

**Factoring**

Example 1: \*\*\* You always pull out a GCF first!!

A.  $2x^2 + 4x + 20$

$2(x^2 + 2x + 10)$

B.  $3xy + 6x$

$3x(y + 2)$

C.  $20x + 10$

$10(2x + 1)$

Example 2: \*\*\* Trinomials:  $x^2 \pm bx \pm c$

+c then add to get b  
-c then subtract to get b

A.  $x^2 + 25x + 24$

$(x + 1)(x + 24)$

mult — mult

B.  $x^2 + 10x + 24$

$(x + 4)(x + 6)$

C.  $x^2 - 10x - 24$

$(x + 2)(x - 12)$

24  
1·24  
2·12  
3·8  
4·6

D.  $x^2 + 5x - 24$

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

E.  $x^2 + 10x - 24$

$(x - 2)(x + 12)$

F.  $x^2 - 11x + 24$

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

**"Guess & Check"**

Example 3: \*\*\* Trinomials:  $ax^2 \pm bx \pm c$

+c then add to get b  
-c then subtract to get b

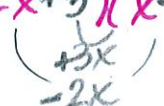
A.  $2x^2 + 7x + 3$

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



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

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



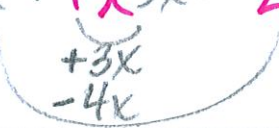
C.  $2x^2 + 7x + 3$  mult

$x^2 + 7x + 6$   
 $(x + \frac{1}{2})(x + \frac{6}{2})$  divide  
 $(2x + 1)(x + 3)$

"Drop/Add"

D.  $6x^2 - x - 2$

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



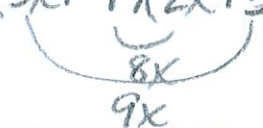
E.  $6x^2 + 17x + 10$

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



F.  $6x^2 + 17x + 12$

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



Example 4: \*\*\* Difference of Perfect Squares:  $a^2 - b^2$

1. You have 2 terms
2. One Positive / One Neg
3. Both Perfect Squares

A.  $100 - 4x^2$

$(10 + 2x)(10 - 2x)$   
 $2(5 + x)2(5 - x)$   
 $4(5 + x)(5 - x)$

B.  $-m^6 + 16$

$(m^3 + 4)(-m^3 + 4)$

C.  $b^8 - 16$

$(b^4 + 4)(b^4 - 4)$   
 $(b^4 + 4)(b^2 + 2)(b^2 - 2)$   
 $(b^4 + 4)(b^2 + 2)(b + \sqrt{2})(b - \sqrt{2})$

- 2 terms
- Both need to be Perfect Cubes

same  
opposite  
always  
positive  
"SOAP"

Example 5: \*\*\* Sum/Difference of Perfect Cubes:  $a^3 - b^3$

$$a^3 - b^3 = (A - B)(A^2 + AB + B^2)$$

$$a^3 + b^3 = (A + B)(A^2 - AB + B^2)$$

A.  $x^3 - 8$

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

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

B.  $8x^3 + 27$

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

$$(2x + 3)(4x^2 - 6x + 9)$$

C.  $1000x^6 - m^3$

$$(10x^2)^3 - (m)^3$$

$$(10x^2 - m)(100x^4 + 10x^2m + m^2)$$

### Rationalize Numerator

get rid of radical  
in the top of the fraction

Example 6: \*\*\* Rationalize the numerator

A.  $\frac{\sqrt{x+5} - \sqrt{5}}{x} \cdot \frac{(\sqrt{x+5} + \sqrt{5})}{(\sqrt{x+5} + \sqrt{5})} = \frac{x+5-5}{x(\sqrt{x+5} + \sqrt{5})} = \frac{x}{x(\sqrt{x+5} + \sqrt{5})} = \frac{1}{\sqrt{x+5} + \sqrt{5}}$

B.  $\frac{(6 - \sqrt{36-x})(6 + \sqrt{36-x})}{x(6 + \sqrt{36-x})} = \frac{36 - (36-x)}{x(6 + \sqrt{36-x})} = \frac{36 - 36 + x}{x(6 + \sqrt{36-x})} = \frac{x}{x(6 + \sqrt{36-x})} = \frac{1}{6 + \sqrt{36-x}}$

C.  $\frac{\sqrt{x+5} - \sqrt{5}}{x}$

## Rules of Exponents

Multiply like bases you <b>add</b> exponents	$x^a \cdot x^b$	$x^{a+b}$
Divide like bases you <b>subtract</b> exponents	$\frac{x^a}{x^b}$	$x^{a-b}$
Raise a power to a power you <b>multiply</b> exponents	$(x^a)^b$	$x^{ab}$
Anything raised to the zero power is <b>one</b>	$(x^a)^0$	$\frac{1}{x^{-a}}$
When you move a base from a denominator to a numerator you <b>change</b> the sign of the exponent	$\frac{1}{x^a}$	$x^{-a}$
When you move a base from a numerator to a denominator you <b>change</b> the sign of the exponent	$x^a$	$\frac{1}{x^{-a}}$

Example 7:

A.  $\frac{x^6 y^5 z^7}{x^6 z^7 y^8} = \frac{x^3}{y^3}$

B.  $(-m^2 n)^5$   
 $(-1)^5 (m^2)^5 (n)^5$   
 $-m^{10} n^5$

C.  $(x^2 y^{n-4})^3 (x^3 y^{n+6})^2$   
 $(x^6 y^{3n-12})(x^6 y^{2n+12})$   
 $x^{12} y^{5n}$

D.  $\frac{(-km^2)^4}{(km)^3 (km^5)}$   
 $\frac{k^4 m^8}{(k^3 m^3)(k m^5)} = \frac{k^4 m^8}{k^4 m^8} = 1$

E.  $(4r^2 t^{-2})^3 (6r^{-2} t^3)^0$   
 $(4)^3 r^6 t^{-6} (1)$   
 $\frac{64 r^6}{t^6}$

F.  $\frac{10a^{+2} b^{-7} c^{-2+3}}{15a^2 b^7 c^3} = \frac{2a^3}{3b^7}$

G.  $(6t^{-5})^{-1}$   
 $6^{-1} t^5 = \frac{t^5}{6}$

H.  $\frac{-a^3}{(-a^3)^2}$   
 $\frac{-a^3}{a^{6-3}} = \frac{-1}{a^3}$

I.  $\frac{3^{-1}}{1+9^{-1}}$   
 $\frac{\frac{1}{3}}{1 + \frac{1}{9}}$   
 $\frac{\frac{1}{3}}{\frac{10}{9}} = \frac{3}{10}$