

NAME _____

DATE _____

Module Test **B**

Module 15

Fill in the blanks.

- All real numbers except the restricted values of a rational term are the **domain** _____ of the function.
- A **common denominator** _____ is needed before rational terms can be added or subtracted.
- A rational expression with more than one term in the numerator and/or denominator must first be **factored** _____ in order to simplify.
- During the **division** _____ of two fractions, the operation is changed to multiplication, and the reciprocal of the second fraction is used.
- A **complex fraction** _____ is the division of two fractions, written in the form of a fraction.

Choose the correct response to each of the following:

- Simplify: $\frac{x-4}{4-x}$.
 a. 1 **b.** -1 c. $\frac{x-1}{1-x}$ d. $\frac{x-4}{4-x}$
- Simplify: $\frac{5+3r}{3r+5}$.
a. 1 b. -1 c. $\frac{1+r}{r+1}$ d. $\frac{5+3r}{3r+5}$
- Find all restricted values for: $\frac{3x}{5}$.
 a. 0 b. 5 c. a and b **d.** no restricted values
- Find all restricted values for: $\frac{4}{x^2+7x-18}$.
 a. -9 b. 2 **c.** a and b d. no restricted values
- Find the least common denominator for: $\frac{2}{5x^3}$ and $\frac{1}{10x^2}$.
 a. 10 b. $2x^2$ c. $5x^3$ **d.** $10x^3$

11. Find the least common denominator for: $\frac{x}{x+4}$ and $\frac{1}{x+2}$.
- a.** $x^2 + 6x + 8$ **b.** $x + 4$ **c.** $x + 2$ **d.** $x^2 + 8$

12. Find the least common denominator for: $\frac{5}{x-3}$ and $\frac{3x-1}{x^2-6x+9}$.
- a.** $x - 3$ **c.** $x^2 - 6x + 9$
- b.** $x - 6$ **d.** $x^3 - 9x^2 + 27x - 27$

Are the following statements true or false?

- | | |
|--|--|
| <p>13. $\frac{x+5}{x+10}$ is in simplest form.</p> <p>True</p> <hr/> <p>15. $\frac{x-3}{2x}$ has the restricted value 0.</p> <p>True</p> <hr/> <p>17. $\frac{3(q+5)}{6(q+5)}$ reduces to 2.</p> <p>False</p> <hr/> <p>19. To divide two fractions, the expression must be changed to multiplication with the reciprocal of the first fraction.</p> <p>False</p> <hr/> | <p>14. $\frac{4}{x+1}$ has no restricted values.</p> <p>False</p> <hr/> <p>16. $\frac{x-7}{2x+6}$ has the restricted value -6.</p> <p>False</p> <hr/> <p>18. A least common denominator is needed to find the sum of two fractions.</p> <p>True</p> <hr/> |
|--|--|

20. Simplify the rational expressions.

- a.** $\frac{12x^5y^4z^3}{18xy^4z^2}$ $\frac{2x^4z}{3}$
- b.** $\frac{10b-20}{10b+20}$ $\frac{b-2}{b+2}$
- c.** $\frac{y^2+7y}{y^2-49}$ $\frac{y}{y-7}$
- d.** $\frac{3x^2+11x-4}{x^2+8x+16}$ $\frac{3x-1}{x+4}$

21. Multiply or divide the rational expressions. Simplify, if necessary.

- a.** $\frac{6yw}{3x^4w} \cdot \frac{2x^5yw^2}{4xy^2}$ w^2
- b.** $\frac{x^2+2x+1}{5x^2-5x} \div \frac{x^2-1}{5x}$ $\frac{x+1}{(x-1)^2}$
- c.** $\frac{n+4}{5n^2+30n+45} \cdot \frac{5n^2+15n}{n^2+4n}$ $\frac{1}{n+3}$
- d.** $\frac{\frac{x^2-9}{4x+2}}{\frac{x^2-3x}{2xy+y}}$ $\frac{y(x+3)}{2x}$

© 2003 BestQuest

22. Add or subtract the rational expressions. Simplify, if necessary.

a. $\frac{3x}{x+5} + \frac{15}{x+5} = \frac{3}{4}$

b. $\frac{5x-3}{7x} - \frac{x-3}{7x} = \frac{4}{7}$

c. $\frac{q-4}{10q} + \frac{3}{2q} = \frac{q+11}{10q}$

d. $\frac{5}{x+4} - \frac{2}{x+3} = \frac{3x+7}{(x+4)(x+3)}$ or $\frac{3x+7}{x^2+7x+12}$

e. $\frac{5}{2y+3} - \frac{y-16}{6y^2+11y+3} = \frac{7}{3y+1}$

Answer the questions with complete sentences.

23. List the steps taken when adding or subtracting rational terms with unlike denominators.

To add or subtract rational terms with unlike denominators, find the least common denominator for the expression. The LCD must contain the higher power of each different factor in the denominators. Write equivalent fractions using the least common denominator by determining what each denominator must be multiplied by to get the LCD as a product and multiplying the corresponding numerator by the same factor. Then, add or subtract the fractions according to rules of rational terms with like denominators: add or subtract the numerators, keep the common denominator, and simplify if necessary.

24. Explain how to divide rational expressions.

To divide rational expressions, multiply the first term by the reciprocal of the second term. Then, proceed as with a multiplication between rational expressions: multiplying the numerators together and the denominators together, and simplifying by dividing out any common factors.

