Name:_____

SM3 4.1 : Simplifying Rationals

For problems 1-6, simplify each rational expression. State any restrictions on x.

1) $\frac{35x}{7x}$

$5, x \neq 0$

2) $\frac{3x+12}{2x+8}$

$\frac{3}{2}, x \neq -4$

3) $\frac{x^2+7x}{x}$

$x+7, x \neq 0$

4) $\frac{18x^4-6x^2+9x}{3x}$

$6x^3-2x+3, x \neq 0$

5) $\frac{8+2x}{2x^2+10x+8}$

$\frac{1}{x+1}, x \neq -4, -1$

6) $\frac{2x^3+13x^2-7x}{x^2+7x}$

$2x-1, x \neq 0, -7$

7) Show that $\frac{x^3-6x^2-7x}{x^2+4x+3}$ is equivalent to $\frac{x^2-7x}{x+3}$ for most values of x. State which values of x cause the expressions to be not equivalent.

$\frac{x(x-7)(x+1)}{(x+3)(x+1)} = \frac{x(x-7)}{x+3} = \frac{x^2-7x}{x+3}, x \neq -1, -3$

In the second equation, x can equal -1, so that is the value that causes the expressions to not be equivalent.

8) What is the simplest rational expression that represents the depth of a pond that is $\frac{3x^2-8x}{5x}$ meters deep?

$\frac{3x-8}{5}\ m, x \neq 0$

9) What is the simplest rational expression that can represent the diameter of a circle that has a radius of $\frac{4x-8}{3x-6}$ centimeters?

$\frac{4}{3}\ cm, x \neq 2$

10) What are the simplest rational expressions that can be used to represent the length and width, in inches, of a rectangle with sides that are $\frac{x^2-x-6}{x+2}$, $\frac{x^2+x-20}{2x+10}$, $\frac{6x^2-96}{48+12x}$, and $\frac{2x-6}{2}$ inches ?

$x-3, x \neq -2$ $\frac{x-4}{2}, x \neq -5$ $\frac{x-4}{2}, x \neq -4$ $x-3$