A.APR.D.6: Rational Expressions 2b

1. If \( x \neq 0 \), the expression \( \frac{x^2 + 2x}{x} \) is equivalent to

2. For all values of \( x \) for which the expression is defined, \( \frac{2x + x^2}{x^2 + 5x + 6} \) is equivalent to

3. Which expression is in simplest form?
   1) \( \frac{x}{x^2} \)
   2) \( \frac{9}{x^2 + 9} \)
   3) \( \frac{x^2 - 4}{x + 2} \)
   4) \( \frac{x^2 - 6x + 9}{x^2 - x - 6} \)

4. Simplify: \( \frac{x^2 + 6x + 5}{x^2 - 25} \)

5. Express in simplest form: \( \frac{x^2 - 5x - 24}{x^2 - 8x} \)

6. Express \( \frac{x^2 + 3x - 10}{x^2 + 5x} \) as a fraction in simplest form.

7. Express the following rational expression in simplest form: \( \frac{9 - x^2}{10x^2 - 28x - 6} \)

8. Simplify: \( \frac{9x^2 - 15xy}{9x^2 - 25y^2} \)

9. The fraction \( \frac{3 - x}{2x - 6} \), \( x \neq 3 \), is equivalent to

10. Written in simplest form, the expression \( \frac{x^2y^2 - 9}{3 - xy} \) is equivalent to

11. Written in simplest form, the expression \( \frac{x^2 - 9x}{45x - 5x^2} \) is equivalent to

12. Which expression is equivalent to \( \frac{y - x}{x^2 - y^2} \)?

13. Written in simplest form, the expression \( \frac{x^2y - 4}{4 - x^3y} \) is

14. The expression \( \frac{3y^2 - 12y}{4y^2 - y^3} \) is equivalent to
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Answer Section

1. \( \frac{x + 2}{x^2 + 2x} = x + 2 \)
   
   REF: 010109a

2. \( \frac{x}{x + 3} \)
   \( \frac{x(x + 2)}{(x + 3)(x + 2)} = \frac{x}{x + 3} \)
   
   REF: 060202b

3. ANS: 2
   \( \frac{x}{x^2} = \frac{1}{x} \quad \frac{x^2 - 4}{x + 2} = \frac{(x + 2)(x - 2)}{x + 2} = x - 2 \)
   \( \frac{x^2 - 6x + 9}{x^2 - 6} = \frac{(x - 3)(x - 3)}{(x - 3)(x + 2)} = \frac{x - 3}{x + 2} \)
   
   REF: 060712b

4. ANS:
   \( \frac{x + 1}{x - 5} \cdot \frac{(x + 5)(x + 1)}{(x + 5)(x - 5)} = \frac{x + 1}{x - 5} \)
   
   REF: 010631a

5. ANS:
   \( \frac{x + 3}{x} \cdot \frac{x^2 - 5x - 24}{x^2 - 8x} = \frac{(x - 8)(x + 3)}{x(x - 8)} = \frac{x + 3}{x} \)
   
   REF: 060837a

6. ANS:
   \( \frac{x - 2}{x} \)
   
   REF: 088704siii

7. ANS:
   \( \frac{-x - 3}{10x + 2} \cdot \frac{(3 + x)(3 - x)}{(x - 3)(10x + 2)} = \frac{-1(3 + x)(x - 3)}{(x - 3)(10x + 2)} = \frac{-x - 3}{10x + 2} \)
   
   REF: 060325b
8 ANS: \[ \frac{3x}{3x + 5y} \]
REF: 069924a

9 ANS: \[ \frac{1}{2} \]
REF: 060118siii

10 ANS: \[-(3 + xy) \]
\[ \frac{(3y + 3)(3y - 3)}{-1(3y - 3)} = -(3 + xy) \]
REF: 080305b

11 ANS: \[ \frac{1}{5} \]
\[ \frac{x(x - 9)}{5x(9 - x)} = \frac{-1(9 - x)}{5(9 - x)} = \frac{-1}{5} \]
REF: 060504b

12 ANS: \[ \frac{-1}{x + y} \]
REF: 011013b

13 ANS: \[-1 \]
REF: fall9911b

14 ANS: \[ \frac{-3}{y} \]
\[ \frac{3y^2 - 12y}{4y^2 - y^3} = \frac{3y(y - 4)}{y^2(4 - y)} = \frac{-3y(4 - y)}{y^2(4 - y)} = \frac{-3}{y} \]
REF: 080619b