

AIM: HOW DO WE FACTOR TRINOMIALS WHERE 'A' IS GREATER THAN 1 ("HARD TRINOMIALS")?

Do Now: Multiply $(2x+3)(x-1)$ FOIL!

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

$$\boxed{2x^2 + x - 3}$$

HARD TRINOMIALS - RAINBOW METHOD

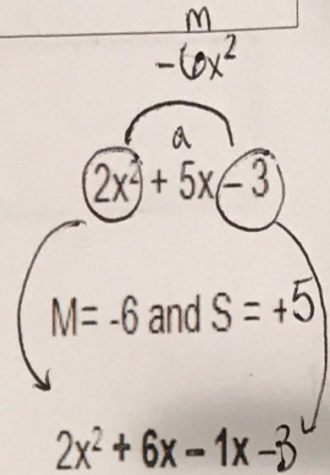
How do we know when to use it?

When the 'a' term is greater than 1 and there is no GCF

O
M
G
S
A
M
E
V
o

STEPS:

- 1) Bring the 1st and last term down (pots of gold).
- 2) Multiply the first and last coefficients (rainbow).
- 3) Find factors that add or subtract to the middle term and multiply to the product of the first and last coefficients.
- 4) Rewrite the problem with 4 terms.
- 5) Factor by "Grouping" - Split problem down the middle.
- 6) Factor the 1st two terms (GCF).
- 7) Copy and paste the () on the other side.
- 8) Put the GCF of last two terms in front.
- 9) Determine your factors.
- 10) To check, double distribute or use tabular method.



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

$$\boxed{(2x-1)(x+3)}$$

PRACTICE: $10x^2$

1. $2x^2 + x - 3$

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

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

$$\boxed{(2x+3)(x-1)}$$

2. $16x^2 + 8x + 1$

$$16x^2 + 4x + 4x + 1$$

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

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

$$\boxed{(4x+1)^2}$$

$$m - 10x^2$$

$$3. \quad \overset{a}{\underbrace{4x^2 - 6x - 4}}$$

$$4x^2 - 8x + 2x - 4$$

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

$$\boxed{(4x+2)(x-2)}$$

$$m - 30x^2$$

$$5. \quad \overset{a}{\underbrace{3x^2 - 5x - 12}}$$

$$3x^2 - 9x + 4x - 12$$

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

$$\boxed{(3x+4)(x-3)}$$

$$m - 60x^2$$

$$4. \quad \overset{a}{\underbrace{5x^2 - 17x - 12}}$$

$$5x^2 + 5x - 12x - 12$$

$$5x(x+1) - 12(x+1)$$

$$\boxed{(5x-12)(x+1)}$$

$$m^2$$

$$6. \quad \overset{a}{\underbrace{9x^2 - 6x + 1}}$$

$$9x^2 - 3x - 3x + 1$$

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

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

$$\boxed{(3x-1)^2}$$

$$7. \quad 10x^2 + 26x - 12 \quad \star \text{GCF FIRST!} \star$$

$$2(5x^2 + 13x - 6)$$

$$2(5x^2 - 10x - 3x - 6)$$

$$2(5x(x-2) + 3(x-2))$$

$$\boxed{2((5x-3)(x-2))}$$

$$8. \quad 2x^3 + 3x^2 - 5x + 8x^2y + 12xy - 20y$$

$$x(2x^2 + 3x - 5) + 4y(2x^2 + 3x - 5)$$

$$(x+4y)(2x^2 + 3x - 5)$$

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

$$(x+4y)(2x(x-1) + 5(x-1))$$

$$\boxed{(x+4y)(2x+5)(x-1)}$$