

**A2.A.16: Mixed Operations with Rationals: Perform arithmetic operations with rational expressions and rename to lowest terms**

1 For all values of  $n$  for which the expressions are defined,  $\left(1 + \frac{1}{n}\right) \div \left(\frac{n+1}{n^2}\right)$  is equivalent to

1)  $\frac{(n+1)^2}{n^3}$

3)  $\frac{n^2}{n+1}$

2)  $\frac{2n}{n+1}$

4)  $n$

2 Express in simplest form:  $\frac{2x}{x^2-4} \div \frac{4}{x^2-4x+4} + \frac{12}{x^2-4} \cdot \frac{2-x}{3}$

3 Simplify:  $\frac{1}{2} \left( \frac{x+y}{x-y} - \frac{x-y}{x+y} \right) \left( \frac{x}{y} - \frac{y}{x} \right)$

4 Simplify:  $b^2 \left( \frac{a}{b} + \frac{a+b}{a-b} \right) \left( \frac{a}{b} - \frac{a-b}{b-a} \right)$

5 Simplify:  $\left( \frac{a+2b}{2a+b} - \frac{a-2b}{2a-b} \right) \left( \frac{1}{b} + \frac{b}{2ab} \right)$

6 Reduce to simplest form:  $\left( \frac{x}{x-y} - \frac{y}{x+y} \right) \div \frac{x^2+y^2}{x^2+xy}$

7 Simplify:  $\left(\frac{x}{1+x} + \frac{1-x}{x}\right) \div \left(\frac{x}{1+x} - \frac{1-x}{x}\right)$

8 Simplify:  $\left(\frac{2}{x} - \frac{1}{a+x} + \frac{1}{a-x}\right) \div \left(\frac{a+x}{a-x} - \frac{a-x}{a+x}\right)$

9 Reduce the following to simplest form:  $\left(\frac{a}{b} - \frac{b}{a}\right) \div \left(\frac{b}{a} - \frac{a}{b}\right) + \frac{a^2b^2 - b^4}{a+b} \times \frac{1}{b^2(a-b)}$

10 Simplify:  $\frac{1 + \frac{a-x}{a+x}}{1 - \frac{a-x}{a+x}} \div \frac{1 + \frac{a^2-x^2}{a^2+x^2}}{1 - \frac{a^2-x^2}{a^2+x^2}}$

11 Simplify:  $\frac{a}{a^2-b^2} \times \frac{a-b-2b\left(\frac{a-b}{a+b}\right)}{\frac{a-b}{b} \div \frac{a+b}{a}}$

12 Simplify:  $\left(1 - \frac{\frac{a^2}{b^2} - \frac{b^2}{a^2}}{\frac{a^2}{b^2} + \frac{b^2}{a^2}}\right) \left(\frac{a^3}{b} + \frac{b^3}{a}\right)$

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## **Answer Section**

1 ANS: 4 PTS: 2 REF: 088531siii

2 ANS:

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

PTS: 6

REF: 080733b

3 ANS:

$$2$$

PTS: 10

REF: 099402al

4 ANS:

$$\frac{(a^2 + b^2)(a + b)}{a - b}$$

PTS: 10

REF: 019502al

5 ANS:

$$\frac{3}{2a - b}$$

PTS: 10

REF: 089701al

6 ANS:

$$\frac{x}{x - y}$$

PTS: 4

REF: 069104al

7 ANS:

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

PTS: 10

REF: 039802al

8 ANS:

$$\frac{a}{2x^2}$$

PTS: 10

REF: 039901al

9 ANS:

$$0$$

PTS: 10

REF: 119303al

10 ANS:

$$\frac{x}{a}$$

PTS: 10

REF: 069702al

11 ANS:

$$\frac{b}{a+b}$$

PTS: 10

REF: 019803al

12 ANS:

$$\frac{2b^3}{a}$$

PTS: 10

REF: 039702al