

# Friday, March 1, 2019

- Warm-up

- Multiply the following binomials:

$$(x - 8)(x + 1)$$

$$x^2 + \underline{1x} - \underline{8x} - 8$$

$$x^2 - 7x - 8$$

$$(x - 3)(x - 6)$$

$$x^2 - \underline{6x} - \underline{3x} + 18$$

$$x^2 - 9x + 18$$

- Factoring polynomials

**Objectives:**

**Content:** I will factor trinomials.

**Social:** I will demonstrate my work to the group as well as the class.

**Language:** I will write my factoring process clearly for myself and others.

# Factoring → Working Backwards

If I had a trinomial:  $x^2 + 5x + 6$   
and factored it to:  $(x + m)(x + n)$

$$(x + 2)(x + 3) \checkmark$$
$$x^2 + 3x + 2x + 6$$

what do I know about the product of m & n? +6

what are my options?

+6 • +1	-6 • -1
+2 • +3	-2 • -3

what do I know about the sum of m & n? +5

what are my options?

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# Try some

$$x^2 + 7x + 12$$

$16 \cdot +2$   
 $-6 \cdot -2$   
 $+3 \cdot +4$   
 $-3 \cdot -4$   
 $+1 \cdot +12$   
 $-1 \cdot -12$

$$(x+3)(x+4)$$

$$(x+4)(x+3)$$

$$y^2 + 9y + 18$$

$1 \cdot 18$   
 $2 \cdot 9$   
 $3 \cdot 6$

$$(y+3)(y+6)$$

$$m^2 + 10m + 21$$

$1 \cdot 21$   
 $3 \cdot 7$

$$(m+3)(m+7)$$

$$x^2 + 8x + 12$$

$1 \cdot 12$   
 $2 \cdot 6$   
 $3 \cdot 4$

$$(x+2)(x+6)$$

factor it to:  $(x + m)(x + n)$

what do I know about the product of m & n?

what are my options?

what do I know about the sum of m & n?

what are my options?

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$$(x-2)(x-4)$$

What if I had this trinomial:  $x^2 - 6x + 8$

and factored it to:  $(x + m)(x + n)$

what do I know about the product of  $m$  &  $n$ ?

+8

what are my options?

+1 +8

-1 -8

+2 +4

-2 -4

what do I know about the sum of  $m$  &  $n$ ?

-6

what are my options?

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# Try some more

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

*(Handwritten: -4x circled in green, with an arrow pointing to a box containing +1 and +3 above, and -1 and -3 below.)*

$$(x - 1)(x - 3)$$

$$x^2 - 6x + 5$$
$$(x - 1)(x - 5)$$

factor it to:  $(x + m)(x + n)$

**what do I know about the product of m & n?**

**what are my options?**

**what do I know about the sum of m & n?**

**what are my options?**

$$m^2 - 7m + 10$$

$$(m - 2)(m - 5)$$

*(Handwritten: 1 1 0 above, 2 5 to the right)*

$$y^2 - 14y + 24$$
$$(y - 2)(y - 12)$$

*(Handwritten: + x above)*

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What if I had this trinomial:  $x^2 - 7x - 8$

$$\begin{matrix} (x+1)(x-8) \\ (x-8)(x+1) \end{matrix}$$

and factored it to:  $(x+m)(x+n)$

what do I know about the product of m & n?

-8

$$\begin{matrix} -1 & +6 \\ +1 & -6 \end{matrix}$$

$$\begin{matrix} +1 & -8 \\ -1 & +8 \end{matrix}$$

$$x^2 + 5x - 6$$

$$(x-1)(x+6)$$

$$(x+6)(x-1)$$

what are my options?

+

$$x^2 + x - 12$$

$$\begin{matrix} +4 & -3 \\ -4 & +3 \end{matrix}$$

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

what do I know about the sum of m & n?

-7

$$x^2 - 2x - 15$$

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

what are my options?

$$-5x + 3x$$

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# Brain Break

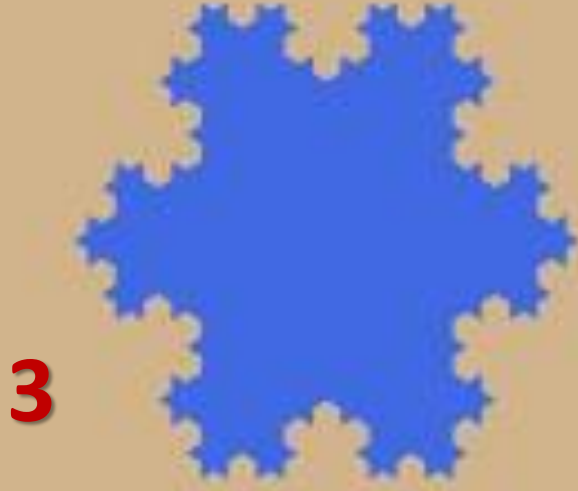


Which one doesn't belong?





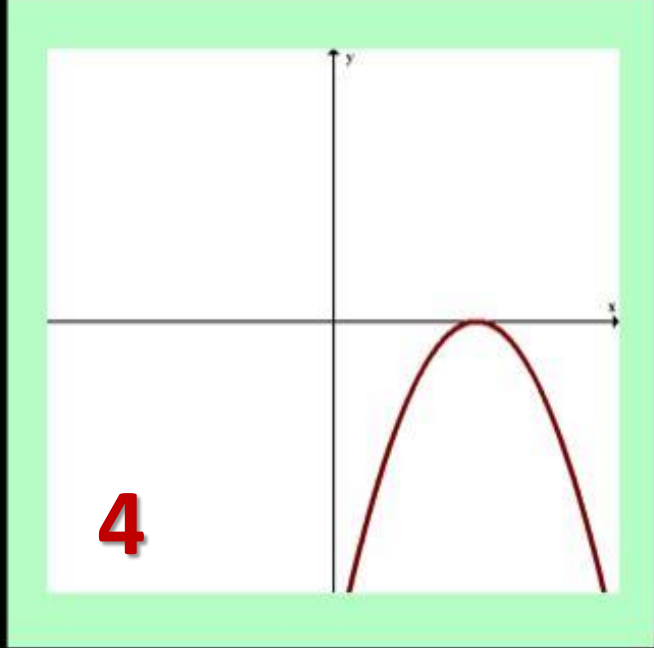
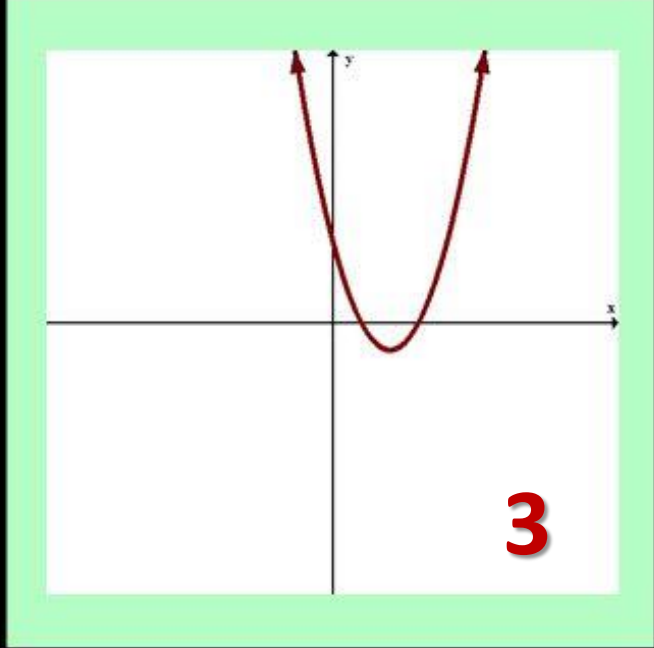
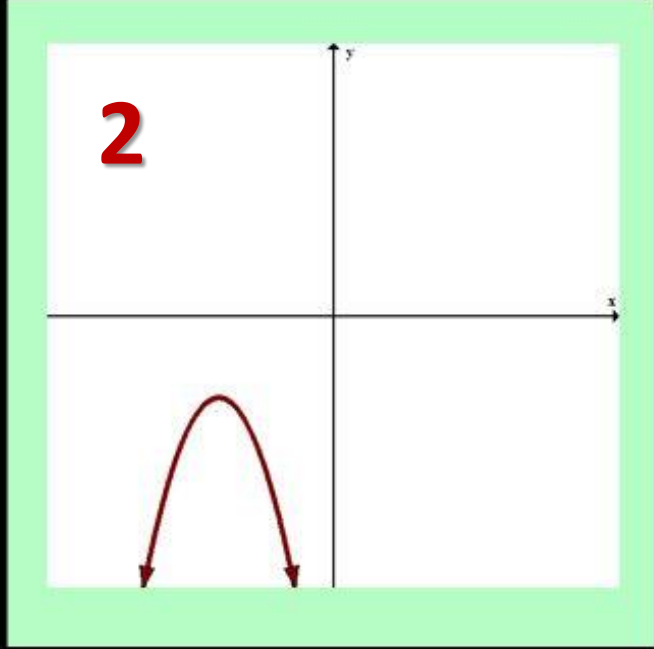
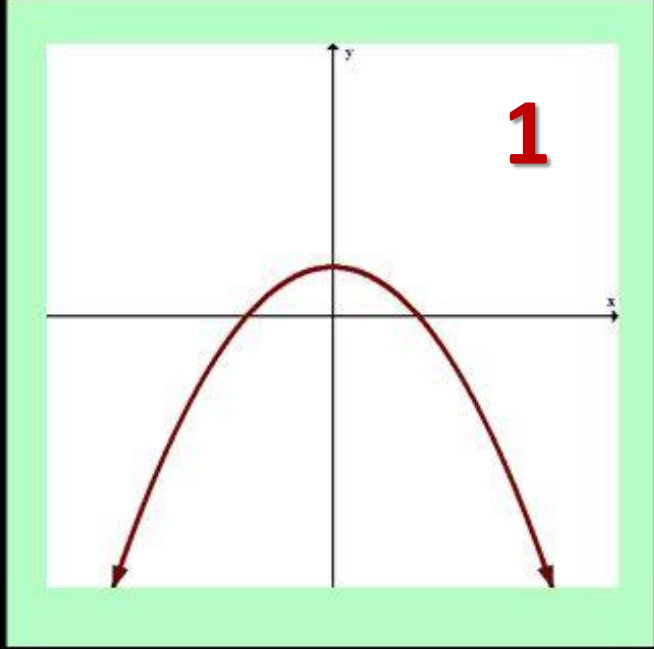
Which one doesn't belong?



Which one doesn't belong?

$3x$ <b>1</b>	$-3$ <b>2</b>
$-3x^2$ <b>3</b>	$-5x$ <b>4</b>

Which one doesn't belong?



★ if there is a number in front of  $x^2$  try to factor

# Factoring plus

our first

$$x^2 - 6x - 7$$

+1 -7

+7 -1

$$(x-7)(x+1)$$

$$x^2 - 5x + 6$$

+2 +3

-2 -3

+1 +6  
-1 -6

$$(x-2)(x-3)$$

$$\frac{5x}{5} + \frac{35}{5}$$

$$5(x+7)$$

$x \cdot x \cdot x$       $x \cdot x$

$$\frac{8x^2}{8} + \frac{32}{8}$$

$$8(x^2 + 4)$$

+2 +2

-2 -2

+4 +1

-4 -1

$$8(x^2 + 0x + 4)$$

$$\frac{4x^2}{4} - \frac{24x}{4} + \frac{32}{4}$$

$$4(x^2 - 6x + 8)$$

$$4(x-2)(x-4)$$

$$\frac{3x^3}{3x} + \frac{6x^2}{3x} + \frac{3x}{3x}$$

$$3x(x^2 + 2x + 1)$$

$$3x(x+1)(x+1)$$

$$3x(x+1)^2$$

# Try some more

factor it to:  $(x + m)(x + n)$

is there a common factor to divide out?

what do I know about the product of  $m$  &  $n$ ?

what are my options?

what do I know about the sum of  $m$  &  $n$ ?

what are my options?  
 $m \cdot m$

$$\frac{2x^2}{2} - \frac{8x}{2} - \frac{64}{2}$$

$$2(x^2 - 4x - 32)$$

*Handwritten notes:  $-1 + 32$ ,  $+2 + 16$ ,  $+4 + 8$*

$$2(x + 4)(x - 8)$$

$$2(x - 8)(x + 4)$$

$$\frac{3x^3}{3x} - \frac{15x^2}{3x} - \frac{18x}{3x}$$

$$3x(x^2 - 5x - 6) \rightarrow 3x(x + 1)(x - 6)$$

*Handwritten notes:  $+6 - 1$ ,  $+1 - 6$ ,  $+2 - 3$ ,  $-2 + 3$*

$$\frac{m^3}{m} + \frac{6m^2}{m} - \frac{72m}{m}$$

$$m(m^2 + 6m - 72)$$

$$m(m - 6)(m + 12)$$

*Handwritten notes: 1 · 72, 2 · 36, 3 · 24, 4 · 18, -6 · 12*

$$y^2 + 2x - 15$$

unfactorable  
prime

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# Show Down



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# Questions

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

$$x^2 + 13x - 30$$

$$(x - 8)(x + 3)$$

$$x^2 - 5x - 24$$

$$(x + 7)(x + 8)$$

$$x^2 + 15x + 56$$

$$(x - 4)(x - 8)$$

$$x^2 - 12x + 32$$

$$x^2 + 14x + 49$$

$$x^2 - 25$$

$$3x^2 - 15x + 18$$

$$2x^2 + 16x + 32$$

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# Special Cases

## Perfect Squares

## Difference of Squares

$$x^2 - 8x + 16$$

$$x^2 - 4$$

$$x^2 + 12x + 36$$

$$x^2 - 81$$

$$4x^2 + 20x + 25$$

$$49a^2 - 64b^2$$

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