

Unit 4 Lesson 16: Equivalent Exponential Expressions

1 Up or Down? (Warm up)

Student Task Statement

Find the values of 3^x and $(\frac{1}{3})^x$ for different values of x . What patterns do you notice?

| x | 3^x | $(\frac{1}{3})^x$ |
|-----|-------|-------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |

2 What's the Value?

Student Task Statement

Evaluate each expression for the given value of x .

1. $3x^2$ when x is 10

2. $3x^2$ when x is $\frac{1}{9}$

3. $\frac{x^3}{4}$ when x is 4

4. $\frac{x^3}{4}$ when x is $\frac{1}{2}$

5. $9 + x^7$ when x is 1

6. $9 + x^7$ when x is $\frac{1}{2}$

3 Exponent Experimentation

Student Task Statement

Find a solution to each equation in the list. (Numbers in the list may be a solution to more than one equation, and not all numbers in the list will be used.)

1. $64 = x^2$

2. $64 = x^3$

3. $2^x = 32$

4. $x = \left(\frac{2}{5}\right)^3$

5. $\frac{16}{9} = x^2$

6. $2 \cdot 2^5 = 2^x$

7. $2x = 2^4$

8. $4^3 = 8^x$

List:

$\frac{8}{125}$ $\frac{6}{15}$ $\frac{5}{8}$ $\frac{8}{9}$ 1 $\frac{4}{3}$ 2 3 4 5 6 8