EXTRA PRACTICE 13
Simplifying Complex Rational Expressions
Use after Section 6.5 **Name**_____

Example: Simplify.

$$\frac{3-\frac{1}{x}}{9-\frac{1}{x^2}} = \frac{3-\frac{1}{x}}{9-\frac{1}{x^2}} \cdot \frac{x^2}{x^2}$$

$$= \frac{3\cdot x^2 - \frac{1}{x}\cdot x^2}{9\cdot x^2 - \frac{1}{x^2}\cdot x^2}$$

$$= \frac{3x^2 - x}{9x^2 - 1}$$

$$= \frac{x(3x-1)}{(3x-1)(3x+1)}$$

$$= \frac{x}{3x+1}$$

or

$$\frac{3-\frac{1}{x}}{9-\frac{1}{x^2}} = \frac{3\cdot\frac{x}{x} - \frac{1}{x}}{9\cdot\frac{x^2}{x^2} - \frac{1}{x^2}}$$

$$= \frac{\frac{3x-1}{x}}{\frac{9x^2-1}{x^2}}$$

$$= \frac{3x-1}{x}\cdot\frac{x^2}{9x^2-1}$$

$$= \frac{3x-1}{x}\cdot\frac{x^2}{(3x-1)(3x+1)}$$

$$= \frac{x}{3x+1}$$

Simplify.

1. $\dfrac{1+\frac{4}{9}}{1-\frac{2}{3}}$ _____

2. $\dfrac{\frac{8}{27}-8}{\frac{1}{3}+1}$ _____

3. $\dfrac{\frac{1}{x}+4}{\frac{1}{x}-2}$ _____

4. $\dfrac{\frac{4}{a}+a}{\frac{a}{4}+a}$ _____

5. $\dfrac{\frac{1}{x}-1}{\frac{1}{x}-2}$ _____

6. $\dfrac{\frac{3}{y}+\frac{2}{3y}}{y+\frac{y}{3}}$ _____

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7. $\dfrac{1-\dfrac{1}{x}}{1-\dfrac{1}{x^2}}$ _____

8. $\dfrac{4-\dfrac{1}{x}}{\dfrac{4}{x}}$ _____

9. $\dfrac{\dfrac{a}{a+b}}{\dfrac{a^2}{a^2-b^2}}$ _____

10. $\dfrac{\dfrac{1}{x}+\dfrac{1}{y}}{\dfrac{x}{y}-\dfrac{y}{x}}$ _____

11. $\dfrac{\dfrac{4}{m}+\dfrac{3}{m^3}}{\dfrac{2}{m^2}-\dfrac{5}{m}}$ _____

12. $\dfrac{\dfrac{3}{4x^3}-\dfrac{1}{2x}}{\dfrac{3}{2x}+\dfrac{5}{4x^3}}$ _____

13. $\dfrac{\dfrac{1}{8}-\dfrac{1}{y}}{\dfrac{8-y}{8}}$ _____

14. $\dfrac{9-\dfrac{4}{x^4}}{3x+\dfrac{2}{x}}$ _____

15. $\dfrac{\dfrac{a-4}{a^3}}{\dfrac{2}{a}-\dfrac{8}{a^2}}$ _____

16. $\dfrac{\dfrac{4}{x^2y}+\dfrac{3}{xy^2}}{\dfrac{2}{xy^3}+\dfrac{1}{x^2y}}$ _____