page 435 # 4-7, 9

4. a)

$y_1 = x+7$
$y_2 = (x+2)^2 + 3$

(0,7)
(-3,4)

$[-8, 2]$
x min, max

$[-2, 10]$
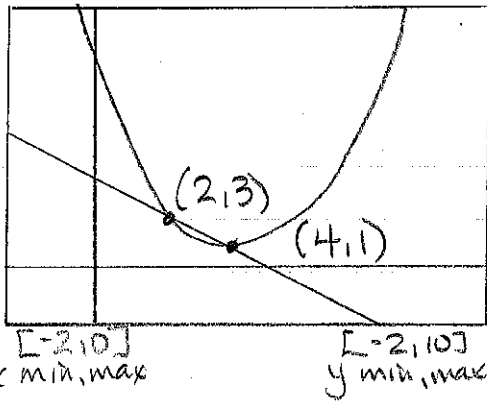y min, max

Arrange your window so you can see the intersection points and the x- and y-intercepts

solutions: (-3,4) (0,7)

b)

$y_1 = -x+5$
$y_2 = \frac{1}{2}(x-4)^2 + 1$
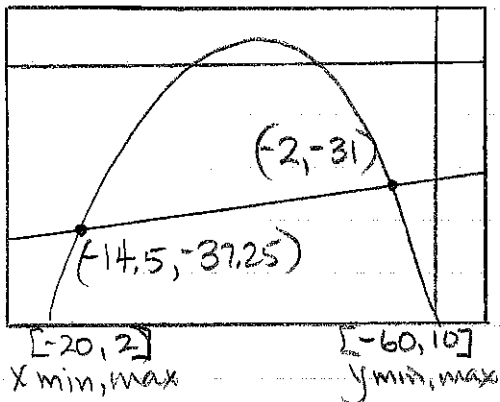
(2,3)
(4,1)

$[-2, 10]$
x min, max

$[-2, 10]$
y min, max

solutions: (2,3) (4,1)

c) $x^2 + 16x + y = -59$
$y = -x^2 - 16x - 59$

$x - 2y = 60$
$x - 60 = 2y$
$\frac{1}{2}x - 30 = y$

$y_1 = -x^2 - 16x - 59$
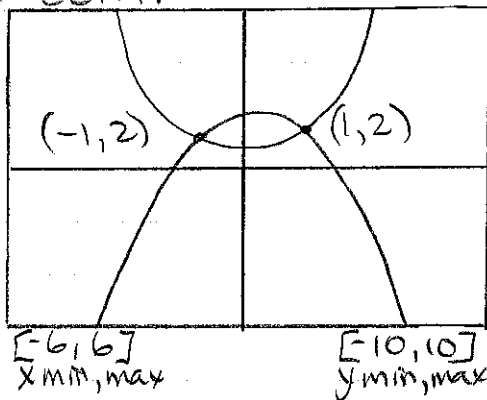$y_2 = \frac{1}{2}x - 30$

(-2, -31)
(-14.5, -37.25)

$[-20, 2]$
x min, max

$[-60, 10]$
y min, max

solutions: (-14.5, -37.25) (-2, -31)

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

$x^2 - y + 1 = 0$
$x^2 + 1 = y$

page 435 cont.

4. d) cont.

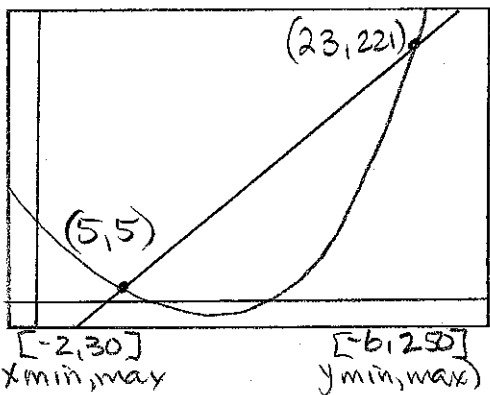

$y_1 = -x^2 + 3$
$y_2 = x^2 + 1$

$[-6, 6]$
x min, max

$[-10, 10]$
y min, max

solutions: $(-1, 2)$ $(1, 2)$

e)

$y_1 = x^2 - 10x + 32$
$y_2 = 2x^2 - 32x + 137$

$[-2, 20]$
x min, max

$[-20, 140]$
y min, max
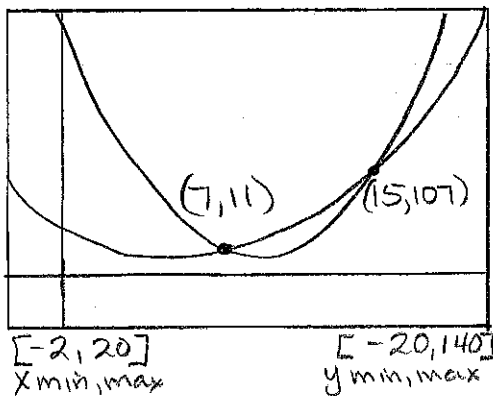
solutions: $(7, 11)$ $(15, 107)$

5. a)

$y_1 = x^2 - 16x + 60$
$y_2 = 12x - 55$

keep playing with the window to make sure they cross or don't cross!

$[-2, 30]$
x min, max

$[-6, 250]$
y min, max

solutions: $(5, 5)$ $(23, 221)$

b)

$y_1 = 3x^2 - 12x + 17$
$y_2 = -0.25x^2 + 0.5x + 1.75$
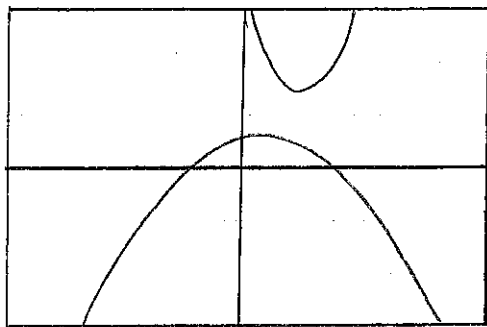
no intersection points
no solution

page 435 cont.

5. c) $2v^2 + 20v + t = -40$

$t = -2v^2 - 20v - 40$

$5v + 2t + 26 = 0$

$2t = -5v - 26$

$t = -2.5v - 13$

$y_1 = -2x^2 - 20x - 40$

$y_2 = -2.5x - 13$

[-10, 2]
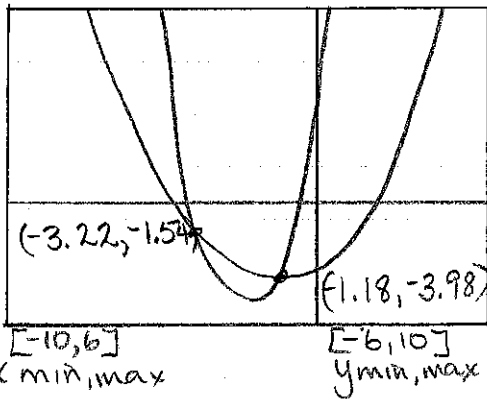x min, max

[-20, 10]
y min, max

(-6.75, 3.875)

(-2, -8)
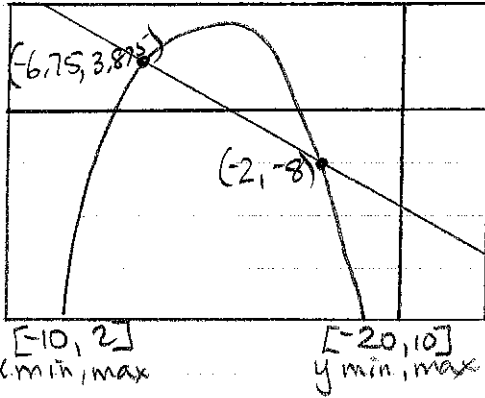
solutions $(-6.75, 3.875)$ $(-2, -8)$

d) $n^2 + 2n - 2m - 7 = 0$

$n^2 + 2n - 7 = 2m$

$\frac{1}{2}n^2 + n - \frac{7}{2} = m$

$0.5n^2 + n - 3.5 = m$

$3n^2 + 12n - m + 6 = 0$
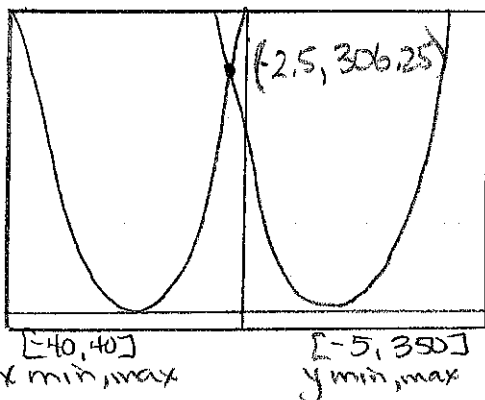
$3n^2 + 12n + 6 = m$

$y_1 = 0.5x^2 + x - 3.5$

$y_2 = 3x^2 + 12x + 6$

(-3.22, -1.54)

(-1.18, -3.98)

[-10, 6]
x min, max

[-6, 10]
y min, max

Solutions: $(-3.22, -1.54)$ $(-1.18, -3.98)$

e) $0 = t^2 + 40t - h + 400$

$h = t^2 + 40t + 400$

$t^2 = h + 30t - 225$
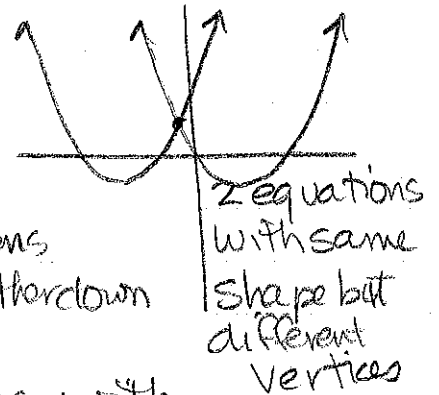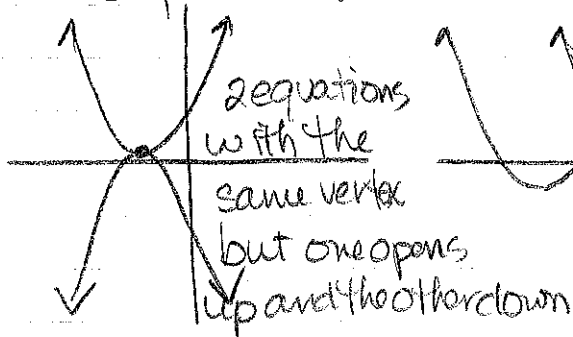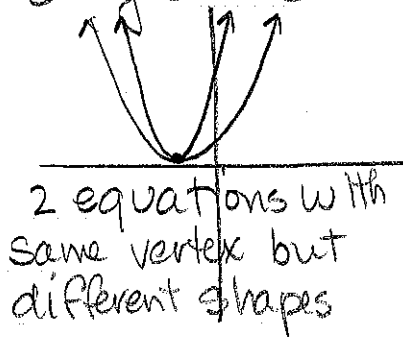
$t^2 - 30t + 225 = h$

$y_1 = x^2 + 40x + 400$

$y_2 = x^2 - 30x + 225$

(-2.5, 306.25)

[-40, 40]
x min, max

[-5, 350]
y min, max

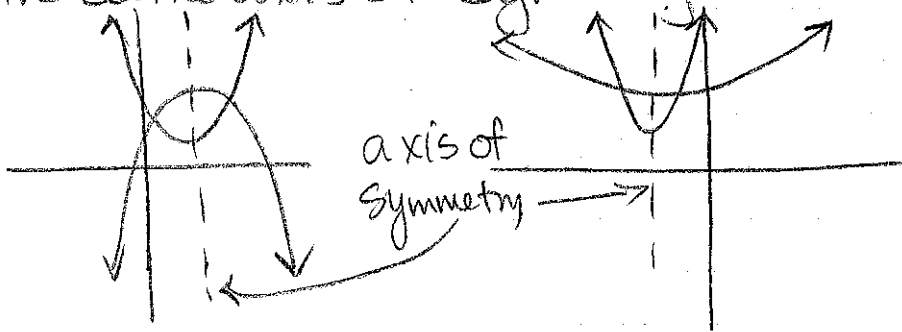they both start with x^2 so they are exactly the same shape - lines are parallel

Solution $(-2.5, 306.25)$

Page 435 cont.

6. a system of two quadratic equations with only one solution - 3 possibilities

2 equations with same vertex but different shapes

2 equations with the same vertex but one opens up and the other down

2 equations with same shape but different vertices

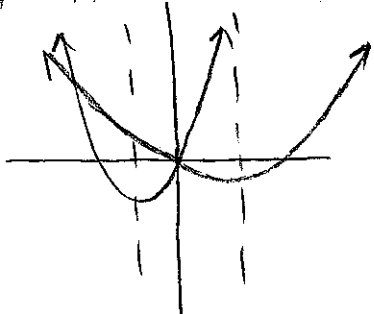7. a system of two quadratic equations with two solutions

a) the same axis of symmetry

axis of symmetry →

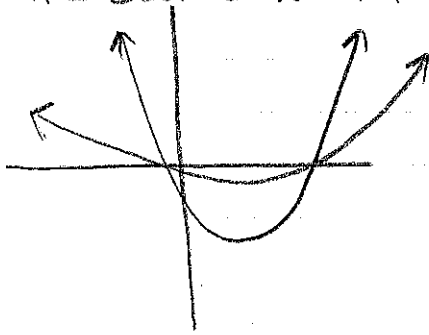b) the same axis of symmetry and the same y-intercept
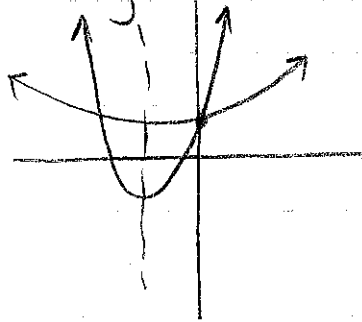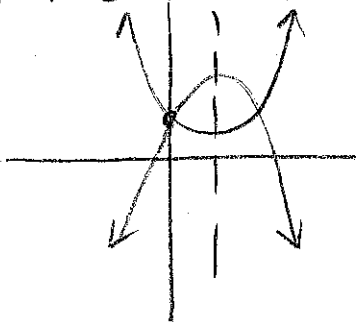
c) different axes of symmetry but the same y-intercept

page 435 cont.

7. d) the same x-intercepts

9. graph. page 436

   a) Look for the intersection points (to the nearest 100)
      when quantity is 100, value is about 3800
      when quantity is 1000, value is about 8000

   b) When Jonas sells 100 or 1000 shirts the amount of money he makes equals the amount of the cost of making the shirts so he makes no profit

   c) The greatest profit occurs when there is the biggest space between the cost line and revenue curve. This occurs at about 550 or 600 shirts.