

Mathematics 20-1
 Chapter 8: Systems of Equations
 Final Exam Review Assignment

Name: Answers
 Date: _____

1. Solve the following systems of equations graphically.

see sheet

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

b) $4x^2 + 8x + 5 - y = 1$
 $3x^2 - x + 3 = y + x + 8$

2. A model rocket is launched from a field. The height of the rocket, y , in feet above the ground, after x second is modeled by the equation $y = -16x^2 + 177x + 4$. From the 10th floor of a nearby building, a boy looks out a window when he hears the rocket fired. The boy's line of sight is given by the equation $y = 65x + 100$. Determine and interpret the point(s) of intersection.

see sheet

$(6, 490)$

$(1, 165)$

3. Solve the following systems of linear-quadratic or quadratic-quadratic equations algebraically.

see sheet

a) $3x - y = -5$
 $x^2 - y + 2x = 1$

b) $4x^2 - y + 8x = -2$
 $y + 2 = 4x^2 - 8x$

$(3, 14)$

$(-2, -1)$

$(-\frac{1}{4}, \frac{1}{4})$

4. Determine the value of the integers given the following information. The square of the first number subtract the second number is equal to 5. The first number is equal to the second number subtract 7. Create a system of equations and then solve the system to determine the numbers.

$x^2 - y = 5$

$x = y - 7$

$(y - 7)^2 - y = 5$

$y^2 - 14y + 49 - y - 5 = 0$

$y^2 - 15y + 44 = 0$

$(y - 4)(y - 11) = 0$

$y = 4 \quad y = 11$

$y = 4$

$x = 4 - 7$

$x = -3$

$y = 11$

$x = 11 - 7$

$x = 4$

$(-3, 4)$

$(4, 11)$

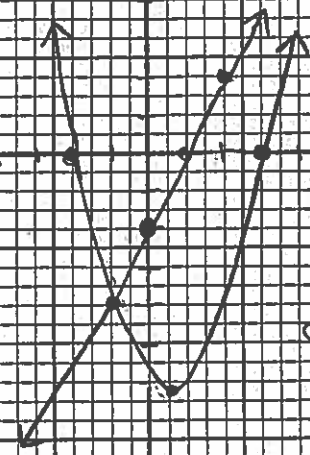
Chapter 8 : Systems of Equations

1) a) $y = x^2 - x - 6$
 $y = 2x - 2$

X-int

$y = x^2 - x - 6$
 $x^2 - x - 6 = 0$
 $(x-3)(x+2) = 0$
 $x = 3, x = -2$

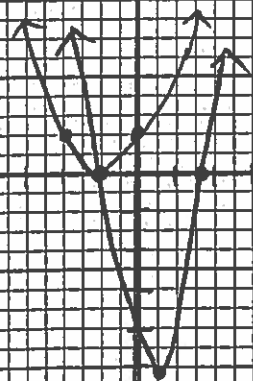
Vertex
 $x = \frac{1}{2}$
 $y = -\frac{25}{4}$



Solution
 $(=1, 0)$

b) $4x^2 + 8x + 5 - y = 1$
 $4x^2 + 8x + 4 = y$
 $x^2 + 2x + 1 = y$
X-int $(x+1)(x+1) = 0$
 $x = -1, x = -1$

Vertex
 $x = \frac{-2}{2} = -1$
 $y = (-1)^2 + 2(-1) + 1$
 $y = 1 - 2 + 1$
 $y = 0$



Solution $(-1, 0)$

$3x^2 - x + 3 = y + x + 8$
 $3x^2 = x + x + 3 - 8 = y$
 $3x^2 - 2x - 5 = 0$ $\begin{matrix} p = -15 \\ s = 2 \end{matrix}$
 $3x^2 - 5x + 3x - 5 = 0$
 $x(3x-5) + 1(3x-5) = 0$
 $(x+1)(3x-5) = 0$
 $x = -1, 3x-5 = 0$
 $x = 5/3$

Vertex $x = \frac{2}{6} = \frac{1}{3}$
 $y = 3(\frac{1}{3})^2 - 2(\frac{1}{3}) - 5$
 $y = -\frac{21}{4} = -5.25$

$$2. \quad y = -16x^2 + 177x + 4$$

$$y = 65x + 100$$

$$65x + 100 = -16x^2 + 177x + 4$$

$$16x^2 - 112x + 96 = 0$$

$$x^2 - 7x + 6 = 0$$

$$(x-6)(x-1) = 0$$

$$x=6 \quad x=1$$

$$x=6$$

$$y = 65(6) + 100$$

$$y = 390 + 100$$

$$y = 490$$

$$(6, 490)$$

$$x=1$$

$$y = 65(1) + 100$$

$$y = 65 + 100$$

$$y = 165$$

$$(1, 165)$$

Verify

$$(6, 490) \quad \checkmark$$

$$(1, 165) \quad \checkmark$$

$$\text{LHS}$$

$$490$$

RHS

$$-16(6)^2 + 177(6) + 4$$

$$-576 + 1062 + 4$$

$$490$$

$$\text{LHS}$$

$$165$$

RHS

$$-16(1)^2 + 177(1) + 4$$

$$-16 + 177 + 4$$

$$165$$

$$3. a) \begin{cases} 3x - y = -5 & (-1) \\ x^2 - y + 2x = 1 \end{cases}$$

$$\begin{array}{r} y - 3x = 5 \\ x^2 - \cancel{y} + 2x = 1 \\ \hline x^2 - x = 6 \end{array}$$

$$\begin{aligned} x^2 - x - 6 &= 0 \\ (x-3)(x+2) &= 0 \\ x=3 \quad x &= -2. \end{aligned}$$

$$x=3$$

$$\begin{aligned} 3x - y &= -5 \\ (3)(3) - y &= -5 \\ -y &= -5 - 9 \\ -y &= -14 \\ y &= 14. \end{aligned}$$

$$(3, 14)$$

$$x=-2$$

$$\begin{aligned} 3x - y &= -5 \\ 3(-2) - y &= -5 \\ -y &= -5 + 6 \\ -y &= 1 \\ y &= -1 \end{aligned}$$

$$(-2, -1)$$

$$b) \begin{cases} 4x^2 - y + 8x = -2 \\ y + 2 = 4x^2 - 8x \end{cases}$$

$$\begin{aligned} 4x^2 - y + 8x &= -2 \\ 4x^2 - \cancel{y} - 8x - 2 &= 0 \end{aligned}$$

$$\begin{cases} 4x^2 - y + 8x = -2 & (-1) \\ 4x^2 - y - 8x = 2 \end{cases}$$

$$\begin{array}{r} -4x^2 + y - 8x = 2 \\ \hline 4x^2 - y - 8x = 2 \\ \hline -16x = 4 \\ \frac{-16}{-16} \quad \frac{4}{-16} \\ x = -\frac{1}{4} \end{array}$$

$$\left(-\frac{1}{4}, \frac{1}{4}\right)$$

$$\underline{x = \frac{1}{4}}$$

$$\begin{aligned} y + 2 &= 4\left(\frac{1}{4}\right)^2 - 8\left(\frac{1}{4}\right) \\ y + 2 &= \frac{9}{4} \\ y &= \frac{9}{4} - 2 \\ y &= \frac{1}{4} \end{aligned}$$