# What Is the Difference Between a Barbell and an Ocean?

Express the product in simplest form. Cross out the letters above each correct answer. Write the letters that remain in the spaces at the bottom of the page.

1. $\frac{7x}{4} \cdot \frac{16}{5x^3} = \frac{28}{5x^2}$

2. $\frac{9x^5}{x-3} \cdot \frac{x+3}{6x^2} = \frac{3x^3(x+3)}{2(x-3)}$

3. $\frac{2x-10}{x+4} \cdot \frac{x^2-16}{x-5} = 2(x-4)$

4. $\frac{x^2+5x+6}{8x^4} \cdot \frac{15x}{7x+21} = \frac{15(x+2)}{56x^3}$

5. $\frac{x^2+3x-10}{x^2-7x+10} \cdot \frac{x^2-25}{5x} = \frac{(x+5)^2}{5x}$

6. $\frac{x^2-8x}{10x^3} \cdot \frac{4x}{x^2-11x+24} = \frac{2}{5x(x-3)}$

7. $\frac{7}{c^2-49} \cdot \frac{c+7}{c-7} = \frac{7}{(c-7)^2}$

8. $\frac{8c^3}{3c^2+30c} \cdot \frac{c^2+7c-30}{24c} = \frac{c(c-3)}{9}$

9. $\frac{c-1}{c+5} \cdot \frac{2c^2+11c+5}{c^2-1} = \frac{2c+1}{c+1}$

10. $\frac{c^2-1c-12}{6c^3} \cdot \frac{15c}{c^2+6c+9} = \frac{5(c-4)}{2c^2(c+3)}$

11. $\frac{5c+45}{10c+45} \cdot \frac{4c^2-81}{c+9} = 2c-9$

12. $\frac{c^2-8c+16}{4} \cdot \frac{12c^2-36c}{9c^2-36c} = \frac{(c-3)(c-4)}{3}$

| | | | | | |
|---|---|---|---|---|---|
| **TH** $2(x-4)$ | **AT** $\frac{2c+1}{c+1}$ | **WE** $\frac{5(c+4)}{2c^3(c+3)}$ | **LL** $\frac{28}{5x^2}$ | **AB** $\frac{(c-4)(c-3)}{3}$ | **IG** $\frac{c^3(c+3)}{3}$ |
| **SO** $\frac{2}{5x(x-3)}$ | **HT** $\frac{(c-3)(c+8)}{4}$ | **ON** $\frac{7}{(c-7)^2}$ | **PL** $2c-9$ | **AN** $\frac{4}{5x(x-4)}$ | **TS** $\frac{(x+5)^2}{5x}$ |
| **DS** $\frac{15(x+3)}{8x^3}$ | **AT** $\frac{15(x+2)}{56x^3}$ | **ON** $\frac{5(c-4)}{2c^2(c+3)}$ | **TR** $\frac{3x^3(x+3)}{2(x-3)}$ | **EA** $\frac{2c+1}{c(c-1)}$ | **TS** $\frac{c(c-3)}{9}$ |

W e i g h t a n d s e a

# What Is Used to Keep Dolls From Escaping?

Express the quotient in simplest form, then cross out the letter pair next to your answer. For each letter pair that you DON'T cross out, write the uppercase letter in the box containing the lowercase letter.

1. $\frac{8a^2}{a+3} \div \frac{3a}{a^2-9} = \frac{8a^2}{a+3} \cdot \frac{(a+3)(a-3)}{3a} = \frac{8a(a-3)}{3}$

2. $\frac{4a-20}{9a} \div \frac{a^2-5a}{12a} = \frac{4(a-5)}{3\cdot 3a} \cdot \frac{4\cdot 3a}{a(a-5)} = \frac{16}{3a}$

3. $\frac{a^2+8a+12}{a^2-4a-12} \div \frac{6a}{a^2-36} = \frac{(a+6)(a+2)}{(a-6)(a+2)} \cdot \frac{(a+6)(a-6)}{6a} = \frac{(a+6)^2}{6a}$

4. $\frac{a^2-13a+30}{10a^2} \div \frac{7a-21}{a^7} = \frac{(a-10)(a-3)}{10a^2} \cdot \frac{a^7a^5}{7(a-3)} = \frac{a^5(a-10)}{70}$

5. $\frac{2a^2+9a+7}{2a^3+7a^2} \div \frac{a^2-1}{11a} = \frac{(2a+7)(a+1)}{a^2(2a+7)} \cdot \frac{11a}{(a-1)(a+1)} = \frac{11}{a(a-1)}$

m 14 > 7,2
a 9
$2a^2+7a+2a+7$
$a(2a+7)+1(2a+7)$

## Answers 1-5

| | | | |
|---|---|---|---|
| m • E | $\frac{a+6}{6a^2}$ | j • P | $\frac{16}{3a}$ |
| e • N | $\frac{a^5(a-10)}{70}$ | f • I | $\frac{11(a+1)}{a-1}$ |
| l • V | $\frac{8a(a-3)}{3}$ | d • R | $\frac{a^5(a+10)}{10}$ |
| c • A | $\frac{4(a-5)}{3}$ | b • H | $\frac{(a+6)^2}{6a}$ |
| a • J | $\frac{11}{a(a-1)}$ | k • I | $\frac{8a(a+3)}{9}$ |

6. $\frac{x^2+10x+25}{2x^2+10x} \div \frac{8x+40}{240x^3} = \frac{(x+5)(x+5)}{2x(x+5)} \cdot \frac{5\cdot 240x^3}{8(x+5)} = \frac{5x^2}{2}$

7. $\frac{x^2+3x-28}{4x} \div (x^2+6x-7) = \frac{(x-4)(x+7)}{4x} \cdot \frac{1}{(x-1)(x+7)} = \frac{x-4}{4x(x-1)}$

8. $\frac{18}{x^2-4} \div \frac{4x-36}{x^2-11x+18} = \frac{18}{(x-2)(x+2)} \cdot \frac{(x-9)(x-2)}{2\cdot 2(x-9)} = \frac{9}{2(x+2)}$

9. $\frac{144x^2-1}{x-1} \div \frac{60x^2-5x}{1-x} = \frac{(12x+1)(12x-1)}{x-1} \cdot \frac{-1(x-1)}{5x(12x-1)} = \frac{-1(12x+1)}{5x}$

10. $\frac{9x^2}{30x^2-45x} \div \frac{1}{4x^2-12x+9} = \frac{3\cdot 3x^2}{5\cdot 3x(2x-3)} \cdot \frac{(2x-3)(2x-3)}{1} = \frac{3x(2x-3)}{5}$

## Answers 6-10

| | | | |
|---|---|---|---|
| a • A | $\frac{12x+1}{5x}$ | g • E | $\frac{x-4}{4(x+7)}$ |
| j • W | $\frac{9x}{2(x-9)}$ | h • T | $\frac{5x^2}{2}$ |
| e • B | $\frac{12x-1}{5x^2}$ | l • R | $\frac{3(2x-3)}{10}$ |
| i • L | $\frac{x-4}{4x(x-1)}$ | c • S | $\frac{9}{2(x+2)}$ |
| b • B | $\frac{5x(x+5)}{2}$ | n • D | $\frac{3x(2x-3)}{5}$ |

| a | b | c | d | e | f | g | h | i | j | k | l | m | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | A | R | B | I | E | | | W | I | R | E | |

Day #38
9-27-11

# Multiply and Divide Rational expressions

## Background

$\frac{\cancel{8}^{1}}{\cancel{8}_{4}} \cdot \frac{\overset{7}{\cancel{14}}}{\cancel{15}_{5}} = \boxed{\frac{7}{20}}$ $\qquad \frac{3}{8} \div \frac{18}{9} = \frac{3}{8} \cdot \frac{\overset{1}{\cancel{9}}}{\underset{2}{\cancel{18}}} = \boxed{\frac{3}{16}}$

## Multiplication:

① $\frac{4x-8}{x^2-10x+16} \cdot \frac{x^2-9x+14}{4} = \frac{\cancel{4}(x-2)}{(x-8)\cancel{(x-2)}} \cdot \frac{(x-7)\cancel{(x-2)}}{\cancel{4}} = \boxed{\frac{(x-7)(x-2)}{(x-8)}}$

m 16, a −10 → (−8, −2) $\qquad$ m 14, a −9 → (−7, −2)

② $\frac{6x^2-13x-5}{2x^3-3x^2-5x} \cdot \frac{x^2-1}{5x^2} = \frac{(2x-5)(3x+1)}{x\cancel{(x+1)(2x-5)}} \cdot \frac{(x-1)\cancel{(x+1)}}{5x^2} = \boxed{\frac{(3x+1)(x-1)}{5x^3}}$

m −30, a −13 → (−15, 2)
$6x^2-15x+2x-5$
$3x(2x-5)+1(2x-5)$
$(2x-5)(3x+1)$

$x(2x^2-3x-5)$
m −10, a −3 → (2, −5)
$2x^2+2x-5x-5$
$2x(x+1)-5(x+1)$
$(x+1)(2x-5)$

③ $\frac{6x-15}{x^2-9} \cdot \frac{2x-6}{12x-30} = \frac{\overset{1}{\cancel{3}}(2x-5)}{\cancel{(x-3)}(x+3)} \cdot \frac{\overset{1}{\cancel{2}}\cancel{(x-3)}}{\underset{2}{\cancel{6}}\cancel{(2x-5)}} = \boxed{\frac{1}{x+3}}$

## Division:

① $\frac{v-1}{2v^2-16v} \div \frac{3v^3+18v^2}{v^2-2v-48} = \frac{(v-1)}{2v\cancel{(v-8)}} \cdot \frac{\cancel{(v-8)}(v+6)}{3v^2\cancel{(v+6)}} = \boxed{\frac{v-1}{6v^3}}$

m −48, a −2 → (−8, 6)

② $\frac{x^2-4}{3x^2+24x} \div \frac{x^2+6x-16}{3x^2+7x+2} = \frac{\cancel{(x+2)}\cancel{(x-2)}}{3x(x+8)} \cdot \frac{\cancel{(x+2)}(3x+1)}{(x+8)\cancel{(x-2)}}$

m −16, a 6 → (8, −2) $\qquad$ m 6, a 7 → (6, 1)

$3x^2+6x+1x+2$
$3x(x+2)+1(x+2)$
$(x+2)(3x+1)$

$= \boxed{\frac{(3x+1)(x+2)^2}{3x(x+8)^2}}$