

## Unit 10 Algebraic Fractions Test

Date \_\_\_\_\_

Algebra \_\_\_\_\_

Simplify each expression.

$$(4) 1) \frac{9n^2 + 81n}{n+9} \leftarrow \text{gcf}$$

$$\frac{9n(n+9)}{(n+9)}$$

$$\boxed{9n}$$

$$(4) 2) \frac{5a^2 - 5}{a^2 + 8a + 7} \leftarrow \begin{array}{l} \text{gcf} \\ \text{diamond} \end{array}$$

$$\frac{5(a^2 - 1) \leftarrow \text{dots}}{(a+7)(a+1)}$$

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

Evaluate the given algebraic fraction for the stated value.

$$(3) 3) \frac{6a}{10a^2 - 16a}, a = 1$$

$$\frac{6(1)}{10(1^2) - 16(1)} = \frac{6}{10-16}$$

$$= \frac{6}{-6}$$

$$= -1$$

$$(3) 4) \frac{5x+1}{x+5}, x = -5$$

$$\frac{5(-5)+1}{-5+5} = \frac{-25+1}{0} \leftarrow \text{uhoh!}$$

$$\boxed{\text{undefined}}$$

State the excluded values for each.

$$(5) \frac{p^3 + p^2 - 30p}{p^2 - 3p - 10}$$

$$-3p - 10 = 0$$

$$-5)(p+2) = 0$$

$$p = 5, -2$$

$$\boxed{\text{vals: } 5, -2}$$

$$(3) 6) \frac{14x - 2}{8x}$$

$$8x = 0$$

$$\frac{8}{8} \frac{0}{8}$$

$$x = 0$$

$$\boxed{\text{ex val: } 0}$$

Which of the following algebraic fractions has NO excluded values?

2

A)  $\frac{3}{x^2 + 5x + 6}$   
 C)  $\frac{x^2 - 16}{x + 4}$

B)  $\frac{5x + 25}{15}$   
 D)  $\frac{x^2}{2x + 1}$

8) Which of the following is an example of a rational expression (algebraic fraction) that IS in its most simple form?

2

A)  $\frac{x^2 + 12x - 8}{x + 2}$   
 C)  $\frac{x^2 + 2x - 8}{x + 2}$

B)  $\frac{x^2 - 1}{2x^2 + 2x}$   
 D)  $\frac{x^2 + x}{x}$

5

9) The area of a rectangle is  $v^2 + 8v + 15$ . If the length of the rectangle is  $v + 3$ , what is the width?

$\frac{v^2 + 8v + 15}{v + 3} \leftarrow \text{diamond}$

$\frac{(v+5)(v+3)}{v+3}$

Width:  $v + 5$

Add, Subtract, Multiply or Divide each expression.

4

10)  $\frac{3x}{3} + \frac{4}{2x}$

11)  $\frac{1}{2} - \frac{2x+2}{x+1}$

$\frac{x}{x} + \frac{2}{x}$

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

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

$\frac{-3x-3}{2(x+1)} \leftarrow \text{gcf} = \frac{-3(x+1)}{2(x+1)}$

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

$\frac{-3}{2}$

12)  $\frac{4}{3} - \frac{x+2}{x^2+3x+2}$  ← diamond

⑥  $\frac{4}{3} - \frac{x+2}{(x+2)(x+1)}$

$(\frac{4x}{4x}) \frac{4}{3} - \frac{1}{x+1} (\frac{3}{3})$

$\frac{4x+4}{3(x+1)} - \frac{3}{3(x+1)}$

$\frac{4x+1}{3(x+1)}$

14)  $\frac{x^2-6x+5}{3x^2-3} \div \frac{x-5}{x^2-4x-5}$   
 ← diamond  
 gcf!

$\frac{(x-5)(x-1)}{3(x^2-1)} \cdot \frac{(x-5)(x+1)}{(x-5)}$   
 ↑  
 dots

$\frac{(x-5)(\cancel{x-1})}{3(\cancel{x+1})(\cancel{x-1})} \cdot \frac{(\cancel{x-5})(\cancel{x+1})}{(\cancel{x-5})}$

$\frac{x-5}{3}$

13)  $\frac{2}{v^2-3v} \cdot \frac{v^2+4v-21}{v+7}$  ← diamond  
 ↑  
 gcf

$\frac{2}{v(v-3)} \cdot \frac{(v+7)(v-3)}{(v+7)}$   
 $= \frac{2}{v}$

Micheal looks at the expression and cancels out the 10s. Is he correct? Explain your answer mathematically.

No...

Simplify the following expression:

16)  $\frac{8r^2 + 24r}{5r^2 + 3r - 2} \div \frac{r^2 + 8r + 5}{25r^2 - 4} \cdot \frac{r + 5}{20r^2 + 9r}$

*Handwritten notes:*  
 - Above  $8r^2 + 24r$ :  $\leftarrow$  gcf  
 - Above  $r^2 + 8r + 5$ :  $\leftarrow$  factored  
 - Below  $5r^2 + 3r - 2$ :  $\rightarrow$   $\frac{3}{-10} \cdot 2$  qcf  $(5r+5)(5r-2)$   
 - Below  $25r^2 - 4$ :  $\rightarrow$  ~~dots~~ gcf  $\rightarrow$

$$\frac{8r(r+3)}{(r+1)(5r-2)} \cdot \frac{(5r+2)(5r-2)}{(r+5)(r+5)} \cdot \frac{r+5}{r(20r+9)}$$

$$\frac{8(5r+2)}{(r+1)(20r+9)}$$