

Key

NAME

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132

Unit 6, Lesson 14: Evaluating Expressions with Exponents

1. Lin says, "I took the number 8, and then multiplied it by the square of 3." Select **all** expressions that equal Lin's answer.

$8 \cdot 3^2$

P
E
M
D
A
S

- A. $8 \cdot 3^2$ **Yes**
- B. $(8 \cdot 3)^2$ **NO** \rightarrow This would be 24^2
- C. $8 \cdot 2^3$ **NO** $3^2 \cdot 3 \cdot 3 \neq 2 \cdot 2 \cdot 2$
- D. $3^2 \cdot 8$ **Yes**
- E. 24^2 **NO**
- F. 72 **Yes** $8 \cdot 3^2 = 72$

2. Evaluate each expression.

a. $7 + 2^3$ $2 \cdot 2 \cdot 2 = 8$
 $7 + 8 = 15$

d. $2 \cdot 6^2$ $6 \cdot 6 = 36$
 $2 \cdot 36 = 72$

f. $\frac{1}{3} \cdot 3^3$ $3 \cdot 3 \cdot 3 = 27$
 $\frac{1}{3} \cdot \frac{27}{1} = \frac{27}{3} = 9$

b. $9 \cdot 3^1 = 27$

c. $20 - 2^4$ $2 \cdot 2 \cdot 2 \cdot 2 = 16$
 $20 - 16 = 4$

e. $8 \cdot (\frac{1}{2})^2$ $\frac{8}{1} \cdot \frac{1}{4} = \frac{8}{4} = 2$
 $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

g. $(\frac{1}{5} \cdot 5)^5$ $\frac{1}{5} \cdot \frac{5}{1} = 1$
 $(1)^5 = 1$

3. Andre says, "I multiplied 4 by 5, then cubed the result." Select **all** expressions that equal Andre's answer.

\Rightarrow 3rd power

- A. $4 \cdot 5^3$ **NO**
- B. $(4 \cdot 5)^3$ **Yes**
- C. $(4 \cdot 5)^2$ **NO**
- D. $5^3 \cdot 4$ **NO**
- E. 20^3 **Yes**
- F. 500 **NO**
- G. $8,000$ **Yes**

$(4 \cdot 5)^3$
 \downarrow
 20^3
 $\Rightarrow 20 \cdot 20 \cdot 20 =$
 $400 \cdot 20 =$
 8000

4. Han has 10 cubes, each 5 inches on a side.



- a. Find the total volume of Han's cubes. Express your answer as an expression using an exponent.
Vol of one is $5 \cdot 5 \cdot 5$ or 5^3 $125 \cdot 10 = 1250 \text{ in}^3$
- b. Find the total surface area of Han's cubes. Express your answer as an expression using an exponent.
One surface = 5^2 One cube = $6(5^2) = 150 \text{ in}^2$

50 10 cubes
is $10 \cdot 150 \text{ in}^2$
 1500 in^2

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exponent.

5. Priya says that $\frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3} = \frac{4}{3}$. Do you agree with Priya? Explain or show your reasoning.

No,

she added and should have multiplied

(from Unit 6, Lesson 13)

$$\frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3} \cdot \frac{1}{3} = \frac{1}{81}$$

6. Answer each question. Show your reasoning.

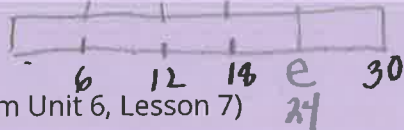
a. 125% of e is 30. What is e ?

b. 35% of f is 14. What is f ?

$$1.25e = 30$$

opposite of multiply is divide

0 25% 50% 75% 100% 125%



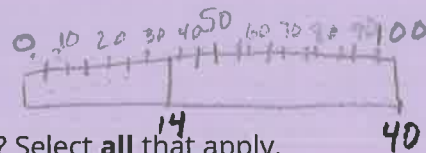
(from Unit 6, Lesson 7)

$$\frac{30}{1.25} = 24$$

$$.35f = 14$$

$$\frac{14}{.35} = 40$$

each 5% is 2



7. Which expressions are solutions to the equation $2.4y = 13.75$? Select **all** that apply.

- A. $13.75 - 1.4$ No
- B. $13.75 \cdot 2.4$ NO
- C. $13.75 \div 2.4$
- D. $\frac{13.75}{2.4}$
- E. $2.4 \div 13.75$ Backwards

opposite multiply is divide

$$y = \frac{13.75}{2.4}$$

(from Unit 6, Lesson 5)

8. Jada explains how she finds $15 \cdot 23$:

$$\begin{array}{r} 23 \cdot 10 = 230 \\ + 2(5) \cdot 23 = 115 \\ \hline 345 \end{array}$$

"I know that ten 23s is 230, so five 23s will be half of 230, which is 115. 15 is 10 plus 5, so $15 \cdot 23$ is 230 plus 115, which is 345."

a. Do you agree with Jada? Explain.

Yes

b. Draw a 15 by 23 rectangle. Partition the rectangle into two rectangles and label them to show Jada's reasoning.

