Math 10

Lesson 1-8 Applying Exponent Rules

# Exponent laws

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| --- | --- |
| Exponent Law | Rule |
| Product of Powers |  |
| Quotient of Powers |  |
| Power of a Power |  |
| Power of a Product |  |
| Power of a Quotient |  |
| Zero Exponent |  |
| Negative Exponent |  |
| Fractional Exponent |  |

We will now use these laws and rules to simplify some expressions.

**Example 1** Simplify the following expressions. Write all answers as positive exponents.

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We can apply the exponent laws in any order. The following are only one solution among many possible ways of solving the problem.

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**Question 1**

Simplify the following expressions. Write all answers as positive exponents.

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**Example 2** Simplify the following expressions. Write all answers as positive exponents.

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The following are only one solution among many possible ways of solving the problem.

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**Example 3** The area of a circle *A* with radius *r* is given by . If the area of a particular circle is 10 square centimetres, what is the radius of the circle?

**Solution**:



The radius of the circle is 1.8 cm.

**Question 2**

Simplify the following expressions. Write all answers as positive exponents.

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**Question 3**

The volume V of a sphere with radius *r* is given by the formula:



If V = 425, solve for *r*.

# Assignment

1. Simplify.

a) b) 

c)  d) 

2. Write as a single power.

a)  b) 

c)  d) 

3. Simplify.

a)  b) 

c) *n*6 ÷ *n*5 d) 

4. Simplify.

a) (*n*2)3 b) (*z*2)-3

c) (*n-*4)-3 d) (*c* -2)2

5. Write as a single power.

a)  b) 

c)  d) 

6. Simplify.

a)  b) 

c)  d) 

e)  f) 

g)  h) 

7. Simplify. State the exponent law you used.

a)  b) 

c)  d) 

e)  f) 

g) h) 

8. Evaluate.

a)  b) 

c)  d) 

e)  f) 

g)  h) 

9. Simplify. Explain your reasoning.

a)  b) 

c)  d) 

10. A cone with equal height and radius has volume 1234 cm3. What is the height of the cone to the nearest tenth of a centimetre?

11. A sphere has volume 375 cubic feet. What is the surface area of the sphere to the nearest square foot?

12. Simplify. Which exponent laws did you use?

a)  b) 

13. Evaluate each expression for *a =−* 2 and *b* = 1.

a)  b) 

c)  d) 

14. Simplify.

a)  b) 

c)  d) 

15. Identify any errors in each solution for simplifying an expression. Write a correct solution.

 a) b) 

16. Identify the errors in each simplification. Write the correct solution.

a) b)

  

17. Simplify. Show your work.

a)  b) 

18. If *x* =*a*−2 and , write each expression in terms of *a*.

a)  b) 

19. Write 3 different expressions for each result.

a) is the product of two powers with rational exponents.

b) is the quotient of two powers with rational exponents.

c) is the result of raising a power with a rational exponent to a rational exponent.