

## A3 Review Rational Expressions

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

#### Factor the polynomial.

- \_\_\_\_\_ 1.  $35w^8 + 40w^6$   
a.  $5w^6(7w^2 + 8)$  c.  $5w^5(7w^3 + 8w)$   
b.  $w^6(35w^2 + 40)$  d.  $5(7w^8 + 8w^6)$

#### Factor the expression.

- \_\_\_\_\_ 2.  $d^2 + 16d + 64$   
a.  $(d + 8)(d - 8)$  c.  $(d - 8)(d - 8)$   
b.  $(d + 8)(d + 8)$  d.  $(d - 8)(d + 8)$
- \_\_\_\_\_ 3.  $24g^2 + 35g - 49$   
a.  $(8g - 7)(3g + 7)$  c.  $(8g - 7)(3g - 7)$   
b.  $(8g + 7)(3g - 7)$  d.  $(8g + 7)(3g + 7)$
- \_\_\_\_\_ 4.  $3g^2 + 7g - 6$   
a.  $(3g - 2)(g + 3)$  c.  $(3g + 2)(g + 3)$   
b.  $(3g - 2)(g - 3)$  d.  $(3g + 2)(g - 3)$

- \_\_\_\_\_ 5. Divide  $\frac{5x^3}{7x^2y} \div \frac{25}{7y^8}$ . Assume that all expressions are defined.

- a.  $\frac{5}{xy^7}$  c.  $\frac{xy^7}{5}$   
b.  $\frac{x}{5y^7}$  d.  $\frac{125x}{49y^9}$

- \_\_\_\_\_ 6. Add  $\frac{3x^2 - 2x + 1}{x^2 - 4} + \frac{-x^2 - 3}{x^2 - 4}$

- a.  
b.  $\frac{2x^2 - 2x - 2}{x^2 - 4}$ ; The expression is undefined at  $x = \pm 2$ .  
c.  $\frac{4x^2 - 2x + 4}{x^2 - 4}$ ; The expression is always defined.  
d.

- \_\_\_\_\_ 7. Add  $\frac{x + 6}{x - 5} + \frac{-17x - 47}{x^2 + 2x - 35}$ .

- a.  $\frac{x + 6}{(x - 5)(x + 7)}$  c.  $\frac{x + 1}{x + 7}$   
b.  $\frac{-16x - 41}{x^2 + 3x - 40}$  d.  $\frac{x^2 + 13x + 42}{(x + 7)(x - 5)}$

**Divide.**

8.  $\frac{s^2 - 5s}{s^2 - s - 20} \div \frac{s - 2}{s + 4}$

a.  $\frac{s - 2}{s}$       b.  $\frac{s - 5}{s - 2}$       c.  $\frac{s}{s - 2}$       d.  $\frac{s - 5}{s^2 - 2s}$

**Multiply or divide. State any restrictions on the variables.**

9.  $\frac{z^2}{z + 1} \cdot \frac{z^2 + 3z + 2}{z^2 + 3z}$

a.  $\frac{z^2 + 2z}{z + 3}, z \neq -1, -3$       c.  $\frac{z + 2}{z + 3}, z \neq -1, -3$

b.  $\frac{z + 2}{z + 3}, z \neq -1, 0, -3$       d.  $\frac{z^2 + 2z}{z + 3}, z \neq -1, 0, -3$

10.  $\frac{x^2 - 16}{x^2 + 5x + 6} \div \frac{x^2 + 5x + 4}{x^2 - 2x - 8}$

a.  $\frac{(x - 4)^2}{(x + 3)(x + 1)}; x \neq -3, -1$

b.  $\frac{(x + 4)^2(x + 1)}{(x + 2)^2(x + 3)}; x \neq -3, -2, 4$

c.  $\frac{(x - 4)^2}{(x + 3)(x + 1)}; x \neq -4, -3, -2, -1, 4$

d.  $\frac{1}{(x + 3)(x + 1)}; x \neq -4, -3, -2, -1, 4$

**Add or subtract. Simplify if possible.**

11.  $\frac{d^2 - 9d + 20}{d^2 - 3d - 10} + \frac{d^2 - 2d - 8}{d^2 + 4d - 32}$

a.  $\frac{2d^2 - 11d + 12}{(d + 2)(d + 8)}$       c.  $\frac{2d^2 - 11d + 12}{2d^2 + d - 42}$

b.  $\frac{d^2 + 8d - 28}{(d + 2)(d + 8)}$       d.  $\frac{2d^2 + 8d - 28}{(d + 2)(d + 8)}$

\_\_\_\_\_ 12.  $\frac{a^2 - 2a - 3}{a^2 - 9a + 18} - \frac{a^2 - 5a - 6}{a^2 + 9a + 8}$

a.  $\frac{21a - 28}{(a - 6)(a + 8)}$

b.  $\frac{2a^2 - 28}{(a - 6)(a + 8)}$

c.  $\frac{-3a + 44}{(a - 6)(a + 8)}$

d.  $\frac{2a^2 + 18a + 44}{2a^2 + 44}$

\_\_\_\_\_ 13.  $\frac{3x^2 - 25x - 18}{27x + 18} \div \frac{5x - 3}{5x^2 - 33x + 18}$

## A3 Review Rational Expressions Answer Section

### MULTIPLE CHOICE

1. A
2. B
3. A
4. A
5. C

$$\frac{5x^3}{7x^2y} \div \frac{25}{7y^8}$$

Rewrite as multiplication by the reciprocal.

$$= \frac{5x^3}{7x^2y} \cdot \frac{7y^8}{25}$$

Simplify by canceling common factors.

$$= \frac{xy^7}{5}$$

6. B

$$\frac{3x^2 - 2x + 1}{x^2 - 4} + \frac{-x^2 - 3}{x^2 - 4}$$

$$= \frac{3x^2 - 2x + 1 - 1x^2 - 3}{x^2 - 4}$$

Add the numerators.

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

Combine like terms.

The expression is undefined at  $x = \pm 2$  because this value makes  $x^2 - 4$  equal 0.

7. C

$$\frac{x+6}{x-5} + \frac{-17x-47}{(x+7)(x-5)}$$

Factor the denominators. The LCD is  $(x+7)(x-5)$ .

$$= \left(\frac{x+7}{x+7}\right) \frac{x+6}{x-5} + \frac{-17x-47}{(x+7)(x-5)}$$

Multiply by  $\left(\frac{x+7}{x+7}\right)$ .

$$= \frac{x^2 + 13x + 42}{(x+7)(x-5)} + \frac{-17x-47}{(x+7)(x-5)}$$

$$= \frac{x^2 - 4x - 5}{(x+7)(x-5)}$$

Add the numerators.

$$= \frac{(x+1)(x-5)}{(x+7)(x-5)}$$

Factor the numerator.

$$= \frac{x+1}{x+7}$$

Divide the common factor.

8. C
9. D
10. C

11. D
12. A