

Geometry

Factoring Quadratic Equations

Binomial

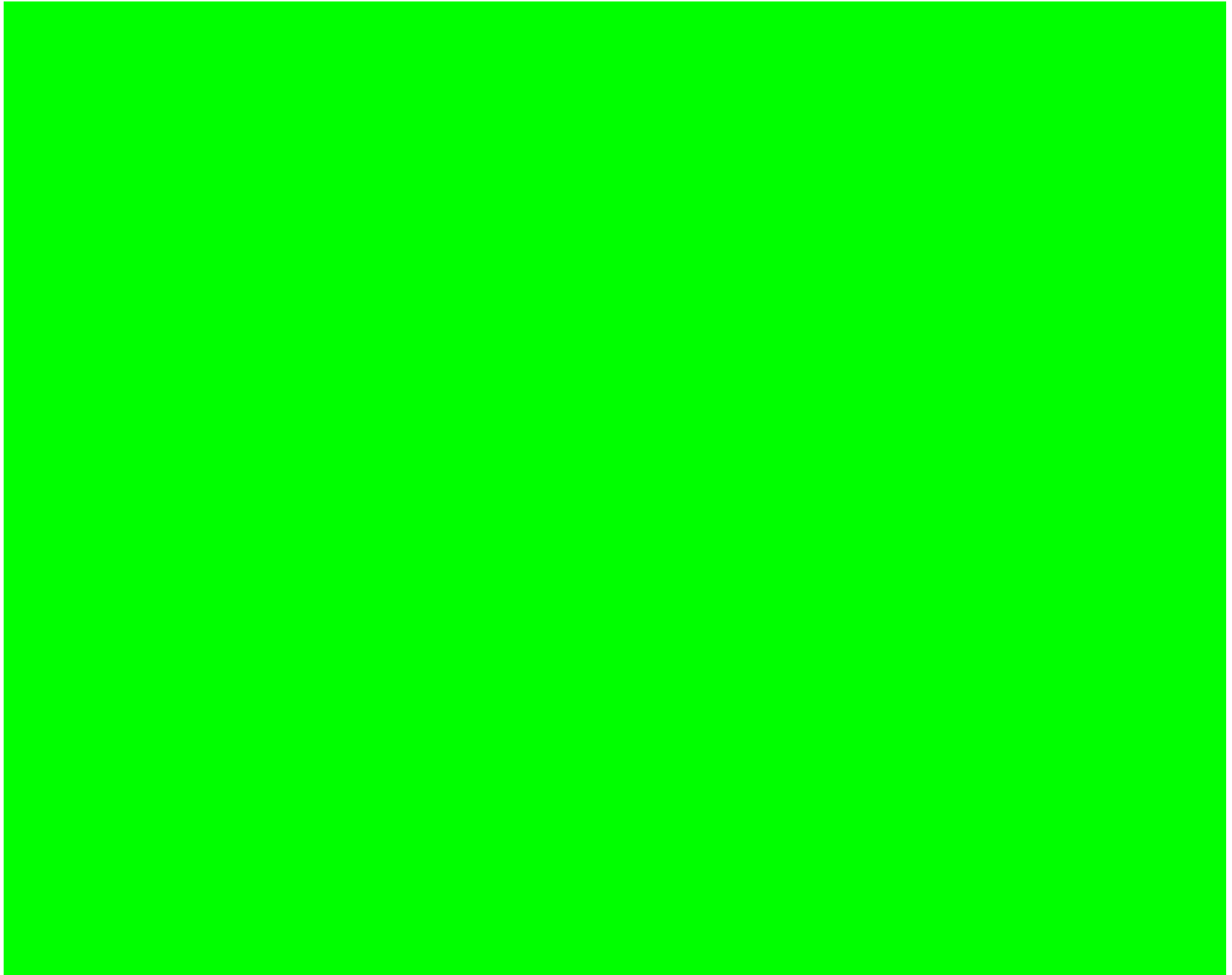
Pull

a polynomial with 2 terms
 $2x + 3$

Trinomial

Pull

a polynomial with 3 terms
 $x^2 + 6x + 9$



Rules to Factoring: (must be completely factored - written as a product of terms)

- 1) Factor out all common factors
- 2) If an expression has two terms (binomial) then it may be difference of squares:

$$(1st\ term)^2 - (2nd\ term)^2 = (1st\ term - 2nd\ term)(1st\ term + 2nd\ term)$$

Example: $x^2 - 16 = (x - 4)(x + 4)$

(Handwritten in red: $(x)^2 - (4)^2$)

- 3) If an expression has three terms (trinomial) then factor it by trial and error.

If last term is positive, (+)(+) or (-)(-)

If last term is negative, (+)(-) or (-)(+)

- 4) continue to factor until each individual factor is prime
- 5) check the results by multiplying

Factor each expression. Check your answers.

$$\frac{6x^2}{6} + \frac{6x}{6} + \frac{30}{6}$$

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

$$\begin{aligned} & 6x^2 + 30x + 30 \\ & 6(x^2 + 5x + 5) \\ & 6(x+3)(x+2) \end{aligned}$$

$$\frac{20x^3y}{5x^2y} - \frac{25x^2y^3}{5x^2y}$$

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

Factor each expression. Check your answers.

$$z^2 - 49$$

$$(z)^2 - (7)^2$$

$$(z - 7)(z + 7)$$

$$16r^4 - 625$$

$$(4r^2)^2 - (25)^2$$

$$(4r^2 - 25)(4r^2 + 25)$$

$$(2r)^2 - (5)^2$$

$$(2r - 5)(2r + 5)(4r^2 + 25)$$

Factor each expression. Check your answers.

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

2.2
1.4

1.25
5.5

$$(2x - 5)(2x - 5)$$

$$-10x + -10x = -20x$$

1.64
2.32
4.16
8.8

$$64u^2 + 72uv + 81v^2$$

1.81
3.27
9.9

Factor each expression. Check your answers.

$$y^2 + 14y + 40$$

$\begin{array}{l} 1 \cdot 40 \\ 2 \cdot 20 \\ 4 \cdot 10 \\ 5 \cdot 8 \end{array}$

$$(y + 4)(y + 10)$$

$$10y + 4y = 14y$$

$$x^2 - 22x + 72$$

$$\begin{array}{l} 1 \cdot 72 \\ 2 \cdot 36 \\ 3 \cdot 24 \\ 4 \cdot 18 \\ 6 \cdot 12 \\ 9 \cdot 8 \end{array}$$

$$(x - 4)(x - 18)$$

Factor each expression. Check your answers.

$$c^2 + 16cd + 48d^2$$

$$\begin{array}{l} 1 \cdot 48 \\ 2 \cdot 24 \\ 3 \cdot 16 \\ 4 \cdot 12 \\ 6 \cdot 8 \end{array}$$

$$(c + 4d)(c + 12d)$$

$$12cd + 4cd = 16cd$$

$$x^2 - x - 20$$

$$\begin{array}{l} 1 \cdot 20 \\ 2 \cdot 10 \\ 4 \cdot 5 \end{array}$$

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



$$4x + -5x = -x$$

$$a^2 - 13a - 30 \quad \begin{array}{l} 1 \cdot 30 \\ 2 \cdot 15 \\ 3 \cdot 10 \\ 5 \cdot 6 \end{array}$$

$$(a - 15)(a + 2)$$

$$2a + -15a = -13a$$

$$4x^2 - 7x - 15$$

$$\begin{array}{l} 1 \cdot 4 \\ 2 \cdot 2 \end{array}$$

$$\begin{array}{l} 1 \cdot 15 \\ 3 \cdot 5 \end{array}$$

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

$$-12x + 5x = -7x$$

$$x^2 + 4kx - 12k^2 \quad \begin{array}{l} 1 \cdot 12 \\ 2 \cdot 6 \\ 3 \cdot 4 \end{array}$$

$$(x + 6k)(x - 2k)$$

$$-2kx + 6kx = 4kx$$

