

8-7 Factoring and Solving Quadratics of the form $ax^2 + bx + c$

$$m \cdot p = a \cdot c \quad m + p = b$$

In words, we are going to break up the b term so that we end up with 4 factors. We can then factor by grouping.

$$7x^2 + 29x + 4$$

$$7x^2 + 28x + (x + 4)$$

$$(x + 4) + 1 \cdot (x + 4)$$

$$7x + 1)(x + 4)$$

1. Rewrite
2. Find two numbers (m and p) who have a product of a times c and sum of b .
3. Factor by Grouping
4. Write the final factorization

multiply		add	
add	29	7 · 4	28
		28 · 1	29
		7 · 4	11
		14 · 2	16

$$3x^2 - 17x + 20$$

	add
0	-17
-20	-23
-30	-32
-10	-16
-12	-17

$$3x^2 - 5x - 12x + 20$$
$$(3x^2 - 12x) + (-5x + 20)$$

$$3x(x-4) + -5(x-4)$$

$$(x-4)(3x-5)$$

Prime Polynomials: When a product of two polynomials with integer coefficients cannot be found the polynomial is prime.

20 Factor	add 20 -3
-20 • -1	-21
-10 • -2	-12
-4 • -5	-9

$$4x^2 - 3x + 5$$

$4x^2 - 3x + 5$ is

The height of a projectile is given by

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$$h = -16t^2 + vt + h_0$$

h = Height

v = initial velocity

t = time in seconds

h_0 = initial height

Zero Product Prop.
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WILDLIFE Suppose a cheetah pouncing on an antelope leaps with an initial upward velocity of 19 feet per second. How long is the cheetah in the air if it lands on the antelope's hind quarter, 3 feet from the ground? $-16 \cdot -3$ Factor

$V = 19$
 $t = ?$
 $h = 3$
 $h_0 = 0$

set the equation equal to zero

Factor by grouping

$$\begin{aligned}
 3 &= -16t^2 + 19t + 0 \\
 -3 & \\
 0 &= -16t^2 + 19t - 3 \\
 0 &= -16t^2 + 3t + 16t - 3 \\
 0 &= (-16t^2 + 16t) + (3t - 3) \\
 0 &= -16t(t - 1) + 3(t - 1) \\
 0 &= (-16t + 3)(t - 1)
 \end{aligned}$$

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8 · 6
4 · 12
2 · 24
3 · 16

$$) = (-16t + 3)(t - 1)$$

$$16t + 3 = 0$$
$$\frac{-3}{-16} \quad \frac{-3}{-16}$$

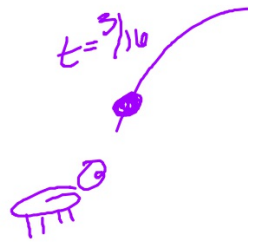
$$\frac{-16t}{-16} = \frac{-3}{-16}$$

$$t = \frac{3}{16}$$

OR

$$t - 1 = 0$$
$$+1 \quad +1$$

$$t = 1$$



The cheetah catches the antelope before it can escape.

