

## 6.1 Factoring Quadratics

1.  $4x^2 = 12x$   
 $4x^2 - 12x = 0$   
 $4x(x-3) = 0$   
 $4x = 0 \quad x-3 = 0$   
 $x = 0 \quad x = 3$

2.  $6x^2 = 24x$   
 $6x^2 - 24x = 0$   
 $6x(x-4) = 0$   
 $6x = 0 \quad x-4 = 0$   
 $x = 0 \quad x = 4$

3.  $x^2 = 36$   
 $x^2 - 36 = 0$   
 $(x-6)(x+6) = 0$   
 $x-6 = 0 \quad x+6 = 0$   
 $x = 6 \quad x = -6$

4.  $x^2 - x - 20 = 0$   
 $(x-5)(x+4) = 0$   
 $x-5 = 0 \quad x+4 = 0$   
 $x = 5 \quad x = -4$

5.  $x^2 - 4x - 32 = 0$   
 $(x-8)(x+4) = 0$   
 $x-8 = 0 \quad x+4 = 0$   
 $x = 8 \quad x = -4$

6.  $x^2 - 18x + 81 = 0$   
 $(x-9)(x-9) = 0$   
 $x-9 = 0 \quad x-9 = 0$   
 $x = 9 \quad x = 9$

7.  $4x^2 - 3x - 10 = 0$   
 ~~$\begin{array}{r} -40 \\ -8 \quad 5 \\ -3 \end{array}$~~   $(4x^2 - 8x) + (5x - 10) = 0$   
 $4x(x-2) + 5(x-2) = 0$   
 $4x+5 = 0 \quad x-2 = 0$   
 $x = -5/4 \quad x = 2$

8.  $12x^2 + 5x - 2 = 0$   
 ~~$\begin{array}{r} -24 \\ 8 \quad -3 \\ 5 \end{array}$~~   $(12x^2 + 8x) - (3x - 2) = 0$   
 $4x(3x+2) - 1(3x+2) = 0$   
 $4x-1 = 0 \quad 3x+2 = 0$   
 $x = 1/4 \quad x = -2/3$

$$9. \quad 8x^2 - 14x + 5 = 0$$

$$\begin{array}{l} \cancel{40} \\ \cancel{-10} \quad \cancel{-4} \\ \cancel{-14} \end{array} \quad \begin{array}{l} (8x^2 - 4x)(10x + 5) = 0 \\ 4x(2x - 1) - 5(2x - 1) = 0 \\ (4x - 5)(2x - 1) = 0 \\ 4x - 5 = 0 \quad 2x - 1 = 0 \\ x = 5/4 \quad x = 1/2 \end{array}$$

$$13. \quad x = -8 \quad x = 22$$

$$x + 8 = 0 \quad x - 22 = 0$$

$$(x + 8)(x - 22) = 0$$

$$x^2 + 8x - 22x - 176 = 0$$

$$x^2 - 14x - 176 = 0$$

$$14. \quad x = \frac{-4}{3} \quad x = \frac{2}{5}$$

$$3x = -4 \quad 5x = 2$$

$$3x + 4 = 0 \quad 5x - 2 = 0$$

$$(3x + 4)(5x - 2) = 0$$

$$15x^2 - 6x + 20x - 8 = 0$$

$$15x^2 + 14x - 8 = 0$$

$$15. \quad x = \frac{-5}{6} \quad x = \frac{7}{5}$$

$$6x = -5 \quad 5x = 7$$

$$6x + 5 = 0 \quad 5x - 7 = 0$$

$$(6x + 5)(5x - 7) = 0$$

$$30x^2 - 42x + 25x - 35 = 0$$

$$30x^2 - 17x - 35 = 0$$

## 6.2 Quadratic formula

1.  $a=1$   $b=-1$   $c=-12$

$$(-1)^2 - 4(1)(-12)$$

$$1 + 48 = 49$$

2 real, rational roots

2.  $a=1$   $b=3$   $c=-3$

$$(3)^2 - 4(1)(-3)$$

$$9 + 12 = 21$$

2 real irrational roots

3.  $a=1$   $b=-2$   $c=5$

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

$$4 - 20 = -16$$

2 imaginary roots

4.  $a=-12$   $b=5$   $c=2$

$$(5)^2 - 4(-12)(2)$$

$$25 + 96 = 121$$

2 real, rational roots

5.  $a=9$   $b=-6$   $c=1$

$$(-6)^2 - 4(9)(1)$$

$$36 - 36 = 0$$

1 real, rational root

6.  $a=4$   $b=-9$   $c=7$

$$(-9)^2 - 4(4)(7)$$

$$81 - 112 = -31$$

2 imaginary roots

7.  $x^2 - 30x - 64 = 0$

$a=1$   $b=-30$   $c=-64$

$$x = \frac{30 \pm \sqrt{(-30)^2 - 4(1)(-64)}}{2(1)} = \frac{30 \pm \sqrt{1156}}{2} = \frac{30 \pm 34}{2}$$

$$x = \frac{30 + 34}{2} = \frac{64}{2} = 32 \quad x = \frac{30 - 34}{2} = \frac{-4}{2} = -2$$

$$8. \quad x^2 - 4x + 7 = 0 \quad a=1 \quad b=-4 \quad c=7$$

$$x = \frac{-4 \pm \sqrt{(-4)^2 - 4(1)(7)}}{2(1)} = \frac{-4 \pm \sqrt{-12}}{2} = \frac{-4 \pm 2i\sqrt{3}}{2}$$

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

$$9. \quad 4x^2 - 36x + 81 = 0 \quad a=4 \quad b=-36 \quad c=81$$

$$x = \frac{36 \pm \sqrt{(-36)^2 - 4(4)(81)}}{(2)(4)} = \frac{36 \pm \sqrt{0}}{8} = \frac{36}{8} = 4.5$$

$$10. \quad 2x^2 - 12x + 2 = 0 \quad a=2 \quad b=-12 \quad c=2$$

$$x = \frac{12 \pm \sqrt{(-12)^2 - 4(2)(2)}}{2(2)} = \frac{12 \pm \sqrt{128}}{4}$$

$$\begin{array}{c} 128 \\ \wedge \\ 4 \quad 32 \\ \wedge \quad \wedge \\ (2) \quad 4 \quad 8 \\ \wedge \quad \wedge \quad \wedge \\ (2) \quad (2) \quad (2) \end{array}$$

$$x = \frac{12 \pm 6\sqrt{2}}{4} = \frac{6 \pm 3\sqrt{2}}{2}$$

$$11. \quad 9x^2 - 6x + 1 = 0 \quad a=9 \quad b=-6 \quad c=1$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(9)(1)}}{2(9)} = \frac{6 \pm \sqrt{0}}{18} = \frac{6}{18} = \frac{1}{3}$$

$$12. \quad x^2 + 2x - 5 = 0 \quad a=1 \quad b=2 \quad c=-5$$

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-5)}}{2(1)} = \frac{-2 \pm \sqrt{24}}{2} = \frac{-2 \pm 2\sqrt{6}}{2}$$

$$13. 125 = 0.05s^2 + 1.1s \quad a = 0.05 \quad b = 1.1 \quad c = -125$$

$$x = \frac{-1.1 \pm \sqrt{(1.1)^2 - 4(0.05)(-125)}}{2(0.05)} = \frac{-1.1 \pm \sqrt{26.2}}{0.1}$$

$$x = \frac{-1.1 \pm 5}{0.1}$$

$$x = \frac{-1.1 + 5}{0.1} = \frac{3.9}{0.1} = 39 \text{ mph}$$

$$14. A(t) = 2.3t^2 - 12.4t + 73.7 \quad t = \# \text{ of years since } 1975$$

$$a) \text{ Domain} = [0, \infty)$$

$$\text{Range} = [0, \infty)$$

$$b) 1000 = 2.3t^2 - 12.4t + 73.7$$

$$2.3t^2 - 12.4t - 926.3 = 0$$

$$t = \frac{12.4 \pm \sqrt{(12.4)^2 - 4(2.3)(-926.3)}}{2(2.3)}$$

$$t = \frac{12.4 \pm \sqrt{8075.72}}{4.6} = \frac{12.4 \pm 93.14}{4.6}$$

$$t = \frac{12.4 + 93.14}{4.6} = \frac{105.5}{4.6} = 22.9 \approx 23 \text{ years}$$

$$\begin{array}{r} 1975 \\ + 23 \\ \hline \end{array}$$

1998

← year salaries exceeded \$1 million

### 6.3 Completing the Square #2-12 even

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

$$x^2 - 2x + \left(\frac{2}{2}\right)^2 = 8 + \left(\frac{2}{2}\right)^2$$

$$x^2 - 2x + 1 = 8 + 1$$

$$(x-1)^2 = 9$$

$$(x-1) = \pm\sqrt{9}$$

$$x-1 = 3$$

$$x = 4$$

$$x-1 = -3$$

$$x = -2$$

4.  $x^2 + 8x + 12 = 0$

$$x^2 + 8x + \left(\frac{8}{2}\right)^2 = -12 + \left(\frac{8}{2}\right)^2$$

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

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

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

$$x+4 = 2$$

$$x = -2$$

$$x+4 = -2$$

$$x = -6$$

6.  $x^2 - 2x - 48 = 0$

$$x^2 - 2x + \left(\frac{-2}{2}\right)^2 = 48 + \left(\frac{-2}{2}\right)^2$$

$$x^2 - 2x + 1 = 48 + 1$$

$$(x-1)^2 = 49$$

$$x-1 = \pm\sqrt{49}$$

$$x-1 = 7$$

$$x = 8$$

$$x-1 = -7$$

$$x = -6$$

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

$$x^2 + 12x + \left(\frac{12}{2}\right)^2 = -20 + \left(\frac{12}{2}\right)^2$$

$$x^2 + 12x + 36 = -20 + 36$$

$$(x+6)^2 = 16$$

$$x+6 = \pm\sqrt{16}$$

$$x+6 = 4$$

$$x = -2$$

$$x+6 = -4$$

$$x = -10$$

10.  $x^2 + 2x - 63 = 0$

$$x^2 + 2x + \left(\frac{2}{2}\right)^2 = 63 + \left(\frac{2}{2}\right)^2$$

$$x^2 + 2x + 1 = 63 + 1$$

$$(x+1)^2 = 64$$

$$(x+1) = \pm\sqrt{64}$$

$$x+1 = 8$$

$$x = 7$$

$$x+1 = -8$$

$$x = -9$$

$$12. \quad x^2 - 8x + 21 = 0$$

$$x^2 - 8x + \left(\frac{-8}{2}\right)^2 = -15 + \left(\frac{-8}{2}\right)^2$$

$$x^2 - 8x + 16 = -15 + 16$$

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

$$x-4 = \pm\sqrt{1}$$

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

$$x = 5 \quad x = 3$$

## Graphing Standard Form

$$1. \quad f(x) = x^2 - 2x$$

$$\text{AOS: } x = 1$$

$$\text{vertex: } (1, -1)$$

$$\text{y-int: } (0, 0)$$

$$\text{Roots: } x = 0, 2$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } [-1, \infty)$$

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

$$y = (0)^2 - 2(0) = 0$$

$$x^2 - 2x = 0 \quad x = 0 \quad x = 2$$

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

$$2. \quad f(x) = x^2 + 2x - 2$$

$$\text{AOS: } x = -1$$

$$\text{vertex: } (-1, -3)$$

$$\text{y-int: } (0, -2)$$

$$\text{roots: } \text{---}$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } [-3, \infty)$$

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

$$y = -3$$

$$y = 0^2 + 2(0) - 2 = -2$$

$$x^2 + 2x - 2 = 0 \quad \text{can't factor}$$

$$3. \quad f(x) = -x^2 - 2x + 3$$

$$\text{AOS: } x = -1$$

$$\text{vertex: } (-1, 4)$$

$$\text{y-int: } (0, 3)$$

$$\text{roots: } 1, -3$$

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

$$y = 4$$

$$y = -(0)^2 - 2(0) + 3 = 3$$

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

$$-x+1 = 0$$

$$x = 1$$

$$x+3 = 0$$

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

$$\text{AOS: } x = 2$$

$$\text{vertex: } (2, 1)$$

$$\text{y-int: } (0, -3)$$

$$\text{roots: } 3, 1$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } (-\infty, 1]$$

$$x = \frac{-4}{2(-1)} = 2 \quad y = -(2)^2 + 4(2) - 3$$

$$2(-1) \quad y = 1$$

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

$$\begin{array}{r} \cancel{3} \quad \cancel{1} \\ 3 \quad \cancel{1} \\ \cancel{4} \end{array} \quad \begin{array}{l} (-x^2 + 1x + 3x - 3) = 0 \\ -1x(x-1) + 3(x-1) = 0 \\ -1x + 3 = 0 \quad x-1 = 0 \\ x = 3 \quad x = 1 \end{array}$$

$$5. f(x) = -2x^2 + 4x$$

$$\text{AOS: } x = 1$$

$$\text{vertex: } (1, 2)$$

$$\text{y-int: } (0, 0)$$

$$\text{roots: } x = 0, 2$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } (-\infty, 2]$$

$$x = \frac{-4}{2(-2)} = 1 \quad y = -2(1)^2 + 4(1)$$

$$2(-2) \quad y = 2$$

$$\begin{array}{l} -2x^2 + 4x = 0 \quad -2x = 0 \quad x - 2 = 0 \\ -2x(x-2) = 0 \quad x = 0 \quad x = 2 \end{array}$$

$$6. f(x) = 2x^2 + 4x + 1$$

$$\text{AOS: } x = -1$$

$$\text{vertex: } (-1, -1)$$

$$\text{y-int: } (0, 1)$$

$$\text{roots: } \text{---}$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } [-1, \infty)$$

$$x = \frac{-4}{2(2)} = -1 \quad y = 2(-1)^2 + 4(-1) + 1$$

$$2(2) \quad y = -1$$

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

$$\begin{array}{r} \cancel{2} \\ \cancel{4} \end{array} \quad \text{Not factorable}$$



## Intercept Form Graphing

1.  $f(x) = (x+2)(x-4)$

$$x+2=0 \quad x-4=0$$

$$x=-2 \quad x=4$$

$$\text{AOS} = \frac{-2+4}{2} = \frac{2}{2} = 1$$

$$y = (1+2)(1-4) \\ = (3)(-3) = -9$$

$$y\text{-int}: (0+2)(0-4) \\ = (2)(-4) = -8$$

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

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

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

$$\text{AOS} = \frac{-3+1}{2} = \frac{-2}{2} = -1$$

$$y = 2(-1+3)(-1-1) \\ = 2(2)(-2) = -8$$

$$y\text{-int}: 2(0+3)(0-1) \\ = 2(3)(-1) = -6$$

3.  $f(x) = -(x-2)(x+4)$

$$x-2=0 \quad x+4=0$$

$$x=2 \quad x=-4$$

$$\text{AOS} = \frac{2+(-4)}{2} = \frac{-2}{2} = -1$$

$$y = -1(-1-2)(-1+4) \\ = -1(-3)(3) = 9$$

$$y\text{-int}: -1(0-2)(0+4) \\ = -1(-2)(4) = 8$$

4.  $f(x) = -\frac{1}{2}(x+2)(x-4)$

$$x+2=0 \quad x-4=0$$

$$x=-2 \quad x=4$$

$$\text{AOS} = \frac{-2+4}{2} = \frac{2}{2} = 1$$

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

$$y = -\frac{1}{2}(3)(-3) = 4.5$$

## Graphing Vertex Form.

15.  $f(x) = -3(x-2)^2 - 4$

vertex:  $(2, -4)$

AOS:  $x = 2$

y-int:  $(0, -16)$

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

Range:  $(-\infty, -4]$

$$y = -3(0-2)^2 - 4$$

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

$$y = -3(4) - 4$$

$$y = -12 - 4 = -16$$

16.  $f(x) = -1/4(x-1)^2 + 4$

vertex:  $(1, 4)$

AOS:  $x = 1$

y-int:  $(0, 3.75)$

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

Range:  $(-\infty, 4]$

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

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

$$y = -1/4 + 4$$

$$y = 3.75$$

17.  $f(x) = 1/4(x+4)^2 + 3$

vertex:  $(-4, 3)$

AOS:  $x = -4$

y-int:  $(0, 7)$

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

Range:  $[3, \infty)$

$$y = 1/4(0+4)^2 + 3$$

$$y = 1/4(16) + 3$$

$$y = 4 + 3 = 7$$

18.  $f(x) = 1/4(x+5)^2 + 2$

vertex:  $(-5, 2)$

AOS:  $x = -5$

y-int:  $(0, 8.25)$

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

Range:  $[2, \infty)$

$$y = 1/4(0+5)^2 + 2$$

$$y = 1/4(25) + 2$$

$$y = 8.25$$

$$19. f(x) = -2(x+5)^2 - 3$$

$$\text{vertex: } (-5, -3)$$

$$\text{AOS: } x = -5$$

$$\text{y-int: } (0, -53)$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } (-\infty, -3]$$

$$y = -2(0+5)^2 - 3$$

$$y = -2(25) - 3$$

$$y = -53$$

$$20. f(x) = (x+2)^2 - 1$$

$$\text{vertex: } (-2, -1)$$

$$\text{AOS: } x = -2$$

$$\text{y-int: } (0, 3)$$

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } [-1, \infty)$$

$$y = (0+2)^2 - 1$$

$$y = (4) - 1$$

$$y = 3$$

## 6.5 Homework

1.  $y = a(x-h)^2 + k$

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

$$3 = a(4-2)^2 - 1$$

$$3 = 4a - 1$$

$$4 = 4a$$

$$a = 1$$

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

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

$$y = a(x-h)^2 + k$$

$$y = a(x+4)^2 + 6$$

$$9 = a(-1+4)^2 + 6$$

$$9 = 9a + 6$$

$$3 = 9a$$

$$a = 1/3$$

$$y = 1/3(x+4)^2 + 6$$

3.  $y = a(x-h)^2 + k$

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

$$-3 = a(8-4)^2 + 5$$

$$-3 = 16a + 5$$

$$-8 = 16a$$

$$a = -1/2$$

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

4.  $y = a(x-h)^2 + k$

$$y = a(x-0)^2 + 0$$

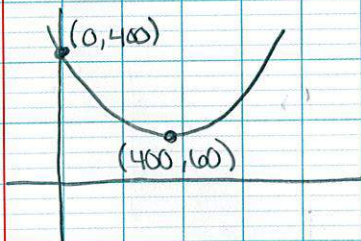
$$-12 = a(-2-0)^2 + 0$$

$$-12 = 4a$$

$$a = -3$$

$$y = -3x^2$$

5.



$$y = a(x-400)^2 + 60$$

$$400 = a(0-400)^2 + 60$$

$$400 = 160000a + 60$$

$$340 = 160000a$$

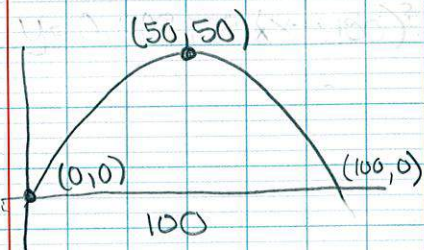
$$a = 0.002125$$

$$y = 0.002125(x-400)^2 + 60$$

$$y = 0.002125(40-400)^2 + 60$$

$$y = 335.4 \text{ feet}$$

6.



$$y = a(x-50)^2 + 50$$

$$0 = a(0-50)^2 + 50$$

$$-50 = 2500a$$

$$a = -0.02$$

$$y = -0.02(x-50)^2 + 50$$

$$y = -0.02(80-50)^2 + 50$$

$$y = 32 \text{ feet}$$

32 feet

## 6.6 Quad. Word Problems

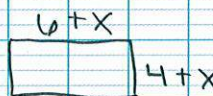
1. 1<sup>st</sup>:  $x$        $x^2 - 17 = 4(x+1)$   
 2<sup>nd</sup>:  $x+1$        $x^2 - 17 = 4x + 4$   
                           $x^2 - 4x - 21 = 0$   
                           $(x-7)(x+3) = 0$   
                           $x = 7 \quad x = -3$

Solutions:  
7, 8

2. 1<sup>st</sup>:  $x$        $x^2 = 8(x+2) + 4$       Solutions:  
 2<sup>nd</sup>:  $x+1$        $x^2 = 8x + 16 + 4$   
 3<sup>rd</sup>:  $x+2$        $x^2 - 8x - 20 = 0$       10, 11, 12  
                           $(x-10)(x+2) = 0$   
                           $x = 10 \quad x = -2$

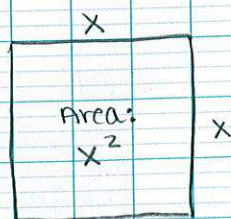
3. 1<sup>st</sup>:  $x$        $x^2 + (x+2)(x+4) = 224$   
 2<sup>nd</sup>:  $x+2$        $x^2 + x^2 + 6x + 8 = 224$       Solutions:  
 3<sup>rd</sup>:  $x+4$        $2x^2 + 6x - 216 = 0$   
                           $x^2 + 3x - 108 = 0$       9, 11, 13  
                           $(x+12)(x-9) = 0$   
                           $x = -12 \quad x = 9$

4. Length:  $x+6$        $(x+6)(x+4) = 48$   
 width:  $x+4$        $x^2 + 10x + 24 = 48$       Solutions:  
 Area:  $2(24)$        $x^2 + 10x - 24 = 0$   
                           $(x+12)(x-2) = 0$       2 meters  
                           $x = -12 \quad x = 2$



5. base<sub>1</sub>:  $x+3$        $45 = \frac{x(x+3+3x-5)}{2}$        $4x+18=0$        $x-5=0$   
 base<sub>2</sub>:  $3x-5$        $90 = x(4x-2)$        $4x = -18$        $x = 5$   
 height:  $x$        $90 = 4x^2 - 2x$        $x = -4.5$   
 Area: 45       $4x^2 - 2x - 90 = 0$       Solutions:

6. Length:  $3x$   
 Width:  $x+10$   
 Area:  $6x^2$



$$3x(x+10) = 6x^2$$

$$3x^2 + 30x = 6x^2$$

$$3x^2 - 30x = 0$$

$$3x(x-10) = 0$$

$$3x = 0 \quad x - 10 = 0$$

$$x = 0 \quad x = 10$$

Solution:

10

7. Length:  $x+7 \rightarrow x+9$   
 Width:  $x \rightarrow 2x$   
 Area:  $x(x+7) \rightarrow x^2 + 7x + 42$

Solutions:

Length: 10

Width: 3

$$2x(x+9) = x^2 + 7x + 42$$

$$x = -14$$

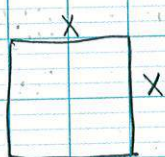
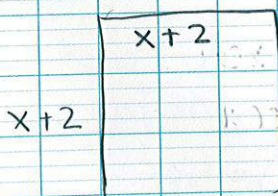
$$2x^2 + 18x = x^2 + 7x + 42$$

$$x = 3$$

$$x^2 + 11x - 42 = 0$$

$$(x+14)(x-3) = 0$$

8.



$$\text{Area: } (x+2)(x+2)$$

$$\text{Area: } x^2$$

$$x+8=0$$

$$x-6=0$$

$$x=-8$$

$$x=6$$

$$(x+2)(x+2) + x^2 = 100$$

$$x^2 + 4x + 4 + x^2 = 100$$

$$2x^2 + 4x - 96 = 0$$

$$x^2 + 2x - 48 = 0$$

$$(x+8)(x-6) = 0$$

Solutions:

small  $\square$ : 6 cm

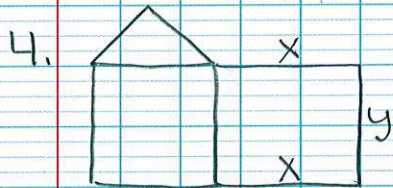
Large  $\square$ : 8 cm

## 6.7 Quadratic Word Problems

1. a) 288 feet  
b) 324 feet  
c) 2 sec and 7 sec  
d) 9 seconds

2. a)  $h = -16(1.5)^2 + 64(1.5) + 80$   
 $h = 140$  feet  
b) 144 feet  
c) 1 sec & 3 sec  
d) 5 sec

3. 0.75 seconds



$$A = xy$$

$$2x + y = 80$$

$$y = 80 - 2x$$

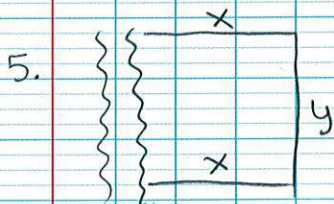
$$\text{Area} = x(80 - 2x)$$

$$\text{Area} = 80x - 2x^2$$

Max Area = 800 feet<sup>2</sup>

Length = 20 feet

width = 40 feet



$$A = xy$$

$$2x + y = 230$$

$$y = 230 - 2x$$

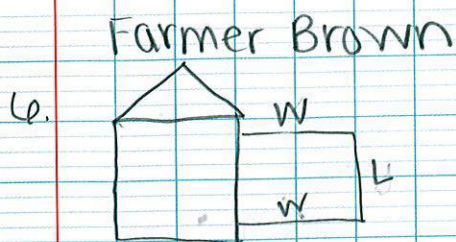
$$\text{Area} = x(230 - 2x)$$

$$\text{Area} = 230x - 2x^2$$

Max Area = 6012.5 feet<sup>2</sup>

Length = 57.5 feet

width = 115 feet



$$A = LW$$

$$2w + L = 12$$

$$L = 12 - 2w$$

$$\text{Area} = w(12 - 2w)$$

$$\text{Area} = 12w - 2w^2$$

$$\text{MAX Area} = 18 \text{ m}^2$$

$$\text{width} = 3 \text{ m}$$

$$\text{Length} = 6 \text{ m}$$

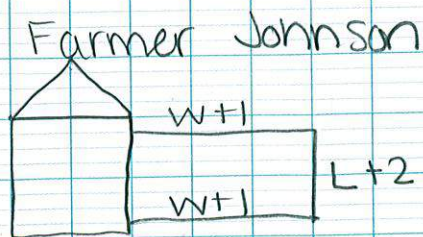
PERIMETER = 12

7.  $f(x) = -16x^2 + 42x + 12$

$$\text{max height} = 39.5625$$

$$g(x) = -16x^2 + 40x + 9$$

$$\text{max height} = 34$$



$$\text{width} = 4$$

$$\text{Length} = 8$$

$$\text{perimeter} = 16$$

$$\text{Area} = 32 \text{ m}^2$$

$$\begin{array}{r} 32 \text{ m}^2 \\ - 18 \text{ m}^2 \\ \hline 14 \text{ m}^2 \end{array}$$

Answer:

D

$$\begin{array}{r} 39.5625 \\ - 34.0 \\ \hline 5.5625 \end{array}$$

Answer:

D