

Simplifying Rational Expressions Practice

Name: _____

Date: _____

Question 1

Simplify

I. $\frac{x+7}{x+3}$

II. $\frac{z-4}{8-2z}$

III. $\frac{50x^2y}{30xy^3}$

IV. $\frac{x^2-9}{x^2+4x+3}$

V. $\frac{-2x+6}{-8x}$

VI. $\frac{3x^2+9x-12}{6x^2-30x+24}$

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VII. $\frac{x^2 - 5}{5}$

VIII. $\frac{x^2 + 5}{5}$

IX. $\frac{6x^2 + 5x + 1}{4x^2 - 3x}$

X. $\frac{x^2 + 9}{x + 3}$

XI. $\frac{x^2 + 6x}{2x^2 + 13x + 6}$

XII. $\frac{x - 2}{x^3 - 8}$

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XIII. $\frac{10 - z}{z - 10}$

XIV. $\frac{9x^2 - 4y^2}{4y^2 - 9x^2}$

XV. $\frac{y^2 - 25}{y^2 + 10y + 25}$

XVI. $\frac{y^2 + 25}{y^2 + 10y + 25}$

XVII. $\frac{x^6 + 27}{x^2 + 3}$

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Question 1

Simplify

I. $\frac{x+7}{x+3}$ already simplified

II. $\frac{z-4}{8-2z} \rightarrow \frac{z-4}{2(4-z)} \xrightarrow{\text{factor}} \frac{z-4}{2(4+(-z))} \xrightarrow{\text{associative/commutative}} \frac{z-4}{2(-z+4)} \xrightarrow{\text{factor}} \frac{z-4}{(2)(-1)(z-4)} \rightarrow \frac{z-4}{-2(z-4)} \xrightarrow{\text{combine}} \frac{\cancel{z-4}}{-2(\cancel{z-4})} \xrightarrow{\text{cancel}} \frac{1}{-2}$
simplified

III. $\frac{50x^2y}{30xy^3} \xrightarrow{\text{prime factorization}} \frac{2 \cdot 5 \cdot 5 \cdot x \cdot x \cdot y}{2 \cdot 3 \cdot 5 \cdot x \cdot y \cdot y \cdot y} \xrightarrow{\text{cancel}} \frac{\cancel{2} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{x} \cdot x \cdot \cancel{y}}{\cancel{2} \cdot 3 \cdot \cancel{5} \cdot \cancel{x} \cdot \cancel{y} \cdot y \cdot y} \rightarrow \frac{5x}{3y^2}$
simplified

IV. $\frac{x^2-9}{x^2+4x+3} \xrightarrow{\text{factor}} \frac{(x+3)(x-3)}{(x+1)(x+3)} \xrightarrow{\text{cancel}} \frac{\cancel{(x+3)}(x-3)}{(x+1)\cancel{(x+3)}} \rightarrow \frac{x-3}{x+1}$
simplified

V. $\frac{-2x+6}{-8x} \xrightarrow{\text{factor}} \frac{-2(x-3)}{-2 \cdot 2 \cdot 2 \cdot x} \xrightarrow{\text{cancel}} \frac{\cancel{-2}(x-3)}{\cancel{-2} \cdot 2 \cdot 2 \cdot x} \rightarrow \frac{x-3}{4x}$
simplified

VI. $\frac{3x^2+9x-12}{6x^2-30x+24} \xrightarrow{\text{factor}} \frac{(x-1)(x+4)}{2(x-4)(x-1)} \xrightarrow{\text{cancel}} \frac{\cancel{(x-1)}(x+4)}{2(x-4)\cancel{(x-1)}} \rightarrow \frac{x+4}{2(x-4)}$
simplified

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VII. $\frac{x^2 - 5}{5}$ already simplified

VIII. $\frac{x^2 + 5}{5}$ already simplified

IX. $\frac{6x^2 + 5x + 1}{4x^2 - 3x} \rightarrow \frac{\overset{\text{factor}}{(3x + 1)(2x + 1)}}{\underset{\text{factor}}{x(4x - 3)}}$ simplified

X. $\frac{x^2 + 9}{x + 3}$ already simplified

XI. $\frac{x^2 + 6x}{2x^2 + 13x + 6} \rightarrow \frac{\overset{\text{factor}}{x(x + 6)}}{\underset{\text{factor}}{(2x + 1)(x + 6)}} \rightarrow \frac{\cancel{x(x + 6)}}{\underset{\text{cancel}}{(2x + 1)\cancel{(x + 6)}}} \rightarrow \frac{\overset{\text{simplified}}{x}}{2x + 1}$

XII. $\frac{x - 2}{x^3 - 8} \rightarrow \frac{x - 2}{\underset{\text{factor}}{(x - 2)(x^2 + 2x + 4)}} \rightarrow \frac{\cancel{x - 2}}{\underset{\text{cancel}}{(\cancel{x - 2})(x^2 + 2x + 4)}} \rightarrow \frac{\overset{\text{simplified}}{1}}{x^2 + 2x + 4}$

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$$\text{XIII. } \frac{10-z}{z-10} \rightarrow \frac{10+(-z)}{z-10} \rightarrow \frac{-z+10}{z-10} \rightarrow \frac{-1(z-10)}{z-10} \rightarrow \frac{\cancel{-1(z-10)}}{\cancel{z-10}} \rightarrow -1$$

associative/commutative factor cancel simplified

$$\text{XIV. } \frac{9x^2-4y^2}{4y^2-9x^2} \rightarrow \frac{9x^2+(-4y^2)}{4y^2-9x^2} \rightarrow \frac{-4y^2+9x^2}{4y^2-9x^2} \rightarrow \frac{-1(4y^2-9x^2)}{4y^2-9x^2} \rightarrow \frac{\cancel{-1(4y^2-9x^2)}}{\cancel{4y^2-9x^2}} \rightarrow -1$$

associative/commutative factor cancel simplified

$$\text{XV. } \frac{y^2-25}{y^2+10y+25} \xrightarrow{\text{factor}} \frac{(y+5)(y-5)}{(y+5)^2} \rightarrow \frac{(y+5)(y-5)}{(y+5)(y+5)} \rightarrow \frac{\cancel{(y+5)}(y-5)}{\cancel{(y+5)}(y+5)} \rightarrow \frac{y-5}{y+5}$$

factor factor cancel simplified

$$\text{XVI. } \frac{y^2+25}{y^2+10y+25} \xrightarrow{\text{factor}} \frac{y^2+25}{(y+5)^2} \rightarrow \text{simplified}$$

factor

$$\text{XVII. } \frac{x^6+27}{x^2+3} \xrightarrow{\text{factor}} \frac{(x^2+3)(x^4-3x^2+9)}{x^2+3} \rightarrow \frac{\cancel{(x^2+3)}(x^4-3x^2+9)}{\cancel{x^2+3}} \rightarrow x^4-3x^2+9$$

factor cancel simplified