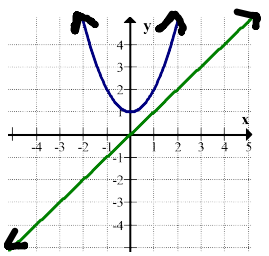
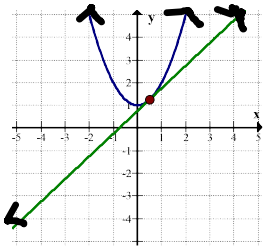
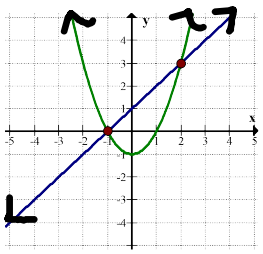
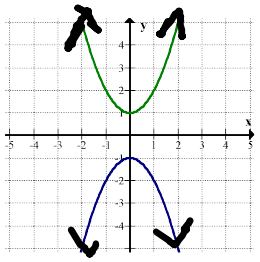
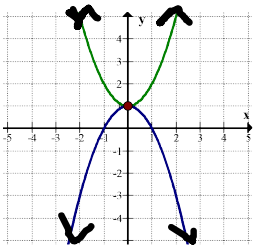
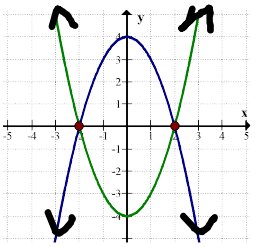
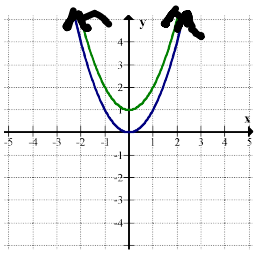
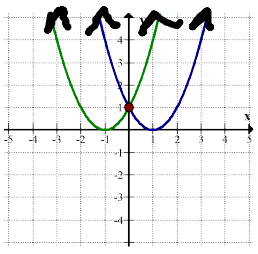
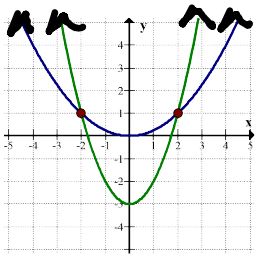
C11 - 8.0 - Systems Sub 0/1/2 Sol Notes

No Solutions	One Solution	Two Solutions
		
		
		

OR INFINITE SOLUTIONS: Congruent Graphs

Solve by Substitution.

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

2 Equations

$$x + 1 = x^2 - 1$$
$$-1 \qquad -1$$
$$x = x^2 - 2$$
$$-x \qquad -x$$
$$0 = x^2 - x - 2$$
$$0 = (x + 1)(x - 2)$$
$$x = -1, x = 2$$

Equation 1 = Equation 2

Equation #3

Solve for x

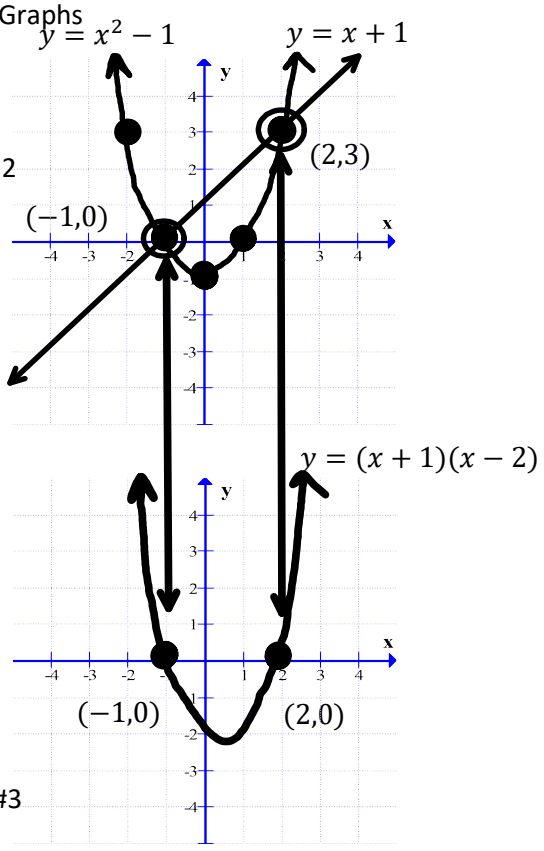
$y = x + 1$
$y = (-1) + 1$
$y = 0$

$y = x + 1$
$y = (2) + 1$
$y = 3$

Solve for y

$(-1,0)$ $(2,3)$

Intersection #1/#1



Solve by graphing.

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

$(-1,0)$ $(2,3)$

$y = (x + 1)(x - 2)$ Equation #3

$x + 1 = 0$ $\quad x - 2 = 0$
$x = -1$ $\quad x = 2$

Repeat Above

Notice the graph of the third equation x-intercepts is the x answer to the question.

C11 - 8.0 - Systems Elim Notes

Solve by Substitution.

$y = (x^2 - 4x + 5)$ $\quad (y) = -x^2 + 4x - 6$

$$x^2 - 4x + 5 = -x^2 + 4x - 6$$
$$2x^2 - 8x + 11 = 0$$

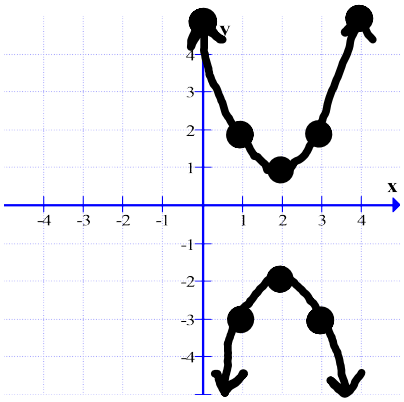
$2x^2 - 8x + 11 = 0$ Algebra
Cannot Factor

Discriminant

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(2)(11)}}{2(2)}$$
$$x = \frac{8 \pm \sqrt{-24}}{4}$$

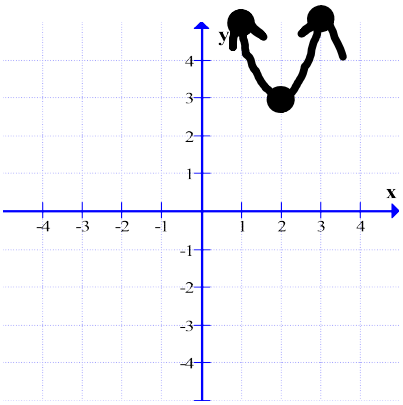
$b^2 - 4AC < 0$

No Solution



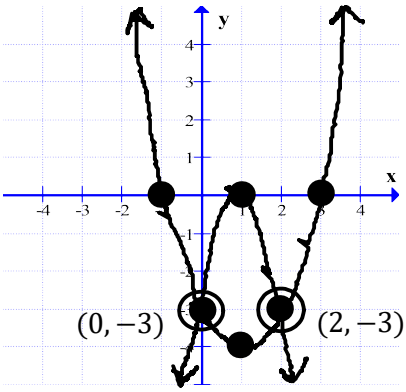
$y = x^2 - 4x + 5$

$y = -x^2 + 4x - 6$



$y = 2x^2 - 8x + 11$

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



$y = -3(x - 1)^2$

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

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

$(0, -3)$

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

$(2, -3)$

Try to eliminate y

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

$$y = -3x^2 + 6x - 3$$
$$-(y = x^2 - 2x - 3)$$
$$0 = -4x^2 + 8x$$
$$\frac{0}{-4} = -\frac{4x^2}{-4} + \frac{8x}{-4}$$
$$0 = x^2 - 2x$$
$$0 = x(x - 2)$$

$x = 0$ $\quad x = 2$

$$x^2 - 2x - 3 - y = 0$$
$$+y \quad +y$$
$$y = -3x^2 + 6x - 3$$

It doesn't have to say $y =$

$$2y = -6x^2 + 12x - 6$$
$$\frac{2y}{2} = \frac{-6x^2}{2} + \frac{12x}{2} - \frac{6}{2}$$
$$y = -3x^2 + 6x - 3$$

C11 - 8.0 - Systems WP's Notes

$P = 8y\ m$, $A = (6y+3)m^2$

$x+6$

$x+8$

$A = lw$

$6y+3 = (x+8)(x+6)$

...

$6y = x^2+14x+45$

$P = 2l+2w$

$8y = 2(x+8)+2(x+6)$

$8y = 4x+28$

$\frac{8y}{4} = \frac{4x}{4}+\frac{28}{4}$

$\frac{2y}{2} = \frac{x+7}{2}$

$y = \frac{x+7}{2}$

$6\left(\frac{x+7}{2}\right) = x^2+14x+45$

$3x+21 = x^2+14x+45$

$0 = x^2+11x+24$

...

$x = -3, -8$

$y = \frac{-3+7}{2}$

$y = 2$

$P = 16\ m$, $A = 15\ m^2$

3

5

$y+14$, $2x$, $5x-1$

$P = 60m$

$A = 10y\ m^2$

$P = a+b+c$

$60 = (2x)+(5x-1)+(y+14)$

$60 = 7x+13+y$

$47 = 7x+y$

$y = 47-7x$

$y = 47-7(5)$

$y = 12$

$A = \frac{bh}{2}$

$10y = \frac{(5x-1)(2x)}{2}$

$20y = 10x^2-2x$

$20(47-7x) = 10x^2-2x$

...

$0 = 10x^2+138x-940$

...

$x = 5, -18.8$

26, 10, 24

$A = \frac{24(10)}{2}$

$A = 120$

$10y = 10(12) = 120$

$60 = 24+10+26$

The sum of two integers is 21. 15 less than double the square of the smaller integer gives the larger integer.

$let\ a = 1st\ \#$

$let\ b = 2nd\ \#$

$a+b = 21$

$b = 21-a$

$b = 21-(4)$

$b = 17$

$2a^2-15 = b$

$2a^2-15 = 21-a$

...

$2a^2+a-36 = 0$

...

$a = 4, -4.5$

$4+17 = 21$

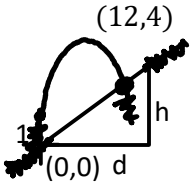
$2(4)^2-15 = 17$

Hill

$h = \frac{1}{3}d$

Soccer Kick

$h = -\frac{1}{16}(d-8)^2+5$



$\frac{1}{3}h = -\frac{1}{16}(d-8)^2+5$

...

$\frac{1}{3}h = -\frac{1}{16}d^2+d+1$

$\left(\frac{1}{3}h = -\frac{1}{16}d^2+d+1\right)\times 48$

$16h = -3d^2+48d+48$

$\frac{0}{-1} = \frac{-3d^2}{-1}+\frac{32d}{-1}+\frac{48}{-1}$

$0 = 3d^2-32d-48$

$0 = (3d+4)(d-12)$

$d = 12, -1.33$

Break Even Point (R=C)?

$R = -x^2+200x$

$C = 10x+1800$

$R = C$

$-x^2+200x = 10x+1800$

...

$x = 10{,}180$

Max Revenue

...

$x = 100$

Max Profit (P=R-C)

...

$x = 95$

$R(100) = 10000$

$C(100) = 2800$

$P(100) = 7200$

$R(95) = 9975$

$C(95) = 2750$

$P(95) = 7225$

Find the legs of a right angle triangle with a hypotenuse of 13 if the legs sum to 17.

$let\ a = x$

$let\ b = y$

13, y, x

$x+y = 17$

$x = 17-y$

$x = 17-5$

$x = 12$

$x = 17-12$

$x = 5$

$a^2+b^2 = c^2$

$x^2+y^2 = 13^2$

$(17-y)^2+(y)^2 = (13)^2$

...

$2y^2-34y+120 = 0$

...

$y = 5$

$y = 12$

OR

$a = 5$, $b = 12$

$a = 12$, $b = 5$

$a^2+b^2 = c^2$ ✓

$5^2+12^2 = 13^2$