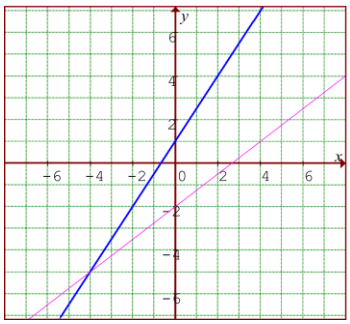
Pre-Calculus 11 **Chapter 8 Review**

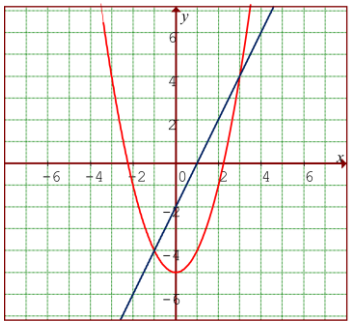
Name: _____KEY_____

1. Solve the following by graphing.

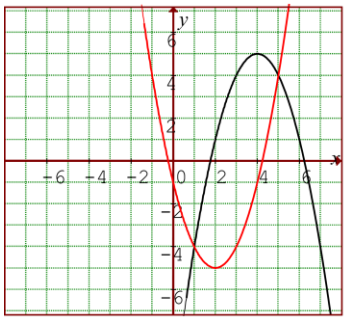
a) $3x-4y=8$
$2y-3x=2$



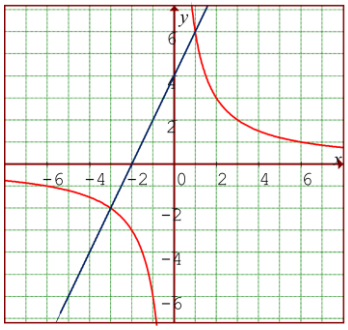
b) $y-x^2=-5$
$y-2x=-2$



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

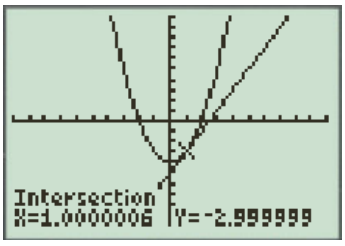


d) $xy=6$
$y-2x=4$

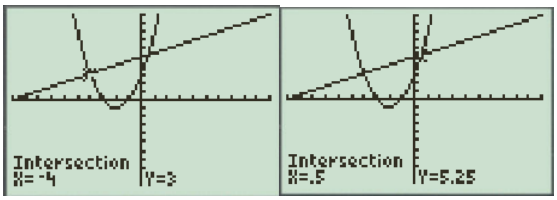


2. Solve by using the graphing calculator.

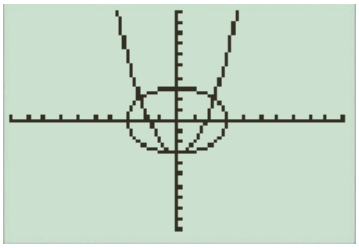
a) $y=x^2-4$
$y=2x-5$



b) $y=x^2+4x+3$
$2y=x+10$

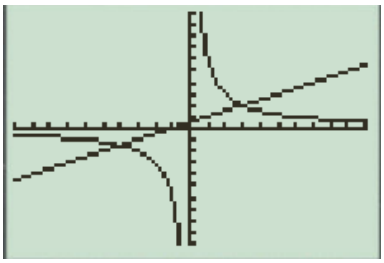


c) $x^2+y^2=9$, $y=x^2-3$



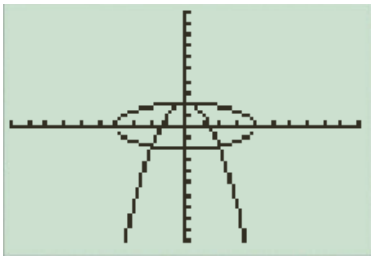
$(-2.34, 2), (0, -3),$ *or* $(2.34, 2)$

d) $x-2y+1=0$, $xy=6$



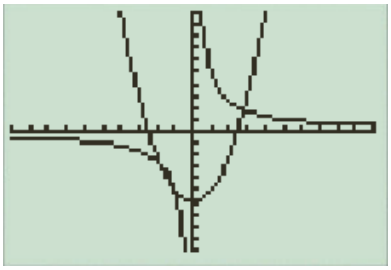
$(-4, -1.5)$ *or* $(3, 2)$

e) $x^2+4y^2=16$, $y=2-x^2$



$(-1.94, -1.75), (0, 2),$ *or* $(1.94, -1.75)$

f) $y=x^2-6$, $xy=5$



$(-1.79, -2.79), (-1, -5),$ *or* $(2.79, 1.79)$

3. Solve algebraically.

a) $2x-y=3$, $3y+2x=15$ $\rightarrow$ $2x-3=y$, $3y+2x=15$

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

$6x-9+2x=15$

$8x=24$

$x=3$

$2(3)-3=y$

$3=y$

b) $x-2y=12$, $2y+3x=8$ $\rightarrow$ $x=2y+12$, $2y+3x=8$

$2y+3(2y+12)=8$

$2y+6y+36=8$

$8y=-28$

$y=-3.5$

$x=2(-3.5)+12$

$x=5$

c) $y=x^2+6x+5$, $3y+x=-15$ $\rightarrow$ $y=x^2+6x+5$, $x=-3y-15$

$y=(-3y-15)^2+6(-3y-15)+5$

$y=9y^2+90y+225-18y-90+5$

$0=9y^2+71y+140$

$0=(9y+35)(y+4)$

$x=-3\left(-\frac{35}{9}\right)-15$

$x=\frac{35}{3}-\frac{45}{3}=-\frac{10}{3}$

d) $xy=-4$, $3x-2y=-10$ $\rightarrow$ $xy=-4$, $y=-\frac{3}{2}x+5$

$x\left(-\frac{3}{2}x+5\right)=-4$

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

$3x^2-10x-8=0$

$y=\left(-\frac{3}{2}\right)\left(\frac{4}{3}\right)+5$

$y=-2+5=3$

$y=-\frac{35}{9}$ *or* $y=-4$ $\quad x=-3(-4)-15$

$x=12-15=-3$

Solutions: $\left(-\frac{10}{3},-\frac{35}{3}\right)$ *or* $(-3,4)$

$(3x-4)(x+2)=0$ $\quad y=\left(-\frac{3}{2}\right)(-2)+5$

$x=\frac{4}{3}$ *or* $x=-2$ $\quad y=3+5=8$

Solutions: $\left(\frac{4}{3},3\right)$ *or* $(-2,8)$

e) $\begin{aligned} x^2+y^2&=13\\ 2x+3y&=13 \end{aligned}$ $\rightarrow$ $x^2+y^2=13$, $x=\frac{13-3y}{2}$

$\left(\frac{13-3y}{2}\right)^2+y^2=13$

$\frac{1}{4}(169-78y+9y^2)+y^2=13$

$9y^2-78y+169+4y^2=4\times13$

$13y^2-78y+117=0$

$13(y^2-6y+9)=0$ $\quad x=\frac{13-3(3)}{2}$

$13(y-3)^2=0$ $\quad x=2$

$y=3$

f) $\begin{aligned} 4x^2+y^2&=16\\ y&=x^2-4 \end{aligned}$

$4x^2+(x^2-4)^2=16$ $\quad y=(0)^2-4$

$4x^2+x^4-8x^2+16=16$ $\quad y=-4$

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

$x^2(x^2-4)=0$ $\quad y=(\pm2)^2-4$

$x^2(x+2)(x-2)=0$ $\quad y=0$

$x=0, x=-2,$ *or* $x=2$

Solution: $(0,-4),(-2,0),$ *or* $(2,0)$

g) $\begin{aligned} x^2+y^2-6y&=1\\ xy&=-6 \end{aligned}$ $\rightarrow$ $x^2+y^2-6y=1$, $x=\frac{-6}{y}$

$\left(\frac{-6}{y}\right)^2+y^2-6y=1$

$\frac{36}{y^2}+y^2-6y=1$ $\quad x=\frac{-6}{6}=-1$

$36+y^4-6y^3=y^2$

$y^4-6y^3+36-y^2=0$ $\quad x=\frac{-6}{2}=-3$

$-y^3(6-y)+(6+y)(6-y)=0$

$(6-y)[-y^3+(6+y)]=0$

$(6-y)(-y^3+y+6)=0$

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

$y=6$ *or* $y=2$ $\quad$ Solution: $(-1,6)$ *or* $(-3,2)$

h) $\begin{aligned} y^2&=-27x\\ x^2&=8y \end{aligned}$

$\left(\frac{x^2}{8}\right)^2=-27x$ $\quad (0)^2=8y$

$\frac{x^4}{64}=-27x$ $\quad 0=y$

$x^4+1728x=0$

$x(x^3+1728)=0$

$x(x+12)(x^2-12x+144)=0$

$x=0$ *or* $x=-12$ $\quad (-12)^2=8y$

$18=y$

Solution: $(0,0)$ *or* $(-12,18)$

4. Three footballs and one soccer ball cost $155. Two footballs and three soccer balls cost $220. Determine the cost of one football and the cost of one soccer ball.

Let F be the cost of a football

And C be the cost of a soccer ball

$$\begin{aligned} 3F + 1C &= 155 \\ 2F + 3C &= 220 \end{aligned} \quad \rightarrow C = 155 - 3F$$

$$\begin{aligned} 2F + 3(155 - 3F) &= 220 \\ 2F + 465 - 9F &= 220 \\ -7F &= -245 \\ F &= \$35 \end{aligned} \qquad \begin{aligned} C &= 155 - 3(35) \\ C &= \$50 \end{aligned}$$

The cost of a football is $35 and $50 for a soccer ball.

5. For the athletic banquet, one adult ticket cost $15.00 and one student ticket costs $10.00. One hundred forty tickets were sold. The total receipts were $1600. How many student tickets were sold?

Let A be the number of adult tickets

And T be the number of student tickets

$$\begin{aligned} A + T &= 140 \\ 15A + 10T &= 1600 \end{aligned} \quad \rightarrow T = 140 - A$$

$$\begin{aligned} 15A + 10(140 - A) &= 1600 \\ 15A + 1400 - 10A &= 1600 \\ 5A &= 200 \\ A &= 40 \end{aligned} \qquad \begin{aligned} T &= 140 - 40 \\ T &= 100 \end{aligned}$$

100 student tickets were sold to the athletic banquet.

6. A crate of 36 grapefruit has a total mass of 4 kg. When 12 grapefruit are removed, the total mass is 3 kg. Determine the mass of the crate and the mass of one grapefruit.

Let C be the mass of the crate

And G be the mass of the grapefruit.

$$\begin{aligned} C+36G&=4 \\ C+24G&=3 \end{aligned} \rightarrow \begin{aligned} C&=4-36G \\ C&=3-24G \end{aligned}$$

$$\begin{aligned} 4-36G&=3-24G \\ 1&=12G \\ \frac{1}{12}&=G \end{aligned} \qquad \begin{aligned} C&=3-24\left(\frac{1}{12}\right) \\ C&=1 \end{aligned}$$

The crate's mass is 1 kg and each grapefruit is 83⅓ g.

7. Jennifer invested $500, part at 7% per annum and the rest at 10% per annum. After one year, the total interest earned was $44. How much did Jennifer invest at each rate?

Let A be the amount invested at 7%
And B be the amount invested at 10%

$$\begin{aligned} A+B&=500 \\ 0.07A+0.1B&=44 \end{aligned} \rightarrow B=500-A$$

$$\begin{aligned} 0.07A+0.1(500-A)&=44 \\ 0.07A+50-0.1A&=44 \\ -0.03A&=-6 \\ A&=\$200 \end{aligned} \qquad \begin{aligned} B&=500-200 \\ B&=\$300 \end{aligned}$$

Jennifer invested $200 at 7% and $300 at 10%.