

1. Find the vertex of $y = 2x^2 + 5x - 6$

$$(-1.25, -9.125)$$

2. Write the equation of the line in slope intercept form that passes through $(4, -7)$, and $(-2, 5)$.

$$m = \frac{5 - (-7)}{-2 - 4} = \frac{12}{-6} = -2$$

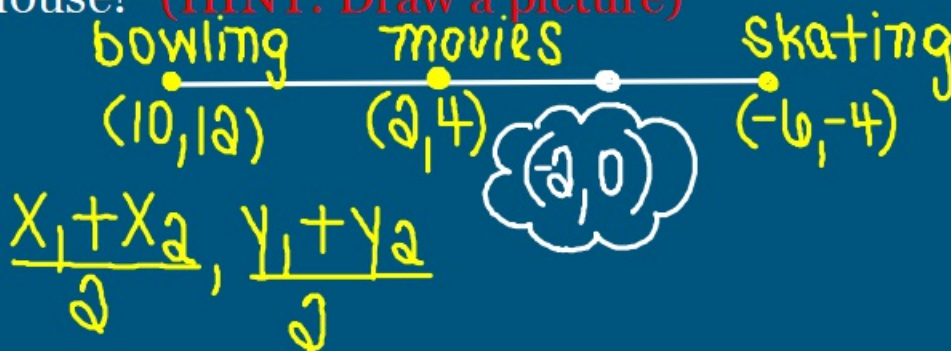
$$y = mx + b$$

$$5 = -2(-2) + b$$

$$5 = 4 + b \quad b = 1$$

$$y = -2x + 1$$

3. Clara created a coordinate grid of her city. The bowling alley is located at $(10, 12)$ and the skating rink is located at $(-6, -4)$. Halfway between the bowling alley and skating rink is the movie theater. Clara's house is halfway between the movie theater and skating rink. What are the coordinates of Clara's house? (HINT: Draw a picture)



$$\textcircled{\#7} \quad 12x^2 + 17x = 5$$

$$\frac{-5 \quad -5}{12x^2 + 17x - 5 = 0}$$

$$\left(\frac{12x^2 - 3x}{3x} + \frac{20x - 5}{5} \right) = 0$$

$$\textcircled{3x} \textcircled{(4x-1)} + \textcircled{5} \textcircled{(4x-1)} = 0$$

$$(3x+5)(4x-1) = 0$$

$$a=12 \quad c=-5$$

$$b=17$$

$$ac = -60$$

$$\begin{array}{r|l} -1 & 60 \\ -2 & 30 \end{array}$$

$$\begin{array}{r|l} -3 & 20 \end{array}$$

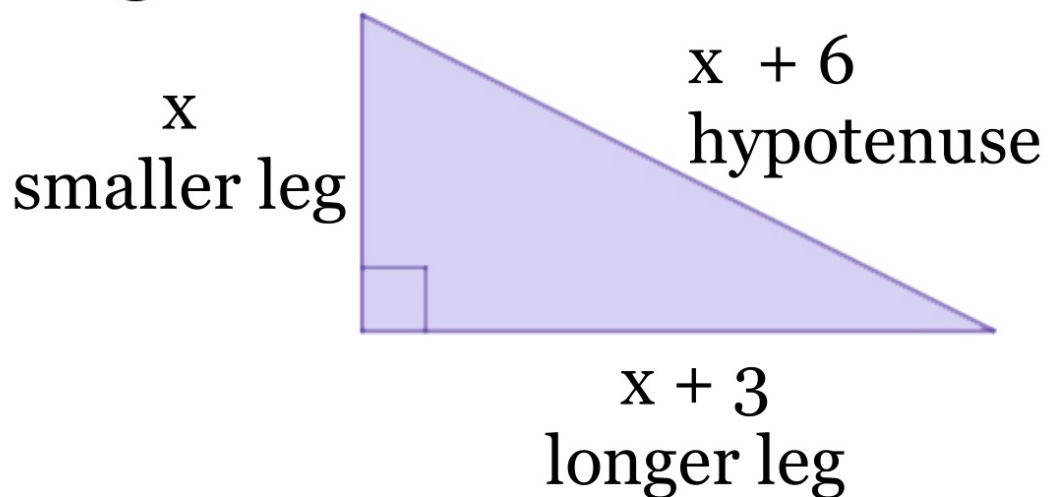
$$\begin{array}{r|l} -4 & 15 \\ -5 & 12 \end{array}$$

$$\begin{array}{r|l} -6 & 10 \end{array}$$

3x+5

Pythagorean Theorem with Quadratics

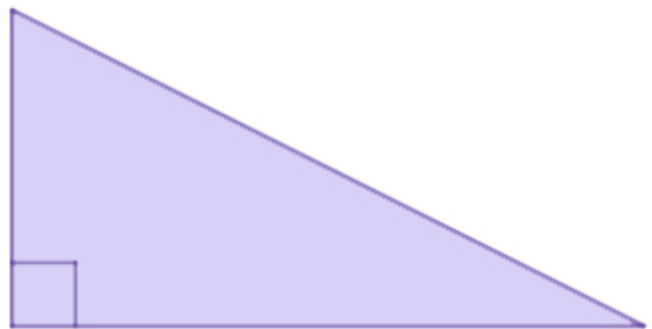
The larger leg of a right triangle is 3 centimeters longer than its smaller leg. The hypotenuse is 6 centimeters longer than the smaller leg. How many centimeters long is the smaller leg?



Pythagorean Theorem with Quadratics

The larger leg of a right triangle is 7 inches shorter than its smaller leg. The hypotenuse is 8 inches longer than the smaller leg. How many centimeters long is the smaller leg?

Label your picture!



Products of Consecutive Numbers

1. The product of two negative consecutive integers is 56. Find the integers.

Let $n = 1\text{st } \#$

Let $n + 1 = 2\text{nd } \#$

$$\begin{aligned}
 n(n+1) &= 56 \\
 n^2 + n &= 56 \\
 \quad -56 \quad -56 \\
 \hline
 n^2 + n - 56 &= 0
 \end{aligned}$$

$$\begin{aligned}
 a=1 \quad b=1 \quad c=-56 \\
 ac = -56
 \end{aligned}$$

-1	56
-14	28
-8	7

$$\begin{aligned}
 (n-7)(n+8) &= 0 \\
 n-7=0 \quad n+8=0 \\
 \cancel{n=7} \quad \text{cloud} \begin{cases} n=-8 \\ n+1=-7 \end{cases}
 \end{aligned}$$

2. The product of two negative consecutive odd integers is 99. Find the integers.

Let $n = 1^{\text{st}}$ #

Let $n+2 = 2^{\text{nd}}$ #

$$n(n+2) = 99$$

$$n^2 + 2n = 99$$

$$\begin{array}{r} -99 \quad -99 \\ \hline \end{array}$$

$$n^2 + 2n - 99 = 0$$

$n = -11$
 $n+2 = -9$

3. Find two consecutive odd integers such that the square of the smaller is 10 more than the larger. n^2

Let $n = 1^{\text{st}} \#$ $n^2 = (n+2) + 10$

Let $n+2 = 2^{\text{nd}} \#$ $n^2 = n + 12$

$a = 1$ $ac = -12$ $-n-12$ $-n-12$
 $b = -10$ $-1 \quad | \quad 12$ $n^2 - n - 12 = 0$
 $c = -12$ $-2 \quad | \quad 6$ $(n+3)(n-4) = 0$
 $+3 \quad -4$ $n+3=0$ $n-4=0$
 $n = -3$ $n = 4$
 $n+2 = -1$

The product of two consecutive odd integers is 1 less than twice their sum. +
 Find the integers.

$$n = 1^{\text{st}} \# \quad n(n+2) = 2(n+n+2) - 1$$

$$n+2 = 2^{\text{nd}} \# \quad n^2 + 2n = 2(2n+2) - 1$$

$$n^2 + 2n = 4n + 4 - 1$$

$$n^2 + 2n = 4n + 3$$

$$\begin{array}{r} -4n - 3 \quad -4n - 3 \\ \hline n^2 - 2n - 3 = 0 \end{array}$$

$n = -1 \quad n = 3$
 $n+2 = 1 \quad n+2 = 5$

Find three consecutive integers such that the sum of all three is 2 times the product of the larger two.

$$n = 1^{\text{st}} \#$$

$$n+1 = 2^{\text{nd}} \#$$

$$n+2 = 3^{\text{rd}} \#$$

	$n+1$	
n	n^2	n
$+2$	$2n$	2

$$n + (n+1) + (n+2) = 2((n+1)(n+2))$$

$$3n+3 = 2(n^2 + 3n+2)$$

$$3n+3 = 2n^2 + 6n+4$$

$$\begin{array}{r} 3n+3 \\ -3n-3 \\ \hline \end{array} \quad \begin{array}{r} 2n^2+6n+4 \\ -3n-3 \\ \hline \end{array}$$

$$0 = 2n^2 + 3n + 1$$

$$\begin{array}{l} n=1 \\ n+1=0 \\ n+2=1 \end{array}$$

The product of two positive consecutive even integers is 6 more than three times their sum. Find the integers.

$$\text{Let } n = 1^{\text{st}}$$

$$\text{Let } n+2 = 2^{\text{nd}}$$

$$n(n+2) = 3(n+n+2) + 6$$

$$n^2 + 2n = 3(2n+2) + 6$$

$$n^2 + 2n = 6n + 6 + 6$$

$$n^2 + 2n = 6n + 12$$

$$-6n - 12 \quad -6n - 12$$

$$n^2 - 4n - 12 = 0$$

$$(n+2)(n-6) = 0$$

$$n+2=0$$

$$n-6=0$$

$$n = -2$$

$$n = 6$$

$$n+2 = 8$$