

Multiplying and Dividing Rational Expressions

Date _____

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Simplify each and state the excluded values.

1)
$$\frac{(p+4)(p-6)}{p-6} \div \frac{(p-4)(p+5)}{p+5}$$

2)
$$\frac{6k^2(k-9)}{2k} \cdot \frac{2k(k-5)}{(k-5)(k-9)}$$

3)
$$\frac{7v(v+4)}{v+10} \div \frac{7v(v-9)}{(v+10)(v-9)}$$

4)
$$\frac{10(b-5)}{10(b+4)} \div \frac{b+9}{(b+9)(b+4)}$$

5)
$$\frac{(x-6)(x+6)}{(x+6)(x+5)} \div \frac{1}{x+5}$$

6)
$$\frac{9x(x-1)}{9x(x+7)} \div \frac{x-5}{x+7}$$

7)
$$\frac{(m+4)(m-5)}{(m-5)(m+6)} \div \frac{1}{7m^2(m+6)}$$

8)
$$\frac{7r}{r-9} \cdot \frac{5(5r+2)}{7r(5r+2)}$$

9)
$$\frac{7(n-10)}{7} \div \frac{(n-10)^2}{9n^2(n-10)}$$

10)
$$\frac{n-5}{n+2} \cdot \frac{(n-2)(n+2)}{(n-3)(n-5)}$$

11)
$$\frac{7p+70}{21p-63} \cdot \frac{12p-36}{4p+28}$$

12)
$$\frac{28x-16}{12x+40} \div \frac{7x^2+24x-16}{15x+50}$$

13)
$$\frac{18a-24}{6} \cdot \frac{7a^2-56a}{3a^2-31a+36}$$

14)
$$\frac{5n^2+33n+18}{15n^2+49n+24} \div \frac{n-7}{6n^3+16n^2}$$

15)
$$\frac{3x^2-3x}{18x-9x^2} \div \frac{28x-4}{21x^2-45x+6}$$

16)
$$\frac{5n^2-20n-25}{45n+45} \cdot \frac{2n+2}{2n^2-10n-12}$$

17)
$$\frac{28x+32}{9} \cdot \frac{27-45x}{35x^2+19x-24}$$

18)
$$\frac{72k}{10k+10} \div \frac{10}{10k+10}$$

19)
$$\frac{2v-6}{v^2+12v+20} \div \frac{6v^2-12v-18}{3v^2+18v+15}$$

20)
$$\frac{15x-10}{3x-2} \cdot \frac{2x^2+6x+4}{8x+8}$$

Answers to Multiplying and Dividing Rational Expressions (ID: 1)

1) $\frac{p+4}{p-4}; \{6, -5, 4\}$

2) $6k^2; \{0, 5, 9\}$

3) $v+4; \{-10, 9, 0\}$

4) $b-5; \{-4, -9\}$

5) $x-6; \{-6, -5\}$

6) $\frac{x-1}{x-5}; \{0, -7, 5\}$

7) $7m^2(m+4); \{5, -6, 0\}$

8) $\frac{5}{r-9}; \left\{9, 0, -\frac{2}{5}\right\}$

9) $9n^2; \{0, 10\}$

10) $\frac{n-2}{n-3}; \{-2, 3, 5\}$

11) $\frac{p+10}{p+7}; \{3, -7\}$

12) $\frac{5}{x+4}; \left\{-\frac{10}{3}, \frac{4}{7}, -4\right\}$

13) $\frac{7a(a-8)}{a-9}; \left\{9, \frac{4}{3}\right\}$

14) $\frac{2n^2(n+6)}{n-7}; \left\{-\frac{8}{3}, -\frac{3}{5}, 0, 7\right\}$

15) $-\frac{(x-1)}{4}; \left\{0, 2, \frac{1}{7}\right\}$

16) $\frac{n-5}{9(n-6)}; \{-1, 6\}$

17) $-4; \left\{\frac{3}{5}, -\frac{8}{7}\right\}$

18) $\frac{36k}{5}; \{-1\}$

19) $\frac{v+5}{(v+10)(v+2)}; \{-10, -2, -5, -1, 3\}$

20) $\frac{5(x+2)}{4}; \left\{\frac{2}{3}, -1\right\}$

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Simplify each and state the excluded values.

1)
$$\frac{(x+5)(x+2)}{x+2} \div \frac{(x+5)(x+2)}{x+3}$$

2)
$$\frac{x-4}{(x-2)(x-4)} \cdot \frac{(x-7)(-x+2)}{x-2}$$

3)
$$\frac{3}{6n(n-1)} \cdot \frac{12n^2(n-1)}{6n^2}$$

4)
$$\frac{x-6}{(6-x)(2+x)} \cdot \frac{7(x+2)}{x+5}$$

5)
$$\frac{6n(n-10)}{6n(n-2)} \div \frac{8n^2}{(n-5)(n-2)}$$

6)
$$\frac{(7-m)(10+m)}{(m+8)(m-7)} \cdot \frac{10-m}{(m-2)(m-10)}$$

7)
$$\frac{6r^2(r+8)}{6r^2} \cdot \frac{8}{(r-7)(r+8)}$$

8)
$$\frac{b-2}{6b(b+3)} \div \frac{1}{6b(b+3)}$$

9)
$$\frac{9}{v+7} \div \frac{4v(v-1)}{4v(v+7)}$$

10)
$$\frac{36}{(a+8)(a-9)} \div \frac{1}{a-9}$$

11)
$$\frac{6x-3}{15x-9} \cdot \frac{21x^2-35x^3}{6x-3}$$

12)
$$\frac{21r+35}{3r+5} \cdot \frac{5r^2+44r+63}{35r+63}$$

13)
$$\frac{30k^2+12k}{20k+8} \div \frac{5k^2+48k-20}{2-5k}$$

14)
$$\frac{10n+5}{2n+1} \cdot \frac{18n^2+60n}{3n^2+19n+30}$$

15)
$$\frac{27p+72}{3p^2-29p-10} \div \frac{9p^2+3p-56}{9p^2-18p-7}$$

16)
$$\frac{35b^2-57b+18}{5b^2-21b+18} \div \frac{7b-3}{4b-32}$$

17)
$$(15n+20) \div \frac{15n+20}{4n+16}$$

18)
$$\frac{9m^2+6m-15}{2m^2-11m+9} \cdot \frac{2m^2-15m+27}{9m^2+6m-15}$$

19)
$$\frac{16x^3-24x^2}{6x^2-24x} \div \frac{6x^2-x-12}{18x^2+24x}$$

20)
$$\frac{9v-63}{9v+72} \cdot \frac{10-7v}{70v-100}$$

Answers to Multiplying and Dividing Rational Expressions (ID: 2)

- 1) $\frac{x+3}{x+2}; \{-2, -3, -5\}$ 2) $-\frac{(x-7)}{x-2}; \{2, 4\}$ 3) $\frac{1}{n}; \{0, 1\}$ 4) $-\frac{7}{x+5}; \{6, -2, -5\}$
 5) $\frac{(n-10)(n-5)}{8n^2}; \{0, 2, 5\}$ 6) $\frac{10+m}{(m+8)(m-2)}; \{-8, 7, 2, 10\}$ 7) $\frac{8}{r-7}; \{0, 7, -8\}$
 8) $b-2; \{0, -3\}$ 9) $\frac{9}{v-1}; \{-7, 0, 1\}$ 10) $\frac{36}{a+8}; \{-8, 9\}$ 11) $-\frac{7x^2}{3}; \left\{\frac{3}{5}, \frac{1}{2}\right\}$
 12) $r+7; \left\{-\frac{5}{3}, -\frac{9}{5}\right\}$ 13) $-\frac{3k}{2(k+10)}; \left\{-\frac{2}{5}, \frac{2}{5}, -10\right\}$ 14) $\frac{30n}{n+3}; \left\{-\frac{1}{2}, -3, -\frac{10}{3}\right\}$
 15) $\frac{9}{p-10}; \left\{10, -\frac{1}{3}, \frac{7}{3}, -\frac{8}{3}\right\}$ 16) $\frac{4(b-8)}{b-3}; \left\{3, \frac{6}{5}, 8, \frac{3}{7}\right\}$ 17) $4(n+4); \left\{-4, -\frac{4}{3}\right\}$
 18) $\frac{m-3}{m-1}; \left\{1, \frac{9}{2}, -\frac{5}{3}\right\}$ 19) $\frac{8x^2}{x-4}; \left\{0, 4, -\frac{4}{3}, \frac{3}{2}\right\}$ 20) $-\frac{(v-7)}{10(v+8)}; \left\{-8, \frac{10}{7}\right\}$

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Simplify each and state the excluded values.

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

2)
$$\frac{1}{7(p+10)} \cdot \frac{(p+3)(p+10)}{8p^2}$$

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

4)
$$\frac{7x(x-4)}{7x(4-x)} \cdot \frac{(x+8)(x+9)}{x+9}$$

5)
$$\frac{6}{(k-8)(k+7)} \cdot \frac{3(k+7)}{3(k-3)}$$

6)
$$\frac{5(a+9)}{a+4} \cdot \frac{4}{4(a+9)}$$

7)
$$\frac{x+3}{4x^2(x+2)} \div \frac{x+5}{4x^2(x+2)}$$

8)
$$\frac{2(n-4)}{7} \cdot \frac{7(n-9)}{(n-4)(n-9)}$$

9)
$$\frac{5(k+3)}{k+5} \cdot \frac{5}{5(k+3)}$$

10)
$$\frac{n+10}{n+6} \div \frac{10n(n+10)}{10n(n+1)}$$

11)
$$\frac{9n^2 - 18n - 27}{5n+1} \cdot \frac{45n+9}{9n^2 - 18n - 27}$$

12)
$$\frac{3x^2 + 32x + 45}{6x^2 - 17x - 45} \cdot \frac{6x^2 - 31x + 18}{30x - 20}$$

13)
$$\frac{2n^2 + 19n + 45}{21n^2 - 36n - 12} \cdot \frac{21n^2 - 36n - 12}{18n + 81}$$

14)
$$\frac{70 - 21m}{6m^2 + 4m - 80} \div \frac{m+8}{18m+72}$$

15)
$$\frac{7r+1}{r^2 - 11r + 24} \cdot \frac{8r-72}{56r+8}$$

16)
$$\frac{3v^2 - 11v + 10}{5v+4} \div \frac{12v^2 - 20v}{5v^2 - 31v - 28}$$

17)
$$\frac{40a^2 - 72a}{35a^2 - 33a - 54} \cdot \frac{35a^2 - 33a - 54}{35a^2 - 63a}$$

18)
$$\frac{2b-2}{-14b^2 + 28b - 14} \div \frac{2b^3 + 14b^2}{49b - 49}$$

19)
$$\frac{6x^2 - 10x^3}{8x+16} \div \frac{25x^2 - 55x + 24}{64 - 40x}$$

20)
$$\frac{30x^2 + 10x}{49x^2 + 28x + 4} \div \frac{3x+1}{49x^2 + 28x + 4}$$

Answers to Multiplying and Dividing Rational Expressions (ID: 3)

- 1) $\frac{x-6}{2x}; \{0, 4, -2\}$ 2) $\frac{p+3}{56p^2}; \{-10, 0\}$ 3) $\frac{2x}{x-10}; \{10, -3, 4\}$ 4) $-(x+8); \{0, 4, -9\}$
- 5) $\frac{6}{(k-8)(k-3)}; \{8, -7, 3\}$ 6) $\frac{5}{a+4}; \{-4, -9\}$ 7) $\frac{x+3}{x+5}; \{0, -2, -5\}$
- 8) $2; \{4, 9\}$ 9) $\frac{5}{k+5}; \{-5, -3\}$ 10) $\frac{n+1}{n+6}; \{-6, 0, -1, -10\}$
- 11) $9; \left\{-\frac{1}{5}, 3, -1\right\}$ 12) $\frac{x+9}{10}; \left\{\frac{9}{2}, -\frac{5}{3}, \frac{2}{3}\right\}$ 13) $\frac{n+5}{9}; \left\{2, -\frac{2}{7}, -\frac{9}{2}\right\}$
- 14) $-\frac{63}{m+8}; \left\{\frac{10}{3}, -4, -8\right\}$ 15) $\frac{r-9}{(r-8)(r-3)}; \left\{8, 3, -\frac{1}{7}\right\}$ 16) $\frac{(v-2)(v-7)}{4v}; \left\{-\frac{4}{5}, 7, 0, \frac{5}{3}\right\}$
- 17) $\frac{8}{7}; \left\{\frac{9}{5}, -\frac{6}{7}, 0\right\}$ 18) $-\frac{7}{2b^2(b+7)}; \{1, 0, -7\}$ 19) $\frac{2x^2}{x+2}; \left\{-2, \frac{8}{5}, \frac{3}{5}\right\}$
- 20) $10x; \left\{-\frac{2}{7}, -\frac{1}{3}\right\}$