

Bell Ringer

Section 5.5

1. Solve $4^x = \frac{1}{64}$.
 $\frac{1}{4^3} = 4^{-3}$
 $4^x = 4^{-3}$ $x = -3$

2. Solve $9^{x-2} = 729$.
 $9^{x-2} = 9^3$ $x-2=3$
 $x=5$

3. The Function $M(x) = 6^{x-3}$ models the number of members in an online social networking site after x days. According to the model, after how many days will there be 1296 members?

$1296 = 6^{x-3}$
 $6^5 = 6^{x-3}$ $5 = x-3$
 $7 = x$

4. Use a graph to solve $81 = 3^{x-1}$.

$3^4 = 3^{x-1}$ $4 = x-1$ $5 = x$

5. Find the equation of a line perpendicular to $y = 4x + 1$, that passes through $(-1, -7)$.

$y = -\frac{1}{4}x + b$

$y = -\frac{1}{4}x - 7\frac{1}{4}$

$-7 = -\frac{1}{4}(-1) + b$
 $-\frac{7}{4} = \frac{1}{4} + b$
 $-\frac{7}{4} - \frac{1}{4} = b$
 $-7\frac{1}{4} = b$

$y = -\frac{1}{4}x - \frac{29}{4}$

$m = 4$
 $m = -\frac{1}{4}$

Solutions

Section 5.5

1. Solve $4^x = \frac{1}{64}$. $x = -3$

2. Solve $9^{x-2} = 729$. $x = 5$

3. The Function $M(x) = 6^{x-3}$ models the number of members in an online social networking site after x days. According to the model, after how many days will there be 1296 members?

4. Use a graph to solve $81 = 3^{x-1}$. $x = 5$

5. Find the equation of a line perpendicular to $y = 4x + 1$, that passes through $(-1, -7)$.

$$y = -\frac{1}{4}x + \frac{29}{4}$$

correct 5.4 #s 9-14, 16-24, 26-27

- 😊 **16.** The student did not convert 3.5% to a decimal;
 $A = 500\left(1 + \frac{0.035}{4}\right)^{(4 \cdot 2)} = 500(1.00875)^8 \approx 536.09.$

9. 4

😊 **10.** 15

11. 0.2

😊 **12.** 0.94

13. \$32,577.89

14. If $b > 1$, then it is exponential growth. If $0 < b < 1$, then it is exponential decay.

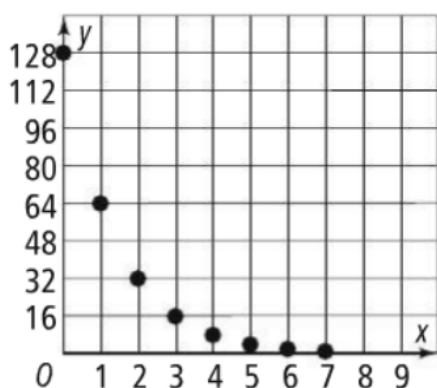
😊 **17.** exponential growth **18.** exponential decay

😊 **19.** neither **20.** exponential decay

21. $y = 10 \cdot 0.5^x$

😊 **22.** a. $y = 128 \times \left(\frac{1}{2}\right)^x$

x	0	1	2	3	4	5	6	7
y	128	64	32	16	8	4	2	1



b. No, Sample answer: The table made it the easiest to determine that it is not possible for 24 teams to remain after a round.

c. the whole numbers from 0 to 7; The domain represents the end of round x .

d. 4 teams

😊 **23.** No; the value of the car is about \$5243.

😊 **24.** about 9 years

26. exponential growth **27.** neither

due tomorrow 5.5 #s 7-12, 14, 15, 17-24, 26

Hand out new hw trackers

Week 1 hw trackers due today

WHITEBOARD REVIEW

Write using only positive exponents

$$\frac{x^{-2}}{y^5} \rightarrow \frac{1}{x^2 y^5}$$

Write using only positive exponents

$$\frac{a^{-1}b^{-2}}{c^{-4}d^1} \quad a^1 \frac{c^4}{b^2 d}$$

Evaluate the function when $x = -1$ and 0

$$f(x) = 2 \cdot 3^x$$

$x = -1$: $\frac{2}{3}$ ~~$2 \cdot 3^{-1}$~~ $= \frac{2}{3}$

$x = 0$:

$$2 \cdot 3^0 = 2 \cdot 1 = 2$$

Evaluate the function when $x = 1$ and 2

$$f(x) = 2 \cdot 3^x$$

$$x = 1: 2 \cdot 3^1 = 2 \cdot 3 = 6$$

$$x = 2: 2 \cdot 3^2 = 2 \cdot 9 = 18$$

Evaluate the expression if $a = 2$

$$\frac{a^3 \cdot a^1}{a^1} = a^2 = 2^2 = 4$$

$$2^3 \cdot 2^{-1}$$

$$8 \cdot \frac{1}{2} = 4$$

Evaluate the expression if $a = 1/2$

$$\begin{aligned} & (a^3 \cdot a^{-1})^5 \\ & \left(\left(\frac{1}{2} \right)^3 \cdot \left(\frac{1}{2} \right)^{-1} \right)^5 \\ & \left(\frac{1}{8} \cdot \frac{2}{1} \right)^5 = \left(\frac{2}{8} \right)^5 = \left(\frac{1}{4} \right)^5 \\ & \qquad \qquad \qquad = \frac{1}{1,024} \end{aligned}$$
$$\begin{aligned} \left(\frac{2}{3} \right)^{-1} &= \frac{3}{2} \\ \left(\frac{5}{7} \right)^{-2} &= \left(\frac{7}{5} \right)^2 \end{aligned}$$

Does the following function represent growth or decay?

$$f(x) = 2(\underbrace{1.43}_{\text{growth factor}})^x$$

Does the following function represent growth or decay?

$$f(x) = 2(\underline{.43})^x$$

decay factor

What is the growth rate of the function below?

Give it as a percentage...

$$f(x) = 2(1.43)^x$$

$$y = a(1+r)^x$$

$(1+r)^x$
 $(1+43\%)$

What is the decay rate of the function below?

Give it as a percentage...

$$f(x) = 2(.43)^x$$

(1 - .57)

A population of 200 tigers decreases at an annual rate of 4%.
How many tigers will there be in 5 years?

$$y = a(1 \pm r)^x$$
$$y = 200(1 - .04)^5$$
$$200(.96)^5$$
$$\approx 163 \text{ tigers}$$

A population of bees starts at 300 and grows at a rate of 16%. How many bees will there be in 4 years?

$$300(1+.16)^4$$

$$543$$

Graph $f(x) = 2 \cdot 3^x$

x	y
-2	$\frac{2}{9}$
-1	$\frac{2}{3}$
0	2
1	6
2	18

Graph $f(x) = 8 \cdot \left(\frac{1}{2}\right)^x$

$(0, 8)$
 $(1, 4)$
 $(2, 2)$
 $(3, 1)$

Solve for x

$$2^{x-2} = 16$$

$$\begin{aligned}x - 2 &= 4 \\ +2 &+2 \\ x &= 6\end{aligned}$$

—

Solve for x

$$49^{2(x-1)} = \frac{1}{7}$$
$$7^{2(2x-1)} = 7^{-1}$$

$$4x - 2 = -1$$

$$\frac{4x}{4} = \frac{1}{4}$$

$$x = \frac{1}{4}$$

$$49^{\frac{1}{2}-1} = \frac{1}{7}$$

$$\frac{1}{49^{\frac{1}{2}}}$$

$$\frac{1}{7} = \frac{1}{7}$$

Solve for x

$$\frac{3 \cdot 2^x}{3} = \frac{24}{3}$$

$$2^x = 8$$

$$2^x = 2^3$$

$$x = 3$$

Solve for x

$$\begin{array}{r} 5 \cdot 2^x - 152 = 8 \\ +152 \quad +152 \\ \hline 5 \cdot 2^x = 160 \\ \hline \end{array}$$

$$\begin{array}{l} 2^x = 32 \\ 2^x = 2^5 \\ x = 5 \end{array}$$

Solve for x

$$-6 - 2^x = -2$$

$$\cancel{+} 2^x = -8$$

$$2^x = 8$$

$$2^x = 2^3$$

$$x = 3$$

due Wednesday

SM1

Name _____ ID: 1

Exponential Equations

Date _____ Period _____

Solve each equation.

1) $4^{-3n} = 16$

2) $3^{-n} = 3^3$

3) $3^{3b-2} = 3^{-b-1}$

4) $4^{b-3} = 4^{2b}$

5) $5^{2x+3} = 5^{-2x-1}$

6) $6^{-n} = 36$

7) $4^{2n} = 64$

8) $5^{-b} = 25$

9) $4^{-3n+2} = 4^{-n-3}$

10) $3^{-3x-2} = 3^{-2x}$

11) $6^{-3x-3} = 6^{2x}$

12) $4^{-3x-3} = 4^{2x}$

13) $3^{-3n} = 81$

14) $2^{-3r} = 2^{-r}$

15) $4^{-2x-2} = 16$

16) $6^{2n} = 6^{-n-1}$

Answers to Exponential Equations (ID: 1)

1) $\left\{-\frac{2}{3}\right\}$

5) $\{-1\}$

9) $\left\{\frac{5}{2}\right\}$

13) $\left\{-\frac{4}{3}\right\}$

2) $\{-3\}$

6) $\{-2\}$

10) $\{-2\}$

14) $\{0\}$

3) $\left\{\frac{1}{4}\right\}$

7) $\left\{\frac{3}{2}\right\}$

11) $\left\{-\frac{3}{5}\right\}$

15) $\{-2\}$

4) $\{-3\}$

8) $\{-2\}$

12) $\left\{-\frac{3}{5}\right\}$

16) $\left\{-\frac{1}{3}\right\}$

