

**Unit 7 - Exponents and Exponential Functions Review Guide**

Simplify the following expressions.

$$x^0 = 1$$

1.  $3x^0$

$$x^{-m} = \frac{1}{x^m}$$

2.  $3x^{-1}$

3.  $2x + (5y)^0$

4.  $(4xy)^{-1}$

5.  $2(3zy^2x^0)$

6.  $2ab^{-1}c$

$$x^m \cdot x^n = x^{m+n}$$

7.  $a^2 \cdot a^3$

$$(x^m)^n$$

8.  $(a^2)^3$

9.  $2x^2y \cdot 3x$

10.  $(3^2)^{-1}$

11.  $4a^3 \cdot 2a^{-1}$

12.  $(x^2)^3 \cdot x^4$

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$$(ab)^m = a^m b^n$$

13.  $(3a^2)^3$

$$\frac{x^m}{x^n} = x^{m-n}, 1, \frac{1}{x^{n-m}}$$

14.  $\frac{a^5}{a^3}$

15.  $(2st^3)^5$

16.  $\frac{4x^5y}{2y^3}$

17.  $(3ab^2)^2 \cdot (ab)$

18.  $\frac{20xy}{5x^2y}$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

19.  $\left(\frac{2x}{y}\right)^2$

$$x^{1/2} = \sqrt{x}$$

20.  $8^{\frac{1}{2}}$

21.  $\left(\frac{2a^2}{b}\right)^3 \cdot (2ab^2)$

22.  $\sqrt[3]{3}$

23.  $\left(\frac{x}{2}\right)^3 \cdot \left(\frac{4}{x}\right)^2$

24.  $(3x)^{\frac{2}{5}}$

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$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

25.  $\sqrt{20}$

26.  $\sqrt{\frac{5x^5}{4}}$

27.  $\sqrt{24x^3}$

28.  $\sqrt{\frac{2x^3}{4x^6}}$

$$\sqrt[m]{\sqrt[n]{x}} = \sqrt[mn]{x} = \sqrt[n]{\sqrt[m]{x}}$$

29.  $\sqrt[6]{x^2}$

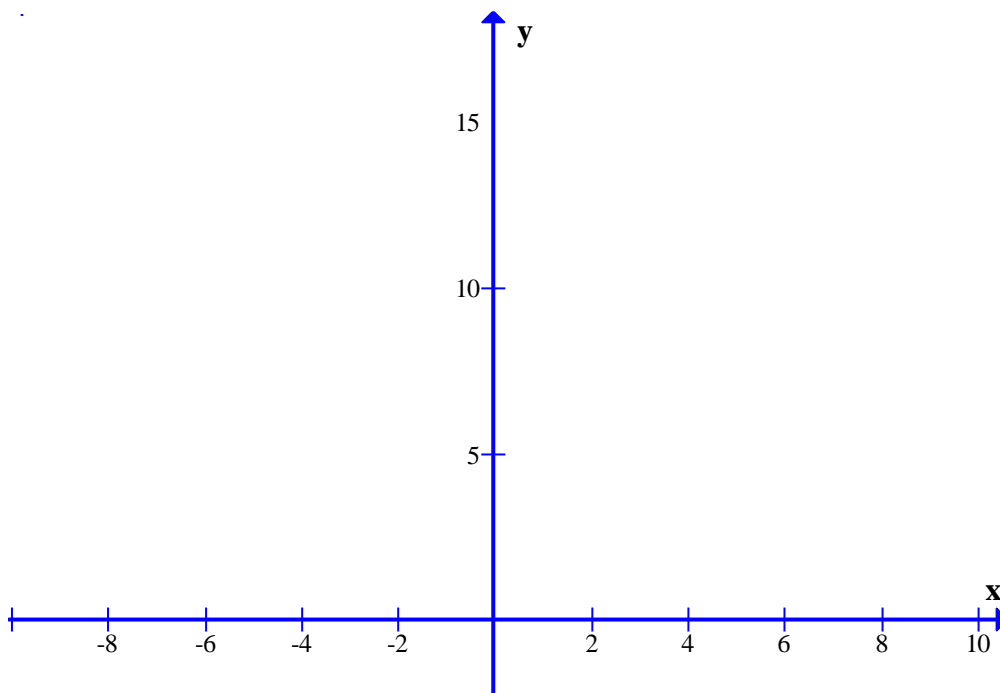
30.  $\sqrt{\sqrt{b}}$

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31. Find  $F(x)$  given the value of  $x$  for the function  $y = 2^{x+3}$ .

<b>x</b>	<b>-1</b>	<b>0</b>	<b>1</b>
<b>y</b>			

32. Draw the graph of  $y = 2^{x+3}$ .

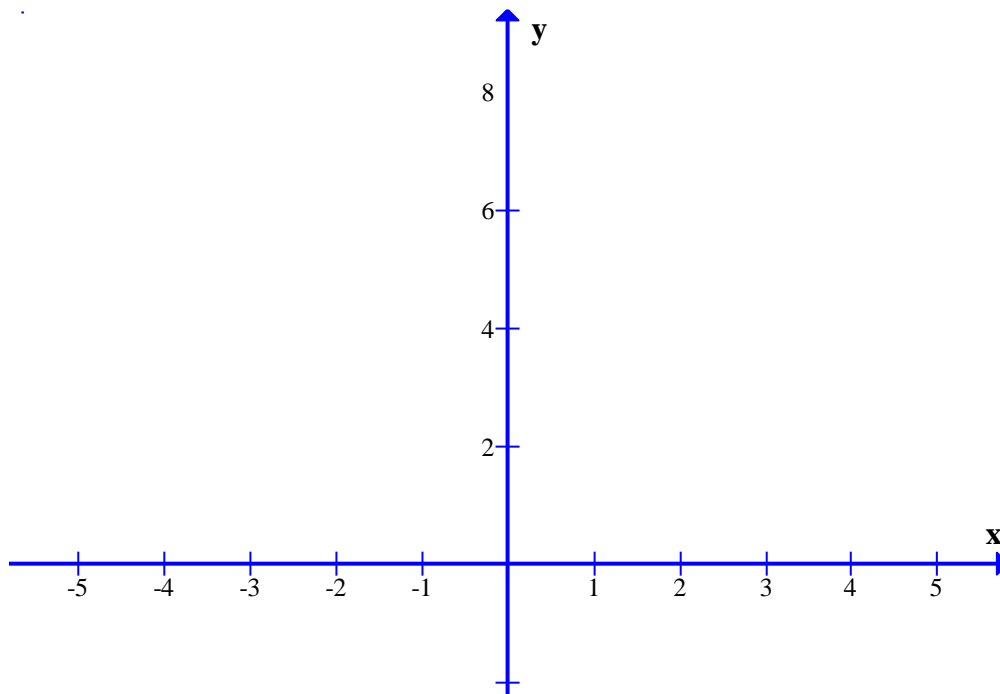


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33. Find  $F(x)$  given the value of  $x$  for the function  $y = \left(\frac{1}{3}\right)^x$ .

<b>x</b>	<b>-1</b>	<b>0</b>	<b>1</b>
<b>y</b>			

34. Draw the graph of  $y = \left(\frac{1}{3}\right)^x$ .



Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Unit 7 - Exponents and Exponential Functions Review Guide

**35.** A certain type of bacteria doubles their number every hour. If there are 100 bacteria from the start, how many bacteria are there after 7 hours?

**36.** A 53 inches flat screen T.V. cost \$3000 depreciate its price by 3% every 6 months. How much will the price of the T.V. after 2 years?

**37.** \$10000 is invested in a bank with 12% interest for 6 years compounded quarterly. What will be the final amount of the money at the end of 6 years?

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Unit 7 - Exponents and Exponential Functions Review Guide

38. Find the 10th term of a geometric sequence with the first element of 5 and a common ratio of 2.

39. Find the sum of the first 6 terms of a sequence with the first element of 6 and a common ratio of  $3/2$ .

40. Suppose you have the following: 2\$ in the first day, 4\$ in the second day, 8\$ in the third day, etc. each day saving double of what you save the preceding day. How many dollar you would have for 15 days?

## Unit 7 - Exponents and Exponential Functions Review Guide

### ANSWER

Simplify the following expressions.

$$x^0 = 1$$

1.  $3x^0 = 3$

3.  $2x + (5y)^0 = 2x + 1$

5.  $2(3zy^2x^0) = 6zy^2$

$$x^m \cdot x^n = x^{m+n}$$

7.  $a^2 \cdot a^3 = a^5$

9.  $2x^2y \cdot 3x = 6x^3y$

11.  $4a^3 \cdot 2a^{-1} = 8a^2$

$$(ab)^m = a^m b^m$$

13.  $(3a^2)^3 = 27a^6$

15.  $(2st^3)^5 = 32s^5t^{15}$

17.  $(3ab^2)^2 \cdot (ab) = 9a^3b^5$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

19.  $\left(\frac{2x}{y}\right)^2 = \frac{4x^2}{y^2}$

21.  $\left(\frac{2a^2}{b}\right)^3 \cdot (2ab^2) = \frac{16a^7}{b}$

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

$$\sqrt{ab} = \sqrt{a}\sqrt{b}$$

25.  $\sqrt{20}$   
 $= \sqrt{4}\sqrt{5} = 2\sqrt{5}$

27.  $\sqrt{24x^3}$   
 $= \sqrt{4}\sqrt{6}\sqrt{x^2 \cdot x} = 2x\sqrt{6x}$

$${}^m\sqrt{{}^n\sqrt{x}} = {}^{mn}\sqrt{x} = {}^n\sqrt{{}^m\sqrt{x}}$$

29.  $\sqrt[6]{x^2} = \sqrt[3]{\sqrt{x^2}} = \sqrt[3]{x}$

$$x^{-m} = \frac{1}{x^m}$$

2.  $3x^{-1} = \frac{3}{x}$

4.  $(4xy)^{-1} = \frac{1}{4xy}$

6.  $2ab^{-1}c = \frac{2ac}{b}$

$$(x^m)^n$$

8.  $(a^2)^3 = a^6$

10.  $(3^2)^{-1} = \frac{1}{9}$

12.  $(x^2)^3 \cdot x^4 = x^{10}$

$$\frac{x^m}{x^n} = x^{m-n}, 1, \frac{1}{x^{n-m}}$$

14.  $\frac{a^5}{a^3} = a^2$

16.  $\frac{4x^5y}{2y^3} = \frac{2x^5}{y^2}$

18.  $\frac{20xy}{5x^2y} = \frac{4}{x}$

$$x^{1/2} = \sqrt{x}$$

20.  $8^{1/2} = \sqrt{8}$

22.  $\sqrt[3]{3} = 3^{1/3}$

24.  $(3x)^{2/5} = \sqrt[5]{(3x)^2}$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

26.  $\sqrt{\frac{5x^5}{4}} = \frac{x^2\sqrt{5x}}{2}$

28.  $\sqrt{\frac{2x^3}{4x^6}} = \frac{x\sqrt{2x}}{2x^3}$

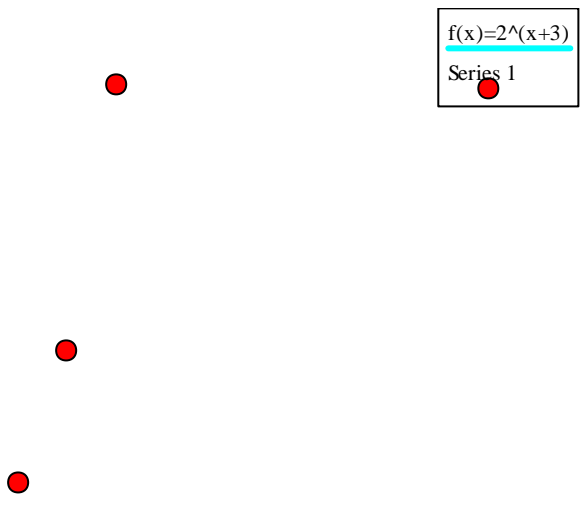
30.  $\sqrt{\sqrt{b}} = \sqrt[4]{b}$

## Unit 7 - Exponents and Exponential Functions Review Guide

31. Find F(x) given the value of x for the function  $y = 2^{x+3}$ .

<b>x</b>	<b>-1</b>	<b>0</b>	<b>1</b>
<b>y</b>	4	8	16

32. Draw the graph of  $y = 2^{x+3}$ .

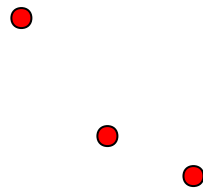
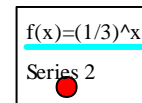


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33. Find  $F(x)$  given the value of  $x$  for the function  $y = \left(\frac{1}{3}\right)^x$ .

<b>x</b>	<b>-1</b>	<b>0</b>	<b>1</b>
<b>y</b>	3	1	1/3

34. Draw the graph of  $y = \left(\frac{1}{3}\right)^x$ .



35. A certain type of bacteria doubles their number every hour. If there are 100 bacteria from the start, how many bacteria are there after 7 hours?

Solution:

$$N_t = N_0(2)^t$$

Given:

$$N_0 = 100$$

$$t = 7$$

$$N_7 = 100(2)^7 = \mathbf{12800 \text{ bacteria}}$$

**Unit 7 - Exponents and Exponential Functions Review Guide**

36. A 53 inches flat screen T.V. cost \$3000 depreciate its price by 3% every 6 months. How much will the price of the T.V. be after 2 years?

Solution:

$$N_t = N_0(1 - 0.03)^t$$

Given:

$$N_0 = 3000$$

$$t = 2(2) = 4$$

$$N_4 = 3000(1 - 0.03)^4 = \$2655.88$$

37. \$10000 is invested in a bank with 12% interest for 6 years compounded quarterly. What will be the final amount of the money at the end of 6 years?

Solution:

$$N_t = N_0(1 + r)^t$$

Given:

$$N_0 = 10000$$

$$t = 6(4) = 24$$

$$r = 0.12/4 = 0.03$$

$$N_t = 10000(1 + 0.03)^{24} = \$20327.94$$

38. Find the 10th term of a geometric sequence with the first element of 5 and a common ratio of 2.

Solution:

$$a_n = ar^{n-1}$$

$$a_{10} = 5(2)^{10-1} = 2560$$

39. Find the sum of the first 6 terms of a sequence with the first element of 6 and a common ratio of 3/2.

Solution:

$$S = \frac{a(1 - r^n)}{1 - r}$$

$$S = \frac{6(1 - (1.5)^6)}{1 - 1.5} = \frac{62.34}{0.5} = 124.6875$$

40. Suppose you have the following: 2\$ in the first day, 4\$ in the second day, 8\$ in the third day, etc. each day saving double of what you save the preceding day. How many dollar you would have for 15 days?

Solution:

$$a = 2, r = 2, n = 15$$

$$S = \frac{a(1 - r^n)}{1 - r}$$

$$S = \frac{2(1 - 2^{15})}{1 - 2} = \$65534$$