



# Algebra 1

## Topic: Exponential Functions

### Instructions

Solve the following problems using the properties of exponential functions. Show all your work and check your solutions.

### Practice Problems

1. Determine whether the equation represents an exponential function. Explain.

- |                    |                      |
|--------------------|----------------------|
| (i) $y = 3(5)^x$   | (v) $y = 10(0.5)^x$  |
| (ii) $y = -7x$     | (vi) $y = 9x^2$      |
| (iii) $y = 2^{4x}$ | (vii) $y = 4^x + 3$  |
| (iv) $y = 6x + 10$ | (viii) $y = -2(3)^x$ |

2. Determine whether the table represents a linear or an exponential function. Explain.

|     |    |   |    |    |
|-----|----|---|----|----|
| $x$ | -2 | 0 | 2  | 4  |
| $y$ | 3  | 9 | 27 | 81 |

Table 1:

|     |    |   |    |     |     |
|-----|----|---|----|-----|-----|
| $x$ | -3 | 0 | 3  | 6   | 9   |
| $y$ | 10 | 1 | -8 | -17 | -26 |

Table 3:

|     |    |   |   |   |
|-----|----|---|---|---|
| $x$ | 1  | 2 | 3 | 4 |
| $y$ | -2 | 0 | 2 | 4 |

Table 2:

|     |   |    |    |    |
|-----|---|----|----|----|
| $x$ | 1 | 2  | 3  | 4  |
| $y$ | 6 | 12 | 24 | 48 |

Table 4:

3. Evaluate the function for the given value of  $x$ .

- |                               |                              |
|-------------------------------|------------------------------|
| (i) $y = 2(3)^x; x = 3$       | (v) $y = 7(1.2)^x; x = -1$   |
| (ii) $y = 5(0.8)^x; x = 2$    | (vi) $y = -4(3)^x; x = 2$    |
| (iii) $f(x) = 3(4)^x; x = 1$  | (vii) $f(x) = 3(2)^x; x = 4$ |
| (iv) $f(x) = 2(2.5)^x; x = 0$ | (viii) $y = 2(5)^x; x = 0$   |

4. Graph the following function. Compare the graph to the graph of the parent function. Describe the domain and range.

- |                                            |                                  |
|--------------------------------------------|----------------------------------|
| (i) $f(x) = 3(0.5)^x$                      | (iv) $f(x) = \frac{1}{8}(3)^x$   |
| (ii) $f(x) = -2(7)^x$                      |                                  |
| (iii) $f(x) = 6\left(\frac{1}{3}\right)^x$ | (v) $f(x) = \frac{3}{2}(0.25)^x$ |

5. Graph the following function. Describe the domain and range.

- |                        |                        |
|------------------------|------------------------|
| (i) $f(x) = 3^x - 1$   | (iv) $f(x) = 2^x - 5$  |
| (ii) $f(x) = 4^x + 3$  | (v) $f(x) = 3(2)^x$    |
| (iii) $f(x) = 5^x + 2$ | (vi) $f(x) = 0.5(5)^x$ |

## Multiple-Choice Questions

1. The value of  $3^3$  is:

- |       |       |
|-------|-------|
| A. 27 | C. 10 |
| B. 30 | D. 9  |

2. The value of  $2^{-3}$  is:

- |                  |                   |
|------------------|-------------------|
| A. $\frac{1}{8}$ | C. $\frac{1}{16}$ |
| B. 8             | D. 16             |

3. The value of  $5^0$  is:

- |      |              |
|------|--------------|
| A. 1 | C. 0         |
| B. 5 | D. Undefined |

4. Which of the following is the solution to  $3^x = 81$ ?

- |            |            |
|------------|------------|
| A. $x = 4$ | C. $x = 5$ |
| B. $x = 2$ | D. $x = 3$ |