4x + 5 = 0$

$$-3x^2 + 4x = -5$$

$$x^2 - \frac{4}{3}x = \frac{5}{3}$$

$\frac{2x}{3} \cdot \frac{1}{2} = \frac{2}{3}$

$$x^2 - \frac{4}{3}x + \frac{4}{9} = \frac{5}{3} + \frac{4}{9}$$

$\left(\frac{2}{3}\right)^2 = \frac{4}{9}$

$$\left(x - \frac{2}{3}\right)^2 = \frac{15}{9} + \frac{4}{9}$$

$$\left(x - \frac{2}{3}\right)^2 = \frac{19}{9}$$

$$x - \frac{2}{3} = \pm\sqrt{\frac{19}{9}}$$

$$x = \frac{2}{3} \pm \frac{\sqrt{19}}{3}$$

$$x = \frac{2 \pm \sqrt{19}}{3}$$

$$x = \frac{2 + \sqrt{19}}{3} \text{ or } x = \frac{2 - \sqrt{19}}{3}$$

$$x = 2.1$$

$$x = -0.8$$

c) $\frac{1}{2}x^2 - 6x - 5 = 0$

$$x^2 - 12x - 10 = 0$$

$$x^2 - 12x = 10$$

$$x^2 - 12x + 36 = 36 + 10$$

$$(x-6)^2 = 46$$

$$x-6 = \pm\sqrt{46}$$

$$x = 6 \pm \sqrt{46}$$

$$x = 6 + \sqrt{46} \text{ or } x = 6 - \sqrt{46}$$

$$x = 12.8$$

$$x = -0.8$$

Page 240 cont.

7. d) $0.2x^2 + 0.12x - 11 = 0$

$0.2x^2 + 0.12x = 11$

$x^2 + 0.6x = 55$

$x^2 + 0.6x + 0.09 = 55 + 0.09$

$(x + 0.3)^2 = 55.09$

$x + 0.3 = \pm \sqrt{55.09}$

$x = -0.3 \pm \sqrt{55.09}$

$x = -0.3 + \sqrt{55.09}$ or $x = -0.3 - \sqrt{55.09}$

$x = 7.1$

$x = -7.7$

multiply all terms by 3

e) $-\frac{2}{3}x^2 - x + 2 = 0$

divide all terms by 2

$-x^2 - 3x + 6 = 0$

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

$x^2 + 3x = 3$

$x^2 + 3x + \frac{9}{4} = 3 + \frac{9}{4}$

$\frac{3}{2} \cdot \frac{1}{2} = \frac{3}{4}$
 $(\frac{3}{4})^2 = \frac{9}{16}$

$(x + \frac{3}{4})^2 = \frac{48}{16} + \frac{9}{16}$

$(x + \frac{3}{4})^2 = \frac{57}{16}$

$x + \frac{3}{4} = \pm \frac{\sqrt{57}}{4}$

$x = -\frac{3}{4} \pm \frac{\sqrt{57}}{4}$

$x = \frac{-3 + \sqrt{57}}{4}$ or $x = \frac{-3 - \sqrt{57}}{4}$

$x = 1.1$

$x = -2.6$

multiply each term by $\frac{4}{3}$

f) $\frac{3}{4}x^2 + 6x + 1 = 0$

$x^2 + 8x + \frac{4}{3} = 0$

$x^2 + 8x = -\frac{4}{3}$

$x^2 + 8x + 16 = 16 - \frac{4}{3}$

$(x + 4)^2 = \frac{48}{3} - \frac{4}{3}$

$(x + 4)^2 = \frac{44}{3}$

$x + 4 = \pm \sqrt{\frac{44}{3}}$

$x = -4 \pm \sqrt{\frac{44}{3}}$

$x = -4 + \sqrt{\frac{44}{3}}$ or $x = -4 - \sqrt{\frac{44}{3}}$

$x = -0.2$

$x = -7.8$