

## Common Factor

$$\underline{5p^2q} - \underline{50p^6q^3} + \underline{35p^3}$$

$$\underline{5p^2} (q - 10p^4q^3 + 7p)$$

$$\underline{14x^2y^3z} - \underline{21x^3y^4z} + \underline{42xyz^2}$$

$$\underline{7xyz} (2xy^2 - 3x^2y^3 + 6z)$$

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

$$y^4 + 11y^2 + 30$$

# Trinomials

$$z^2 + 5zy + 6y^2$$

$$m^2 - 8m + 16$$

# Expand:

$$(x+2)(x+1)$$

$$\underline{x^2} + \underline{x} + \underline{2x} + \underline{2}$$

$$x^2 + \underline{3x} + 2$$

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

$$\underline{x^2} - \underline{4x} + \underline{5x} - \underline{20}$$

$$x^2 + \underline{x} - 20$$

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

$$\underline{x^2} - \underline{x} - \underline{7x} + \underline{7}$$

$$x^2 - \underline{8x} + 7$$

Factor the following

1.  $x^2 + \underline{19}x + \underline{18}$

simple trinomial ( $1x^2$ )

$$\underline{1} + \underline{18} = 19$$

$$\underline{1} \times \underline{18} = 18$$

$$(x+1)(x+18)$$

or

$$(x+18)(x+1)$$

two binomials

$$\begin{array}{l} 18 \\ 1 \times 18 \\ 2 \times 9 \\ 3 \times 6 \end{array}$$

2.  $x^2 - 5x + 6$  ← simple trinomial ( $1x^2$ )

$\underline{-2} + \underline{-3} = -5$   
 $\underline{-2} \times \underline{-3} = 6$

$(x-2)(x-3)$  ← two binomials

6  
 $-1 \times -6$   
 $\underline{-2} \times \underline{-3}$

Simple trinomials

$$3. \quad x^2 + \underline{5}x - \underline{24}$$

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

$$\begin{aligned} \underline{-3} + \underline{8} &= 5 \\ \underline{-3} \times \underline{8} &= -24 \end{aligned}$$

$-24$   
 $-1 \times 24$   
 $-2 \times 12$   
 $\underline{-3 \times 8}$   
 $-4 \times 6$

larger factor is positive

$$x^2 + \underline{7}x + \underline{12}$$

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

$$\begin{aligned} \underline{3} + \underline{4} &= 7 \\ \underline{3} \times \underline{4} &= 12 \end{aligned}$$

$12$   
 $1 \times 12$   
 $2 \times 6$   
 $\underline{3 \times 4}$

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

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

$$\begin{aligned} \underline{-2} + \underline{3} &= 1 \\ \underline{-2} \times \underline{3} &= -6 \end{aligned}$$

$-6$   
 $-1 \times 6$   
 $\underline{-2 \times 3}$

larger factor is positive

$$4. \quad 3x^2 - 18x - 120$$

$$3(x^2 - \underline{6x} - \underline{40})$$

simple trinomial

$$3(x+4)(x-10)$$

\* Always take out a common factor first (if possible)

$$3 \rightarrow 1 \cdot \underline{3}$$

$$18 \rightarrow 2 \cdot \underline{3} \cdot 3$$

$$120 \rightarrow 2 \cdot 2 \cdot \underline{3} \cdot 2 \cdot 5$$

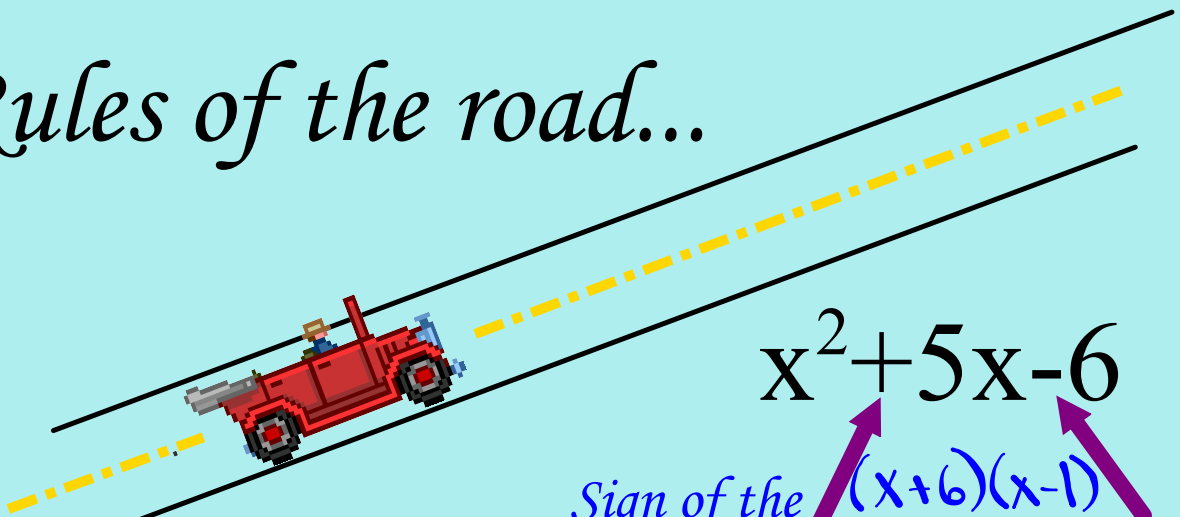
$$\text{GCF} = 3$$

$$\begin{array}{l} \underline{4} + \underline{-10} = -6 \\ \underline{4} \times \underline{-10} = -40 \end{array}$$

-40  
1x-40  
2x-20  
4x-10  
5x-8

larger factor  
is negative

# Rules of the road...



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

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

both signs are negative

Signs are the same.

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

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

Sign of the biggest number is positive.

Signs are different.

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

both signs are positive

signs are the same

$$(x+2)(x+3)$$

$$x^2 - x - 12$$

Sign of the biggest number is negative

signs are different

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





Check out  
a few  
on  
your own.

Hard Trinomial

There is no common factor

$$2x^2 + 7x + 3$$

$$\begin{aligned} & \underline{2x^2} + \underline{7x} + \underline{3} \\ & \underline{(x+1)}(x+\underline{6}) \\ & \underline{(2x+1)}(x+3) \end{aligned}$$

$$\begin{aligned} \frac{1}{1} + \frac{6}{6} &= 7 \\ \frac{1}{1} \times \frac{6}{6} &= 6 \end{aligned}$$

↑  
2x3

$$\begin{array}{c} 6 \\ \hline 1 \times 6 \\ \hline 2 \times 3 \end{array}$$

Hard Trinomial

$$5x^2 + 34x - 7$$

$$= \underline{\quad} =$$

$$(x-1)(x+35)$$

↗ 5 ↖

$$(5x-1)(x+7)$$

$$-\frac{1}{1} + \frac{35}{1} = 34$$

$$-\frac{1}{1} \times \frac{35}{1} = -35$$

-35  
-1 x 35  
-5 x 7

larger factor  
 is positive

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

$$\begin{array}{r} \_ + \_ = \\ \_ x \_ = \end{array}$$

$$8x^2 + 10x - 3$$

$$\begin{array}{l} \underline{\quad} + \underline{\quad} = \\ \underline{\quad} \times \underline{\quad} = \end{array}$$

Check out the sheet. :)

# Expand:

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

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

$$3x^2+5x+2$$

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

$$6x^2-8x+15x-20$$

$$6x^2+7x-20$$

$$(2x-7)(x-1)$$

$$2x^2-2x-7x+7$$

$$2x^2-9x+7$$

$$2x^2+5x+3$$

$$\left(x+\frac{2}{2}\right)\left(x+\frac{3}{2}\right)$$

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


$$\underline{2} + \underline{3} = 5$$

$$\underline{2} \times \underline{3} = 6$$



## *DECOMPOSITION*

If there is a numerical coefficient in front of  $x$ , then we use a method for factoring called *DECOMPOSITION*.


$$4x^2 + 5x - 6$$

$$2x^2+5x+3$$

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

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

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

Check out pages 167,177 and 178.

Numbers \_\_\_\_\_ , 13 and 15. :)

