

Multiplying and Dividing Real Numbers

 Guide Notes

MULTIPLYING REAL NUMBERS

- The product of two real numbers with the same sign is positive.

$$-a \cdot (-b) = ab$$

- The product of two real numbers with different signs is negative.

$$a \cdot (-b) = -ab$$

Sample Problem 1: Find the product.

a. $-4(6)$
 $= -24$

b. $(-21)(-3)$
 $= 63$

c. $11(-7)$
 $= -77$

Sample Problem 2: Simplify each expression.

a. $3(-4x) - 15x$
 $= -12x - 15x$
 $= -27x$

b. $3s(-8r)$
 $= -24sr$

c. $(8x)(-9y) - 12xy$
 $= -72xy - 12xy$
 $= -84xy$

Sample Problem 3: Evaluate each expression if $n = \frac{2}{5}$.

a. $n^2 \left(-\frac{5}{8}\right)$
 $= \left(\frac{2}{5}\right)^2 \left(-\frac{5}{8}\right)$
 $= \frac{4}{25} \left(-\frac{5}{8}\right)$
 $= -\frac{1}{10}$

b. $5n$
 $= 5 \left(\frac{2}{5}\right)$
 $= 2$

c. $15n + 6$
 $= 15 \left(\frac{2}{5}\right) + 6$
 $= 3(2) + 6$
 $= 6 + 6$
 $= 12$

Sample Problem 4: An average person need to drink 3 liters of water a day. How many liters of water an average person drinks in a month?

$$3(30) = 90 \text{ liters}$$

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DIVISION RULE

To divide a number a by a nonzero number b , multiply a by the reciprocal of b .

$$a \div b = a \cdot \frac{1}{b}$$

The result is the quotient of a and b .

Sample Problem 5: Find the quotient.

a. $-66 \div 11$

$$\begin{aligned} &= -\frac{66}{11} \\ &= -6 \end{aligned}$$

b. $\frac{48}{-3}$

$$= -16$$

c. $\frac{1}{3/4}$
$$\begin{aligned} &= 1 \div \frac{3}{4} \\ &= 1 \cdot \frac{4}{3} \end{aligned}$$

$$= \frac{4}{3}$$

THE SIGN OF A QUOTIENT

- The quotient of two numbers with the same sign is positive

$$-a \div (-b) = \frac{a}{b}$$

- The quotient of two numbers with opposite signs is negative.

$$a \div (-b) = -\frac{a}{b}$$

Sample Problem 6: Simplify each expression.

a. $\frac{24 - 8x}{4}$
$$\begin{aligned} &= \frac{24}{4} - \frac{8x}{4} \\ &= 6 - 2x \end{aligned}$$

b. $\frac{32x - 8}{4}$
$$\begin{aligned} &= \frac{32x}{4} - \frac{8}{4} \\ &= 8x - 2 \end{aligned}$$

c. $\frac{45 + 10x}{5}$
$$\begin{aligned} &= \frac{45}{5} + \frac{10x}{5} \\ &= 9 + 2x \end{aligned}$$

Multiplying and Dividing Real Numbers Guide Notes**Sample Problem 7:** Evaluate each expression if $a = -3$ and $b = -2$.

$$\begin{aligned} \text{a. } & \frac{2a}{a-b} \\ &= \frac{2(-3)}{-3 - (-2)} \\ &= \frac{-6}{-3 + 2} \\ &= \frac{-6}{-1} \\ &= 6 \end{aligned}$$

$$\begin{aligned} \text{b. } & \frac{4-b}{a^2} \\ &= \frac{4 - (-2)}{(-3)^2} \\ &= \frac{4 + 2}{9} \\ &= \frac{6}{9} \\ &= \frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{c. } & \frac{a}{3-b} \\ &= \frac{-3}{3 - (-2)} \\ &= \frac{-3}{3 + 2} \\ &= -\frac{3}{5} \end{aligned}$$

Sample Problem 8: Russia has a land area of **17,098,242 km²**. Russia is approximately seven times bigger than Algeria in terms of land area. What is the land area of Algeria?

$$\frac{R}{A} = 7 \quad \rightarrow \quad 7 = \frac{17\,098\,242}{A} \quad \rightarrow \quad A = \frac{17\,098\,242}{7} \quad \rightarrow \quad A = 2\,442\,606 \text{ km}^2$$