A.APR.D.7: Mixed Operations with Rationals

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

   1) $\dfrac{(n+1)^2}{n^3}$ 2) $\dfrac{2n}{n+1}$ 3) $\dfrac{n^2}{n+1}$ 4) n

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

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

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

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

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

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

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

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

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Answer Section

1 ANS: 4   REF: 088531siii

2 ANS:

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

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

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

REF: 080733b

3 ANS:
2

REF: 099402al

4 ANS:

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

REF: 019502al

5 ANS:

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

REF: 089701al

6 ANS:

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

REF: 069104al

7 ANS:

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

REF: 039802al

8 ANS:

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

REF: 039901al

9 ANS:
0

REF: 119303al