

Multiplying and Dividing Rational Expressions Assignment

Multiply the following rational expressions.

1. $\frac{35r^2}{6} \times \frac{24}{7r^3}$

2. $\frac{x-4}{y} \times \frac{y}{x^2-16}$

3. $\frac{3x+15}{10} \times \frac{20}{4x+20}$

4. $\frac{r^2+r}{4} \times \frac{8}{r^2-1}$

5. $\frac{5a-5b}{xy^2} \times \frac{x^2y}{2a-2b}$

6. $\frac{x^2-5x+6}{10x-20} \times \frac{5x+15}{x^2-9}$

7. $\frac{10y-14x}{x-1} \times \frac{x^2-2x+1}{21x-15y}$

8. $(3x^2-14x-5) \times \frac{x^2-2x-35}{3x^2-20x-7}$

Multiplying and Dividing Rational Expressions Assignment

Divide the following rational expressions.

9. $\frac{4a^2}{8a^2} \div \frac{15a^4}{12a^5}$

10. $\frac{25p^{10}}{9p^5} \div \frac{15p^6}{10p^4}$

11. $\frac{y^2 - 36}{y + 5} \div \frac{y - 6}{y^2 - 25}$

12. $\frac{m^3 - 9m}{2m} \div \frac{2m + 6}{4m^2}$

13. $\frac{5x - 20}{10x} \div \frac{7x - 28}{14x^2}$

14. $\frac{4a + 12}{2a - 10} \div \frac{a^2 - 9}{a^2 - a - 20}$

15. $\frac{4x^2 + 12x + 9}{5x^3 - 2x^2} \div \frac{14x^2 + 21x}{10x^2y^2}$

16. $(6x^2 - 19x + 10) \div \frac{6x^2 - 11x - 10}{9x^2 + 12x + 4}$

Multiplying and Dividing Rational Expressions Assignment

Perform the indicated operation on the following rational expressions.

17. $\frac{18x^2}{5a} \times \frac{15ax}{81a^2} \times \frac{44ax}{24x^3}$

18. $\frac{14ab}{18x} \times \frac{27x^3}{15a^3b^3} \div \frac{7a^2x}{25ab}$

19. $\frac{x-y}{x^2-y^2} \div \frac{6x}{x+y} \times \frac{15x^3}{4}$

20. $\frac{x^2-xy}{5x^2y^2} \div \frac{4x-4y}{3xy} \times \frac{20y}{11}$

Multiplying and Dividing Rational Expressions Assignment

Answer:

Multiply the following rational expressions.

1. $\frac{35r^2}{6} \times \frac{24}{7r^3}$

Solution:

$$\frac{35r^2}{6} \times \frac{24}{7r^3} = \frac{5(\cancel{7r^2})}{\cancel{6}} \times \frac{4(\cancel{6})}{\cancel{7r^3}} = \frac{20}{r}$$

2. $\frac{x-4}{y} \times \frac{y}{x^2-16}$

Solution:

$$\frac{x-4}{y} \times \frac{y}{x^2-16} = \frac{\cancel{x-4}}{\cancel{y}} \times \frac{y}{(x+4)(\cancel{x-4})}$$

$$= \frac{1}{x+4}$$

3. $\frac{3x+15}{10} \times \frac{20}{4x+20}$

Solution:

$$\frac{3x+15}{10} \times \frac{20}{4x+20} = \frac{3(\cancel{x+5})}{\cancel{10}} \times \frac{2(\cancel{10})}{4(\cancel{x+5})}$$

$$= \frac{3(2)}{4} = \frac{3}{2}$$

4. $\frac{r^2+r}{4} \times \frac{8}{r^2-1}$

Solution:

$$\frac{r^2+r}{4} \times \frac{8}{r^2-1} = \frac{r(\cancel{r+1})}{(\cancel{4})} \times \frac{2(\cancel{4})}{(\cancel{r+1})(r-1)}$$

$$= \frac{2r}{r-1}$$

5. $\frac{5a-5b}{xy^2} \times \frac{x^2y}{2a-2b}$

Solution:

$$\frac{5a-5b}{xy^2} \times \frac{x^2y}{2a-2b} = \frac{5(\cancel{a-b})}{\cancel{xy^2}} \times \frac{x^2\cancel{y}}{2(\cancel{a-b})} = \frac{5x}{y}$$

6. $\frac{x^2-5x+6}{10x-20} \times \frac{5x+15}{x^2-9}$

Solution:

$$\frac{x^2-5x+6}{10x-20} \times \frac{5x+15}{x^2-9}$$

$$= \frac{(\cancel{x-2})(\cancel{x-3})}{10(\cancel{x-2})} \times \frac{5(\cancel{x+3})}{(\cancel{x+3})(\cancel{x-3})}$$

$$= \frac{5}{10} \text{ or } \frac{1}{2}$$

7. $\frac{10y-14x}{x-1} \times \frac{x^2-2x+1}{21x-15y}$

Solution:

$$\frac{10y-14x}{x-1} \times \frac{x^2-2x+1}{21x-15y}$$

$$= \frac{2(\cancel{5y-7x})}{\cancel{x-1}} \times \frac{(x-1)(\cancel{x-1})}{-3(\cancel{-7x+5y})}$$

$$= -\frac{2(x-1)}{3}$$

8. $(3x^2-14x-5) \times \frac{x^2-2x-35}{3x^2-20x-7}$

Solution:

$$(3x^2-14x-5) \times \frac{x^2-2x-35}{3x^2-20x-7}$$

$$= (\cancel{3x+1})(x-5) \times \frac{(\cancel{x-7})(x+5)}{(\cancel{3x+1})(\cancel{x-7})}$$

$$= (x-5)(x+5) = x^2-25$$

Multiplying and Dividing Rational Expressions Assignment

Divide the following rational expressions.

9. $\frac{4a^2}{8a^2} \div \frac{15a^4}{12a^5}$

Solution:

$$\begin{aligned}\frac{4a^2}{8a^2} \div \frac{15a^4}{12a^5} &= \frac{4a^2}{8a^2} \times \frac{12a^5}{15a^4} = \frac{4\cancel{a^2}}{2(4\cancel{a^2})} \times \frac{4a(3\cancel{a^4})}{5(3\cancel{a^4})} \\ &= \frac{4a}{2(5)} = \frac{2a}{5}\end{aligned}$$

10. $\frac{25p^{10}}{9p^5} \div \frac{15p^6}{10p^4}$

Solution:

$$\begin{aligned}\frac{25p^{10}}{9p^5} \div \frac{15p^6}{10p^4} &= \frac{25p^{10}}{9p^5} \times \frac{10p^4}{15p^6} \\ &= \frac{5p^4(5\cancel{p^6})}{9p(\cancel{p^4})} \times \frac{10\cancel{p^4}}{3(5\cancel{p^6})} = \frac{50p^4}{27p} = \frac{50p^3}{27}\end{aligned}$$

11. $\frac{y^2 - 36}{y + 5} \div \frac{y - 6}{y^2 - 25}$

Solution:

$$\begin{aligned}\frac{y^2 - 36}{y + 5} \div \frac{y - 6}{y^2 - 25} &= \frac{y^2 - 36}{y + 5} \times \frac{y^2 - 25}{y - 6} \\ &= \frac{(y + 6)(\cancel{y - 6})}{\cancel{y + 5}} \times \frac{(y + 5)(y - 5)}{\cancel{y - 6}} \\ &= (y + 6)(y - 5)\end{aligned}$$

12. $\frac{m^3 - 9m}{2m} \div \frac{2m + 6}{4m^2}$

Solution:

$$\begin{aligned}\frac{m^3 - 9m}{2m} \div \frac{2m + 6}{4m^2} &= \frac{m^3 - 9m}{2m} \times \frac{4m^2}{2m + 6} \\ &= \frac{m(\cancel{m + 3})(m - 3)}{2\cancel{m}} \times \frac{2m(2\cancel{m})}{2(\cancel{m + 3})} \\ &= m^2\end{aligned}$$

13. $\frac{5x - 20}{10x} \div \frac{7x - 28}{14x^2}$

Solution:

$$\begin{aligned}\frac{5x - 20}{10x} \div \frac{7x - 28}{14x^2} &= \frac{5x - 20}{10x} \times \frac{14x^2}{7x - 28} \\ &= \frac{5(\cancel{x - 4})}{5(2\cancel{x})} \times \frac{7x(2\cancel{x})}{7(\cancel{x - 4})} = x\end{aligned}$$

14. $\frac{4a + 12}{2a - 10} \div \frac{a^2 - 9}{a^2 - a - 20}$

Solution:

$$\begin{aligned}\frac{4a + 12}{2a - 10} \div \frac{a^2 - 9}{a^2 - a - 20} &= \frac{4a + 12}{2a - 10} \times \frac{a^2 - a - 20}{a^2 - 9} \\ &= \frac{4(\cancel{a + 3})}{2(\cancel{a - 5})} \times \frac{(a + 4)(\cancel{a - 5})}{(a - 3)(\cancel{a + 3})} \\ &= \frac{4(a + 4)}{2} = 2(a + 4)\end{aligned}$$

15. $\frac{4x^2 + 12x + 9}{5x^3 - 2x^2} \div \frac{14x^2 + 21x}{10x^2y^2}$

Solution:

$$\begin{aligned}\frac{4x^2 + 12x + 9}{5x^3 - 2x^2} \div \frac{14x^2 + 21x}{10x^2y^2} &= \frac{(2x + 3)(2x + 3)}{x^2(5x - 2)} \times \frac{10x^2y^2}{7(2x + 3)} = \frac{10y^2(2x + 3)}{7(5x - 2)}\end{aligned}$$

16. $(6x^2 - 19x + 10) \div \frac{6x^2 - 11x - 10}{9x^2 + 12x + 4}$

Solution:

$$\begin{aligned}(6x^2 - 19x + 10) \div \frac{6x^2 - 11x - 10}{9x^2 + 12x + 4} &= (6x^2 - 19x + 10) \times \frac{9x^2 + 12x + 4}{6x^2 - 11x - 10} \\ &= (3x - 2)(2x - 5) \times \frac{(3x + 2)(3x + 2)}{(3x + 2)(2x - 5)} \\ &= (3x - 2)(3x + 2) = x^2 - 9\end{aligned}$$

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Perform the indicated operation on the following rational expressions.

17. $\frac{18x^2}{5a} \times \frac{15ax}{81a^2} \times \frac{44ax}{24x^3}$

Solution:

$$\frac{18x^2}{5a} \times \frac{15ax}{81a^2} \times \frac{44ax}{24x^3}$$

$$= \frac{3(6x^2)}{5a} \times \frac{3x(5a)}{9(3)(3)a^2} \times \frac{11a(4x)}{4x(6x^2)} = \frac{11x}{9a}$$

18. $\frac{14ab}{18x} \times \frac{27x^3}{15a^3b^3} \div \frac{7a^2x}{25ab}$

Solution:

$$\frac{14ab}{18x} \times \frac{27x^3}{15a^3b^3} \div \frac{7a^2x}{25ab}$$

$$= \frac{14ab}{18x} \times \frac{27x^3}{15a^3b^3} \times \frac{25ab}{7a^2x}$$

$$= \frac{2b(7a)}{2(9x)} \times \frac{3x(9x^2)}{(5a)a^2(3)b^3} \times \frac{(5a)(5)b}{(7a)ax}$$

$$= \frac{1}{a^3}$$

19. $\frac{x-y}{x^2-y^2} \div \frac{6x}{x+y} \times \frac{15x^3}{4}$

Solution:

$$\frac{x-y}{x^2-y^2} \div \frac{6x}{x+y} \times \frac{15x^3}{4}$$

$$= \frac{x-y}{x^2-y^2} \times \frac{x+y}{6x} \times \frac{15x^3}{4}$$

$$= \frac{x-y}{(x+y)(x-y)} \times \frac{x+y}{2(3x)} \times \frac{5x^2(3x)}{4} = \frac{5x^2}{8}$$

20. $\frac{x^2-xy}{5x^2y^2} \div \frac{4x-4y}{3xy} \times \frac{20y}{11}$

Solution:

$$\frac{x^2-xy}{5x^2y^2} \div \frac{4x-4y}{3xy} \times \frac{20y}{11}$$

$$= \frac{x^2-xy}{5x^2y^2} \times \frac{3xy}{4x-4y} \times \frac{20y}{11}$$

$$= \frac{x(x-y)}{5x^2y^2} \times \frac{3xy}{4(x-y)} \times \frac{(5)4y}{11} = \frac{15}{11} \text{ or } 1\frac{4}{11}$$