

Warm Up: Factor Completely.

$$3x^4 - 9x^3 - 12x^2 + 36x$$

$$3x ((x^3 - 3x^2)(-4x + 12))$$

$$3x (x^2(x-3) - 4(x-3))$$

$$3x(x-3)(x^2-4)$$

$$\boxed{3x(x-3)(x+2)(x-2)}$$

REVIEW -- Undefined Fraction - An undefined fraction is a fraction in which the denominator is equal to zero. To test for undefined, set denominator equal to zero and solve.

$$\frac{4}{4} = 1 \quad \frac{0}{4} = 0$$

$$\frac{4}{0} = \text{undefined}$$

EXAMPLES: (the first one is worked out for you)

For what value of the variable is the fraction undefined?

1) $\frac{6x^2}{5x-15}$

Let $5x - 15 = 0$
 $5x = 15$
 $x = 3$

2) $\frac{7z}{5n-8}$ $\left\{ \frac{5}{8} \right\}$

$5n - 8 = 0$
 $5n = 8$
 $n = \frac{8}{5}$

3) $\frac{8m}{n^2-7n-18}$ $\{-2, 9\}$

$n^2 - 7n - 18 = 0$
 $(n-9)(n+2) = 0$
 $n-9=0 \quad n+2=0$
 $n=9 \quad n=-2$

REVIEW -- Reduce each of the following. To reduce an algebraic fraction, factor both the numerator and the denominator. Any common factors in the numerator and the denominator can cancel out.

EXAMPLES: (the first one is worked out for you)

4) $\frac{7x-14}{x^2-4}$

$\frac{7x-14}{x^2-4} = \frac{7(x-2)}{(x-2)(x+2)}$
 $= \frac{7}{x+2}, x \neq -2$

5) $\frac{4x+8}{x^2-2x-8}$ *GCF*
Tri

$\frac{4(x+2)}{(x-4)(x+2)}$
 $= \frac{4}{x-4}, x \neq 4$

6) $\frac{a^2x-ax^2}{a^2x^2-a^3x}$ *GCF*
GCF

$\frac{ax(a-x)-1}{a^2x(x-a)}$
 $= \frac{-1}{a}, a \neq 0$

$$\begin{array}{l}
 \frac{36x-72}{-6x+12} \quad \begin{array}{l} \text{GCF} \\ \text{GCF} \end{array} \\
 \frac{36(x-2)}{-6(x-2)} \\
 = \boxed{-6}
 \end{array}
 \left\{
 \begin{array}{l}
 \frac{4x^2+8x}{x} \\
 \frac{4x(x+2)}{x} \\
 = \boxed{4(x+2)}
 \end{array}
 \right\}
 \begin{array}{l}
 \frac{7x^2+9x}{x} \\
 \frac{x(7x+9)}{x} \\
 = \boxed{7x+9}
 \end{array}$$