Math 1320: Reference Sheet

Properties of Real Numbers

<u>Commutative:</u> $a + b = b + a$ <u>Identity:</u> $a + 0 = a$
                   $ab = ba$ $a \cdot 1 = a$

<u>Associative:</u> $(a + b) + c = a + (b + c)$ <u>Inverse:</u> $a + (-a) = 0$
                                               $a \cdot \frac{1}{a} = 1 \quad , \quad a \neq 0$

<u>Distributive:</u> $a(b + c) = ab + ac$

Product and Quotient Rules for nth Roots

$\star$ $\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b}$ $\star$ $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

Properties of Exponents

$\star$ $b^{-n} = \frac{1}{b^n}$ $\star$ $b^0 = 1$

$\star$ $b^m \cdot b^n = b^{m+n}$ $\star$ $(b^m)^n = b^{mn}$

$\star$ $\frac{b^m}{b^n} = b^{m-n}$ $\star$ $(ab)^n = a^n b^n$

$\star$ $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

Rational Exponents

$\star$ $a^{\frac{1}{n}} = \sqrt[n]{a}$ $\star$ $a^{-\frac{1}{n}} = \frac{1}{a^{\frac{1}{n}}} = \frac{1}{\sqrt[n]{a}}$

$\star$ $a^{\frac{m}{n}} = (\sqrt[n]{a})^m = \sqrt[n]{a^m}$ $\star$ $a^{-\frac{m}{n}} = \frac{1}{a^{\frac{m}{n}}} = \frac{1}{\sqrt[n]{a^m}}$

Simplifying Strategies

$\star$ Use order of operations $\star$ Apply distributive property
    (Parentheses, Exponents, $\cdot / \div$, $+/$-)

$\star$ Apply exponent rules $\star$ Combine like terms

Factoring Strategies

Do all terms have a common factor?

YES   **NO**

Factor out the greatest
common factor (GCF)   →   How many terms in the polynomial?

1

Done!

2   Difference of Squares?

3   Square of a Sum?

4   Factor by
Grouping.

NO   **NO**

Sum of Two Cubes?   Square of a Difference?

NO   **NO**

Difference of Two Cubes?   List all possible combinations.