Indicator 44 Class Notes by Mrs. Joshi

Absolute Value and Integers-(7.NS.1b/7.EE.3)

Honors Math-Red Book

1.4   Lesson

Key Ideas

Multiplying Integers with the Same Sign

Words   The product of two integers with the same sign is positive.

Numbers $2 \cdot 3 = 6$ $-2 \cdot (-3) = 6$

Multiplying Integers with Different Signs

Words   The product of two integers with different signs is negative.

Numbers $2 \cdot (-3) = -6$ $-2 \cdot 3 = -6$

EXAMPLE 1   Multiplying Integers with the Same Sign

Find $-5 \cdot (-6)$.

The integers have the same sign.

$-5 \cdot (-6) = 30$

The product is positive.

⁞ The product is 30.

EXAMPLE 2   Multiplying Integers with Different Signs

Multiply.

a. $3(-4)$ b. $-7 \cdot 4$

The integers have different signs.

$3(-4) = -12$ $-7 \cdot 4 = -28$

The product is negative.

⁞ The product is -12.   ⁞ The product is -28.

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EXAMPLE 3 — Using Exponents

a. Evaluate $(-2)^2$.

$(-2)^2 = (-2) \cdot (-2)$ Write $(-2)^2$ as repeated multiplication.

$= 4$ Multiply.

b. Evaluate -5^2.

$-5^2 = -(5 \cdot 5)$ Write 5^2 as repeated multiplication.

$= -25$ Multiply.

c. Evaluate $(-4)^3$.

$(-4)^3 = (-4) \cdot (-4) \cdot (-4)$ Write $(-4)^3$ as repeated multiplication.

$= 16 \cdot (-4)$ Multiply.

$= -64$ Multiply.

EXAMPLE 4 — Real-Life Application

Taxis in Service

Number of taxis / Year

> 50 fewer taxis
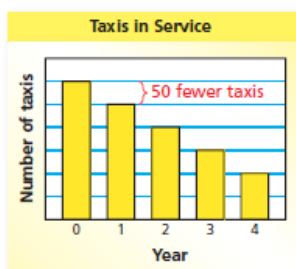
The bar graph shows the number of taxis a company has in service. The number of taxis decreases by the same amount each year for four years. Find the total change in the number of taxis.

The bar graph shows that the number of taxis in service decreases by 50 each year. Use a model to solve the problem.

Total change	=	Change per year	·	Number of years

$= -50 \cdot 4$

Use -50 for the change per year because the number *decreases* each year.

$= -200$

∴ The total change in the number of taxis is -200.

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1.5 Lesson

🔑 Key Ideas

Dividing Integers with the Same Sign

Words The quotient of two integers with the same sign is positive.

Numbers $8 \div 2 = 4$ $\qquad\qquad -8 \div (-2) = 4$

Dividing Integers with Different Signs

Words The quotient of two integers with different signs is negative.

Numbers $8 \div (-2) = -4$ $\qquad\qquad -8 \div 2 = -4$

EXAMPLE 1 — Dividing Integers with the Same Sign

Find $-18 \div (-6)$.

The integers have the same sign.

$$-18 \div (-6) = 3$$

The quotient is positive.

∴ The quotient is 3.

EXAMPLE 2 — Dividing Integers with Different Signs

Divide.

a. $75 \div (-25)$ $\qquad\qquad$ **b.** $\dfrac{-54}{6}$

The integers have different signs.

$$75 \div (-25) = -3 \qquad\qquad \frac{-54}{6} = -9$$

The quotient is negative.

∴ The quotient is -3. $\qquad\qquad$ ∴ The quotient is -9.

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EXAMPLE 3 **Evaluating Expressions**

Evaluate $10 - x^2 \div y$ when $x = 8$ and $y = -4$.

$$10 - x^2 \div y = 10 - 8^2 \div (-4) \qquad \text{Substitute 8 for } x \text{ and } -4 \text{ for } y.$$
$$= 10 - 8 \cdot 8 \div (-4) \qquad \text{Write } 8^2 \text{ as repeated multiplication.}$$
$$= 10 - 64 \div (-4) \qquad \text{Multiply 8 and 8.}$$
$$= 10 - (-16) \qquad \text{Divide 64 and } -4.$$
$$= 26 \qquad \text{Subtract.}$$

Remember
Use order of operations when evaluating an expression.

On Your Own

Now You're Ready
Exercises 28–31

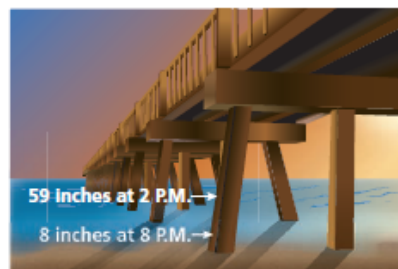Evaluate the expression when $a = -18$ and $b = -6$.

7. $a \div b$

8. $\dfrac{a + 6}{3}$

9. $\dfrac{b^2}{a} + 4$

EXAMPLE 4 **Real-Life Application**

You measure the height of the tide using support beams of a pier. Your measurements are shown in the picture. What is the mean hourly change in the height?

59 inches at 2 P.M.→
8 inches at 8 P.M.→

Use a model to solve the problem.

$$\text{Mean hourly change} = \frac{\text{Final height} - \text{Initial height}}{\text{Elapsed Time}}$$

$$= \frac{8 - 59}{6} \qquad \text{Substitute. The elapsed time from 2 P.M. to 8 P.M. is 6 hours.}$$

$$= \frac{-51}{6} \qquad \text{Subtract.}$$

$$= -8.5 \qquad \text{Divide.}$$

The mean change in the height of the tide is -8.5 inches per hour.