

In Your Words

Here are some of the important mathematical words of this unit.

Build your own glossary by recording definitions and examples here. The first one is done for you.

integer *the numbers ..., -3, -2,*

-1, 0, 1, 2, 3, ...

For example, 1, 2, 3, ... are positive integers and -1, -2, -3, ... are negative integers. 0 is neither positive nor negative.

quotient *the answer to a*

division question

For example, in the division equation

$\frac{(+8)}{(-2)} = -4$, -4 is the quotient.

zero pair *two opposite integers,*

such as +4 and -4, whose sum is 0

commutative property *order*

does not matter when multiplying

integers

For example, $(-2) \times (+3) = (+3) \times (-2)$

zero property *the answer when*

multiplying an integer by 0 is 0

For example, $4 \times 0 = 0 \times 4 = 0$

order of operations *the order to*

perform operations in a mathematical expression

For example, in $[3 + (-2)] + 5 \times (-4)$,

perform the addition in brackets first,

then do the multiplication, and finally do

the addition outside the brackets.

$[3 + (-2)] + 5 \times (-4) = 1 + 5 \times (-4)$

$= 1 + (-20)$

$= -19$

List other mathematical words you need to know.

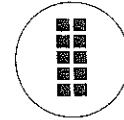
number line, opposite integers, multiplying by 1 property, distributive property, numerator, denominator

Unit Review

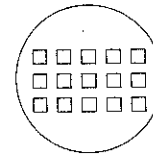
LESSON

- 2.1 1. Write each multiplication as a repeated addition. Then illustrate using coloured tiles to find each sum.

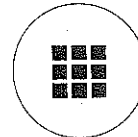
a) $(+5) \times (-2) = \underline{(-2) + (-2) + (-2) + (-2) + (-2)}$
 $= \underline{-10}$



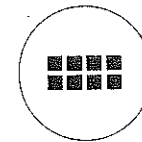
b) $(+3) \times (+5) = \underline{(+5) + (+5) + (+5)}$
 $= \underline{+15}$



c) $(+3) \times (-3) = \underline{(-3) + (-3) + (-3)}$
 $= \underline{-9}$

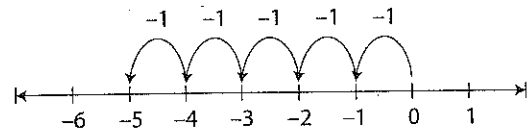


d) $(-4) \times (+2) = (+2) \times \underline{(-4)}$
 $= \underline{(-4) + (-4)}$
 $= \underline{(-8)}$

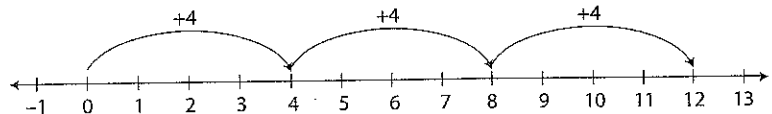


2. Use a number line. Find each product.

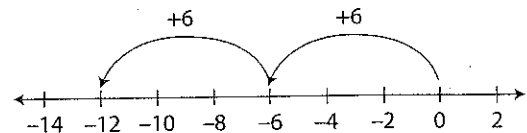
a) $(+5) \times (-1) = \underline{-5}$



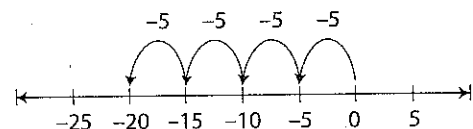
b) $(+3) \times (+4) = \underline{+12}$



c) $(-2) \times (+6) = \underline{-12}$



d) $(+4) \times (-5) = \underline{-20}$



LESSON

3. a) The temperature rose 2°C each hour for 6 h. Use integers to find the total change in temperature.

$+2$ represents a rise of 2°C .

$+6$ represents 6 h.

$(+6) \times (+2) = +12$

The temperature rose 12°C in 6 h.

- b) If the starting temperature was -4°C , what was the temperature after 6 h?

$(-4) + (+12) = +8$

The temperature after 6 h was 8°C .

4. Show how to model $(-2) \times (-5)$. Explain why you chose that model.

Models may vary.

- 2.2 5. Complete each statement using positive, negative, or zero.

a) The product of a positive integer and a negative integer is negative.

b) The product of a negative integer and zero is zero.

c) The product of two negative integers is positive.

6. Find each product.

a) $(+2)(+3) = +6$

b) $(-6)(+4) = -24$

c) $(-22)(-10) = +220$

d) $(+24)(-30) = -720$

e) $(-36)(-5) = +180$

f) $(+42)(+3) = +126$

g) $(-81)(+2) = -162$

h) $(-237)(0) = 0$

7. Fill in the blank to make each equation true.

a) $(-6) \times (+4) = -24$

b) $(-9) \times (-3) = +27$

c) $(+7) \times (-3) = (-21)$

d) $(-4) \times (-6) = +24$

e) $(+20) \times (+15) = +300$

f) $(-32) \times (+5) = -160$

LESSON

2.3 **8.** Write a related multiplication equation for each division equation.

a) $(+100) \div (-25) = -4$

$(-4) \times (-25) = +100$ or $(-25) \times (-4) = +100$

b) $(-28) \div (-7) = +4$

$(+4) \times (-7) = -28$ or $(-7) \times (+4) = -28$

c) $\frac{(-15)}{(-5)} = +3$

$(+3) \times (-5) = -15$ or $(-5) \times (+3) = -15$

d) $\frac{(+48)}{(+12)} = +4$

$(+4) \times (+12) = +48$ or $(+12) \times (+4) = +48$

9. Show how to model $(-12) \div 4$.

Models may vary.

2.4 **10.** Decide whether each quotient will be positive, negative, or zero. Then evaluate each quotient.

a) $(-25) \div (-5)$ positive, +5

c) $\frac{(+42)}{(-7)}$ negative, -6

b) $(-36) \div (+9)$ negative, -4

d) $0 \div (-5)$ zero, 0

11. Evaluate each quotient and order the results from least to greatest.

a) $(-20) \div (+4) =$ -5 b) $(-18) \div (-6) =$ +3 c) $(+48) \div (-8) =$ -6

The quotients from least to greatest are: -6, -5, +3

12. Find all of the divisors of -16. Write a division equation each time. The first one has been done for you.

Divisor	Division Equation
-1	$(-16) \div (-1) = +16$
+1	$(-16) \div (+1) = -16$
-2	$(-16) \div (-2) = +8$
+2	$(-16) \div (+2) = -8$
-4	$(-16) \div (-4) = +4$
+4	$(-16) \div (+4) = -4$
-8	$(-16) \div (-8) = +2$
+8	$(-16) \div (+8) = -2$
-16	$(-16) \div (-16) = +1$
+16	$(-16) \div (+16) = -1$

LESSON

13. Write the next 3 terms in each pattern. Then write the pattern rule.

a) $+1, -4, +16, -64, \underline{+256}, \underline{-1024}, \underline{+4096}, \dots$

Pattern rule: Start at $+1$. Multiply by -4 each time.

b) $-128, +64, -32, 16, \underline{-4}, \underline{+1}, \underline{-\frac{1}{4}}, \dots$

Pattern rule: Start at -128 . Divide by -4 each time.

c) $-3125, +625, -125, \underline{+25}, \underline{-5}, \underline{-\frac{1}{5}}, \dots$

Pattern rule: Start at -3125 . Divide by -5 each time.

2.5 14. State which operation you would do first. Do not evaluate.

a) $(+8) + (-2) \times (-3)$

multiply $(-2) \times (-3)$

b) $(-20) \div (-4) - (-2)$

divide $(-20) \div (-4)$

c) $(-2)(4 - 5)$

subtract $(4 - 5)$

d) $5 - 3 + (-4) \times (-2)$

multiply $(-4) \times (-2)$

15. Evaluate each expression in question 14. Show all your steps.

a) $(+8) + (-2) \times (-3) = (+8) + (+6)$

$= +14$

b) $(-20) \div (-4) - (-2) = (+5) - (-2)$

$= (+5) + (+2)$

$= +7$

c) $(-2)(4 - 5) = (-2)(-1)$

$= +2$

d) $5 - 3 + (-4) \times (-2) = 5 - 3 + 8$

$= 2 + 8$

$= 10$

16. Evaluate using the order of operations.

$$\begin{aligned}\text{a) } 17 - 4 \times 4 &= 17 - 16 \\ &= 1\end{aligned}$$

$$\begin{aligned}\text{b) } -48 \div 4 - 2(3 - 4) &= -48 \div 4 - 2(-1) \\ &= -12 - 2(-1) \\ &= -12 - (-2) \\ &= -12 + 2 \\ &= -10\end{aligned}$$

$$\begin{aligned}\text{c) } -2 - 4 \times 9 &= -2 - 36 \\ &= -38\end{aligned}$$

$$\begin{aligned}\text{d) } \frac{(-6)(8-2)}{-4} &= \frac{(-6)(6)}{-4} \\ &= \frac{-36}{-4} \\ &= 9\end{aligned}$$

$$\begin{aligned}\text{e) } (-3) \times (-3) + (-4) \times (-4) &= (+9) + (-4) \times (-4) \\ &= (+9) + (+16) \\ &= +25\end{aligned}$$

$$\begin{aligned}\text{f) } \frac{21 + 2(3)}{(-3) \times (-3)} &= \frac{21 + 6}{(-3) \times (-3)} \\ &= \frac{27}{(-3) \times (-3)} \\ &= \frac{27}{9} \\ &= 3\end{aligned}$$