

MATH 9 ASSIGNMENT 12

1. Powers Notes handout

Include an explanation
and numerical examples
for a Power.

2. Complete textbook
questions :

p 55-56 #

7,8,9,12,13abde,14a to g

Powers & Exponent Laws Notes

What is a Power?

Zero Exponent: Example: _____

Product of Powers: Example: _____

Quotient of Powers: Example: _____

Power of a Power: Example: _____

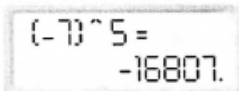
Power of a Product: Example: _____

Power of a Quotient: Example: _____

We may write the product of integer factors without the multiplication sign.

In *Example 3a*, we may write $(-3) \times (-3) \times (-3) \times (-3)$ as $(-3)(-3)(-3)(-3)$.

A calculator can be used to evaluate a power such as $(-7)^5$ in standard form.



Discuss

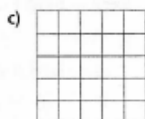
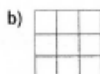
Use the ideas

1. Can every integer, other than 0, be written as a power? Explain.
2. Why is -3^4 negative but $(-3)^4$ positive? Give another example like this.
3. Two students compared the calculator key sequences they used to evaluate a power. Why might the sequences be different?

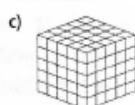
Practice

Check

4. Write the number of unit squares in each large square as a power.



5. Write the number of unit cubes in each large cube as a power.



6. Use grid paper. Draw a picture to represent each square number.

- a) 4^2 b) 6×6 c) 49
 d) 10^2 e) 81 f) 12×12

7. Write the base of each power.

- a) 2^7 b) 4^3
 c) 8^2 d) $(-10)^5$
 e) $(-6)^7$ f) -8^3

8. Write the exponent of each power.

- a) 2^5 b) 6^4
 c) 9^1 d) -3^2
 e) $(-2)^9$ f) $(-8)^3$

9. Write each power as repeated multiplication.

- a) 3^2 b) 10^4
 c) 8^5 d) $(-6)^5$
 e) -6^5 f) -4^2

10. a) Explain how to build models to show the difference between 3^2 and 2^3 .

b) Why is one number called a square number and the other number called a cube number?

11. Use repeated multiplication to show why 6^4 is not the same as 4^6 .
12. Write as a power.
- $4 \times 4 \times 4 \times 4$
 - $2 \times 2 \times 2$
 - $5 \times 5 \times 5 \times 5 \times 5 \times 5$
 - $10 \times 10 \times 10$
 - $(-79)(-79)$
 - $-(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)(-2)$

Apply

13. Write each product as a power, then evaluate.
- 5×5
 - $3 \times 3 \times 3 \times 3$
 - $10 \times 10 \times 10 \times 10 \times 10$
 - $-(9 \times 9 \times 9)$
 - $(-2)(-2)(-2)$
 - $-(-4)(-4)(-4)$
 - $(-5)(-5)(-5)(-5)$
 - $-(5)(5)(5)(5)$
 - $-(-5)(-5)(-5)(-5)$
14. Predict whether each answer is positive or negative, then evaluate.
- 2^3
 - 10^6
 - 3^1
 - -7^3
 - $(-7)^3$
 - $(-2)^8$
 - -2^8
 - -6^4
 - $(-6)^4$
 - $-(-6)^4$
 - $(-5)^3$
 - -4^4
15. Canada Post often creates special postage stamps to celebrate important events and honour famous people.



- a) Captain George Vancouver was a Dutch explorer who named almost 400 Canadian places. To commemorate his 250th birthday in 2007, Canada Post created a \$1.55 stamp.
- How many stamps are in a 3 by 3 block? Write the number of stamps as a power.
 - What is the value of these stamps?
- b) In July 2007, Canada hosted the FIFA U-20 World Cup Soccer Championships. Canada Post issued a 52¢ stamp to honour all the players and fans.
- How many stamps are in a 4 by 4 block? Write the number of stamps as a power.
 - What is the value of these stamps?

16. Evaluate.

- | | |
|-------------|-----------------|
| a) 3^{12} | b) -7^7 |
| c) 5^{11} | d) $-(-4)^{10}$ |
| e) $(-9)^8$ | f) 2^{23} |

17. Assessment Focus

- a) Write as repeated multiplication and in standard form.
- 4^3
 - -4^3
 - $-(-4^3)$
 - (-4^3)
- b) Which products in part a are positive? Why? Which products are negative? Why?
- c) Write as repeated multiplication and in standard form.
- 4^2
 - -4^2
 - $-(-4^2)$
 - (-4^2)
- d) Which products in part c are positive? Why? Which products are negative? Why?
- e) Write other sets of powers like those in parts a and c. Explain how you know if each product is positive or negative before you write the power in standard form.