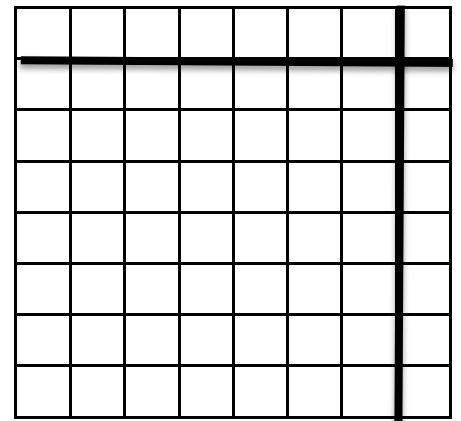


1. a. What is  $(-2)^2$ ?
- b. The expression  $-2^2$  is the negation of the square of 2. What is  $-2^2$ ?

2. a. Explain why  $(8 \cdot 125)^2 = 8^2 \cdot 125^2$ .
- b. How does part a help us compute  $8^2 \cdot 125^2$  quickly?

3. a. What is the value of  $(5+6)^2$ ?
- b. What is the value of  $5^2 + 6^2$ ?
- c. Is  $(5+6)^2 = 5^2 + 6^2$ ?

4. a. Using the picture, explain why  $8^2 = 7^2 + 2(7) + 1$



- b. Explain why  $901^2 = 900^2 + 2(900) + 1$

- c. What is  $901^2$ ?

5. a. Evaluate  $(-4)^3$

- b. For how many integers  $n$  is  $n^3$  between -50 and 50?

6. Let  $a$  be any number.

a. Explain why  $(-a)^4 = a^4$ .

b. Explain why  $(-a)^5 = -a^5$ .

7. Evaluate  $(-1)^{(5^2)} + 1^{(2^5)}$

8. Express each expression as a power of 2.

a.  $(2^7 \cdot 2^8) \div 2^3$

b.  $(2^6)^4 \div 2^7$

c.  $4^6 \div 8^2$

9. a. Which of the numbers  $11^{20,000}$ ,  $5^{30,000}$  and  $2^{70,000}$  is the greatest?

b. Express  $11^{20,000}$  as a  $10,000^{\text{th}}$  power

c. Express  $5^{30,000}$  as a  $10,000^{\text{th}}$  power.

d. Express  $2^{70,000}$  as a  $10,000^{\text{th}}$  power.

10. Let  $a$  be any number. Simplify  $4a^0(4a)^0$ .

11. Let  $P = (2-3-4+7)^{2347}$  and  $Q = (-2+3+4-7)^{2347}$ . What is the value of  $(2+3+4+7)^{P+Q}$ ?

12. Consider the exponent facts below:

$$3^3 = 27$$

$$3^2 = 9$$

$$3^1 = 3$$

$$3^0 = 1$$

$$3^{-1} = \underline{\quad}$$

$$3^{-2} = \underline{\quad}$$

$$3^{-3} = \underline{\quad}$$

- What patterns do you see in the number on the right?
- Assuming that your pattern continues, predict the values of the missing numbers.
- What is the connection between  $3^3$  and  $3^{-3}$ ?

13. Evaluate  $3^3 \div 3^5$ .

14. Evaluate.

a.  $1^{-5}$

b.  $2^{-3}$

c.  $56 \div 2^{-3}$

d.  $10^{-4}$

15. Evaluate.

a.  $\frac{1}{2^{-3}}$

b.  $\frac{1}{5^{-2}}$

c. How are  $\frac{1}{a^{-n}}$  and  $a^n$  related?

16. Evaluate.

a.  $\left(\frac{1}{2}\right)^{-1}$

b.  $\left(\frac{1}{2}\right)^{-2}$

c.  $\left(\frac{1}{2}\right)^{-3}$

17. Express each expression as a power of 2. Order the expressions from least to greatest.

$$4^{16}, (-2)^{34}, 16^8, \left(\frac{1}{8}\right)^{-11}, (2^{-4})^{-8}$$