

### Algebra 2-5: Products and Powers with Negative Numbers

#### Warm-Up

Show your work.

1. There are 10 soda machines in this school. There are 20 ounces of soda in each bottle. Each soda machine can hold 500 bottles when full. If the machines are full, how many ounces of soda will there be in school? 100,000 ounces

$$10 \cancel{\text{ soda machines}} \times \frac{500 \cancel{\text{ bottles}}}{1 \cancel{\text{ machine}}} \times \frac{20 \text{ ounces}}{1 \cancel{\text{ bottles}}} = 100,000$$

2. Let's say we have  $x$  soda machines in school instead of 10. How many ounces of soda will there be in school in terms of  $x$ ? Use the same information from number 1. 10,000X ounces

$$x \cancel{\text{ machines}} \times \frac{500 \cancel{\text{ bottles}}}{1 \cancel{\text{ machine}}} \times \frac{20 \text{ ounces}}{1 \cancel{\text{ bottle}}} =$$

3. The label on a frozen turkey says "Roast thawed turkey at 325 degrees for 20-minutes per pound." How many hours will it take to roast a 22-pound turkey?

7.3 hours

$$\frac{22 \cancel{\text{ lbs}}}{1} \times \frac{20 \cancel{\text{ min}}}{1 \cancel{\text{ lbs}}} \times \frac{1 \text{ hours}}{60 \cancel{\text{ min}}} = \frac{440}{60} = 7.3$$

Vocabulary	Definition	Example
Multiplication Property of -1	$\# \cdot -1 = -\#$	$5 \cdot -1 = -5$
Multiplying #'s with the Same Sign	$\text{positive} \cdot \text{positive} = (+)$ $\text{negative} \cdot \text{negative} = (+)$	$3 \cdot 4 = 12$ $-3 \cdot -4 = 12$
Multiplying #'s with the Opposite Sign	$\text{positive} \cdot \text{negative} = (-)$ $\text{negative} \cdot \text{positive} = (-)$	$5 \cdot -3 = -15$ $-3 \cdot 5 = -15$
Multiplying negative #'s with an EVEN exponent	$(-x)^{\text{even}} = \text{positive}$	$(-3)^4 = 81$
Multiplying negative #'s with an ODD Exponent	$(-x)^{\text{odd}} = \text{negative}$	$(-3)^5 = -243$

$(-2)^5 = +2 \cdot +2 \cdot +2 \cdot +2 \cdot -2 = -32$

## Example Problems

Multiply.

$$1. \frac{-2}{5} \cdot \frac{20}{3} = + \frac{8}{3}$$

$$\text{or } \frac{-40}{-15} = \frac{8}{3}$$

$$2. 3a(+5)(+2a) = 30a^2$$

$$a \cdot a = a^2$$

$$3. \frac{3}{1} \cdot \frac{+4}{-1} \cdot \frac{-2}{+1} = 6$$

Tell if the answer is going to be positive or negative.

4.  $(-3)^4$  positive

5.  $(-3)^9$  negative

6.  $(-7)^{14}$  positive

"Look at the power"

wkst 2.5

$$① \frac{2.5 \text{ cm}}{\text{day}} \cdot \frac{14 \text{ days}}{1}$$

$$\underline{35 \text{ cm}}$$

$$② -\frac{4}{5} \cdot -\frac{5}{4} = \frac{20}{20} = 1$$