

A.A.18: Multiplication and Division of Rationals 2: Multiply and divide algebraic fractions and express the product or quotient in simplest form

1 What is the quotient of $\frac{x}{x+4}$ divided by $\frac{2x}{x^2-16}$?

1) $\frac{2}{x-4}$

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

3) $\frac{2x^2}{x^2-16}$

4) $\frac{x-4}{2}$

2 Perform the indicated operation and simplify:

$$\frac{3x+6}{4x+12} \div \frac{x^2-4}{x+3}$$

3 Express in simplest form:

$$\frac{x^2+9x+14}{x^2-49} \div \frac{3x+6}{x^2+x-56}$$

4 Perform the indicated operation and express the

result in simplest terms: $\frac{x}{x+3} \div \frac{3x}{x^2-9}$

5 Express in simplest form: $\frac{8x}{x^2-16} \div \frac{2x}{x+4}$

6 Perform the indicated operation and express in

simplest form: $\frac{b^2-4}{2b-6} \div \frac{2-b}{b-3}$

7 Express in simplest form: $\frac{81-x^2}{6x-54} \div \frac{x^2+9x}{3x}$

8 Express in simplest form: $\frac{x^2-9}{2x-8} \div \frac{3-x}{x-4}$

9 Express $\frac{3x^2+9x}{x^2+5x+6} \div \frac{x^2-9}{x^2-x-6}$ in simplest form.

10 Express in simplest form: $\frac{2x^2-8x-42}{6x^2} \div \frac{x^2-9}{x^2-3x}$

11 Perform the indicated operations and express in

simplest form: $\frac{3x^2+12x-15}{x^2+2x-15} \div \frac{3x^2-3x}{3x-x^2}$

12 Perform the indicated operations and express the result in simplest form:

$$\left(\frac{10x^2y}{x^2+xy} \right) \cdot \left(\frac{(x+y)^2}{2x} \right) \div \left(\frac{x^2-y^2}{5y^2} \right)$$

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Answer Section

1 ANS: 4

$$\frac{x}{x+4} \div \frac{2x}{x^2-16} = \frac{x}{x+4} \cdot \frac{x^2-16}{2x} = \frac{1}{x+4} \cdot \frac{(x+4)(x-4)}{2} = \frac{x-4}{2}$$

REF: 081130ia

2 ANS:

$$\frac{3}{4x-8} \cdot \frac{3x+6}{4x+12} \div \frac{x^2-4}{x+3} = \frac{3(x+2)}{4(x+3)} \cdot \frac{x+3}{(x+2)(x-2)} = \frac{3}{4(x-2)}$$

REF: 010935ia

3 ANS:

$$\frac{x^2+9x+14}{x^2-49} \div \frac{3x+6}{x^2+x-56} = \frac{(x+7)(x+2)}{(x+7)(x-7)} \cdot \frac{(x+8)(x-7)}{3(x+2)} = \frac{x+8}{3}$$

REF: 061037ia

4 ANS:

$$\frac{x-3}{3} \cdot \frac{x}{x+3} \times \frac{x^2-9}{3x} = \frac{1}{x+3} \times \frac{(x+3)(x-3)}{3} = \frac{x-3}{3}$$

REF: 080022a

5 ANS:

$$\frac{4}{x-4} \cdot \frac{8x}{x^2-16} \div \frac{2x}{x+4} = \frac{8x}{(x+4)(x-4)} \cdot \frac{x+4}{2x} = \frac{4}{x-4}$$

REF: 010935a

6 ANS:

$$-\frac{b+2}{2}$$

REF: 018637siii

7 ANS:

$$-\frac{1}{2}$$

REF: 060042siii

8 ANS:

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

REF: 010141siii

9 ANS:

$$\frac{3x(x+3)}{(x+3)(x+2)} \times \frac{(x-3)(x+2)}{(x+3)(x-3)} = \frac{3x}{x+3}$$

REF: 081338ia

10 ANS:

$$\frac{x-7}{3x} \cdot \frac{2x^2-8x-42}{6x^2} \div \frac{x^2-9}{x^2-3x} = \frac{2(x^2-4x-21)}{6x^2} \cdot \frac{x(x-3)}{(x+3)(x-3)} = \frac{(x-7)(x+3)}{3x} \cdot \frac{1}{x+3} = \frac{x-7}{3x}$$

REF: 080937ia

11 ANS:

$$-1. \frac{3x^2+12x-15}{x^2+2x-15} \div \frac{3x^2-3x}{3x-x^2} = \frac{3(x^2+4x-5)}{(x+5)(x-3)} \times \frac{x(3-x)}{3x(x-1)} = \frac{(x+5)(x-1)}{(x+5)(x-3)} \times \frac{(3-x)}{(x-1)} = \frac{3-x}{x-3} = -1$$

REF: 010928b

12 ANS:

$$\left(\frac{10x^2y}{x^2+xy} \right) \cdot \left(\frac{(x+y)^2}{2x} \right) \div \left(\frac{x^2-y^2}{5y^2} \right) = \left(\frac{10x^2y}{x(x+y)} \right) \cdot \left(\frac{(x+y)^2}{2x} \right) \cdot \left(\frac{5y^2}{(x+y)(x-y)} \right) = \frac{25y^3}{x-y}$$

REF: 011539ia