AP Calculus-AB
Notes: Review of Factoring and Rules of Exponents

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

mult — mult

A. $x^2 + 25x + 24$
$(x+1)(x+24)$

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

"DROP/Add"

mult — mult

A. $2x^2 + 7x + 3$
$(2x+1)(x+3)$
4x
6x

B. $2x^2 + x - 3$
$(2x+3)(x-1)$
+3x
-2x

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

D. $6x^2 - x - 2$
$(2x+1)(3x-2)$
+3x
-4x

E. $6x^2 + 17x + 10$
$(6x+5)(x+2)$
5x
12x

F. $6x^2 + 17x + 12$
$(3x+4)(2x+3)$
8x
9x

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. $100 - 4x^2$
$(10+2x)(10-2x)$
$2(5+x)2(5-x)$
$4(5+x)(5-x)$
$4(25-x^2)$
$4(5-x)(5+x)$

B. $-m^6 + 16$
$(m^3+4)(-m^3+4)$

C. $b^8 - 16$
$(b^4+4)(b^4-4)$
$(b^4+4)(b^2+2)(b^2-2)$
$(b^4+4)(b^2+2)(b+\sqrt{2})(b-\sqrt{2})$

1. 2 terms
2. Both need to be Perfect Cubes

"SOAP" Same Opposite Always Positive

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

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

Rules of Exponents

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

Example 7:

A. $\frac{x^9 y^6 z^7}{x^6 z^7 y^8 y^5} = \frac{x^3}{y^3}$

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. $\frac{(-km^2)^4}{(km)^3 (km^5)}$

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

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

$(4)^3 R^6 t^{-6} (1)$

$\frac{64R^6}{t^6}$

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

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

$\frac{\frac{1}{3}}{\frac{(9)1}{9} + \frac{1}{9}}$

$\frac{\frac{1}{3}}{\frac{10}{9}} = \frac{1}{3} \cdot \frac{9}{10} = \frac{3}{10}$