NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set


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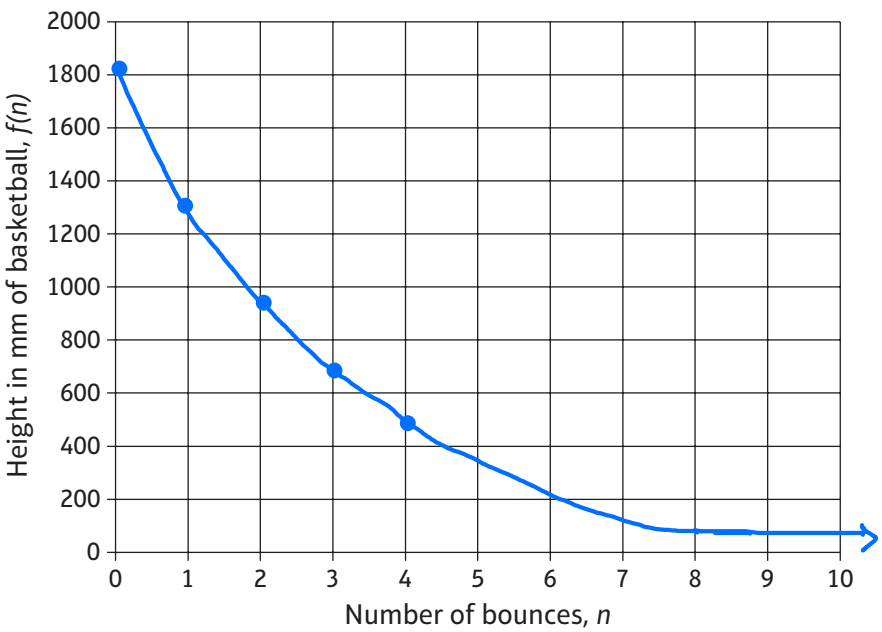
1. According to the International Basketball Association (FIBA), a basketball must be inflated to a pressure such that when it is dropped from a height of 1,800 mm, it rebounds to a height of 1,300 mm. Maddie decides to test the rebound-ability of her new basketball. She assumes that the ratio of each rebound height to the previous rebound height remains the same at $\frac{1300}{1800}$. Let $f(n)$ be the height of the basketball after n bounces.

   A. Complete the chart below to reflect the heights Maddie expects to measure.

n	$f(n)$
0	1,800
1	1300
2	939
3	678
4	490

$r = \frac{1300}{1800} = \frac{13}{18}$ simplified



   B. Write the explicit formula for the sequence that models the height of Maddie's basketball after any number of bounces.

$f(n) = 1800\left(\frac{13}{18}\right)^n$

   C. Plot the points from the table. Connect the points with a smooth curve, and then use the curve to estimate the bounce number at which the rebound height drops below 200 mm.

7th rebound

Evaluate each function at the given values.

2. $f(x) = 3 \cdot 4^x$ at $x = -1$ and $x = 1$

$f(-1) = 3 \cdot 4^{-1}$
$= 3 \cdot \frac{1}{4}$
$f(-1) = \frac{3}{4}$

$f(1) = 3 \cdot 4^1$
$= 3 \cdot 4$
$f(1) = 12$

3. $f(x) = -1 \cdot 2^x$ at $x = -2$ and $x = 0$

$f(-2) = -1 \cdot 2^{-2}$
$= -1 \cdot \frac{1}{4}$
$f(-2) = -\frac{1}{4}$

$f(0) = -1 \cdot 2^0$
$= -1 \cdot 1$
$f(0) = -1$

4. $f(x) = \frac{1}{2} \cdot 4^x$ at $x = 1$ and $x = 3$

$f(1) = 2$

$f(3) = 32$

For each equation, table or graph below, determine if the function is showing exponential growth or exponential decay.

5. $y = 3^{x-1}$

growth

6. $y = 0.8^x$

decay

7. $f(x) = \left(\frac{1}{5}\right)^{x+1}$

decay

8. $f(x) = 1.5^x$

growth

9.

x	y
1	0.5
2	0.25
3	0.125
4	0.0625

x 0.5

decay

10.

x	y
1	6
2	18
3	54
4	162

x 3

growth

11.

x	y
1	3
2	1
3	$\frac{1}{3}$
4	$\frac{1}{9}$

$\times \frac{1}{3}$

decay

12.

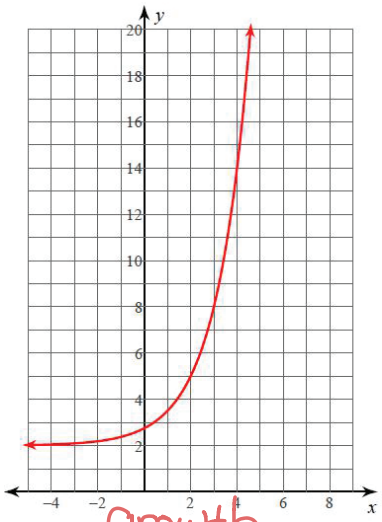
x	y
1	−6
2	−12
3	−24
4	−48

x 2

* y-values are decreasing

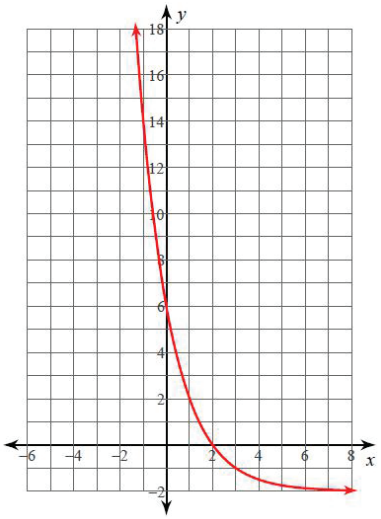
decay

13.



growth

14.



decay

Match the equations to their graph.

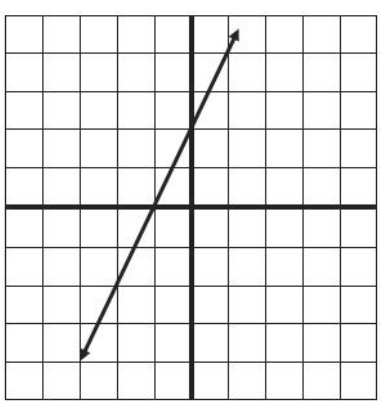
15. $f(x) = 4 \cdot 2^x$ D

16. $f(x) = 2x + 2$ A

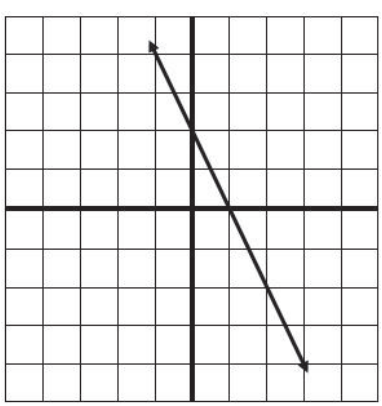
17. $f(x) = -2x + 2$ B

Graphs

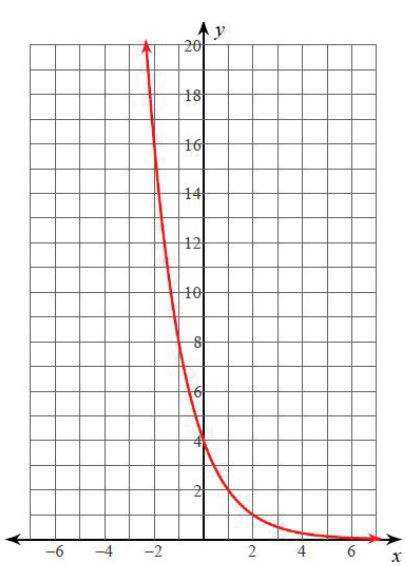
A.



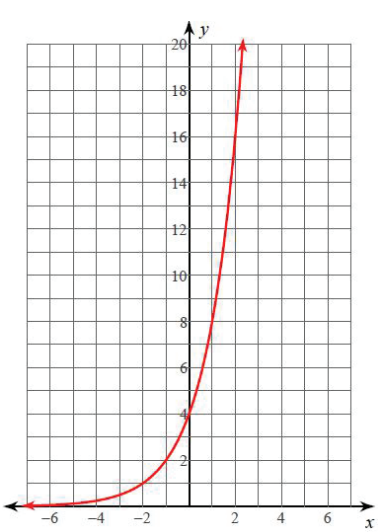
B.



C.

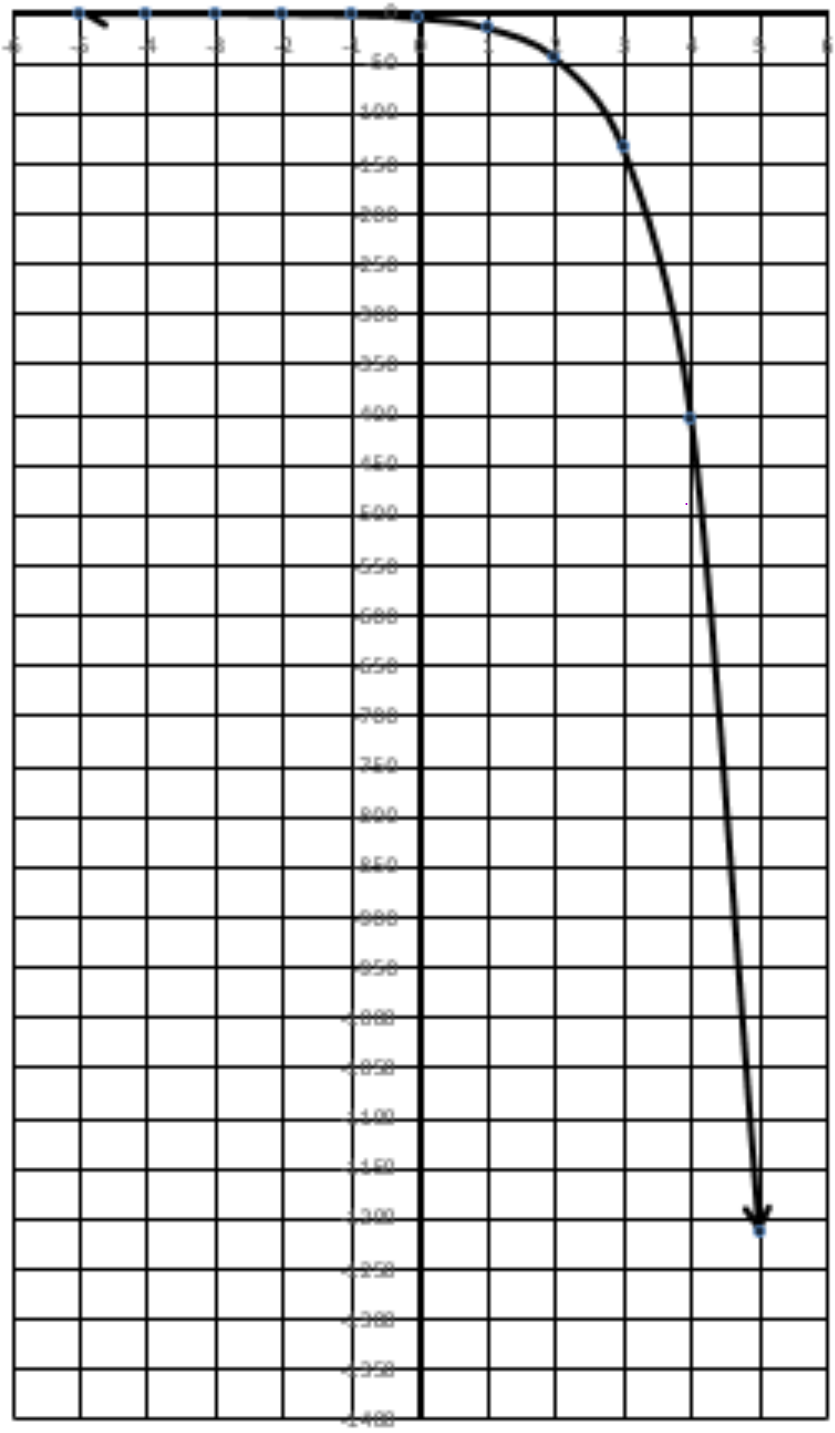


D.



18.

x	$f(x)$
-5	-0.02
-4	-0.06
-3	-0.19
-2	-0.56
-1	-1.67
0	-5
1	-15
2	-45
3	-135
4	-405
5	-1215



Spiral REVIEW—Percent Calculations

Determine each of the following without a calculator.

19. 50% of 100

• 5×100

50

20. 50% of 200

100

21. 50% of 10

5

22. 50% of 1

$\frac{1}{2}$

23. 100% of 100

100

24. 100% of 200

200

25. 100% of 10

10

26. 100% of 1

1

27. 10% of 100

10

28. 10% of 200

20

29. 10% of 10

1

30. 10% of 1

.1

31. 60% of 100

60

32. 60% of 200

120

33. 60% of 10

6

34. 60% of 1

.6

35. 200% of 100

200

36. 200% of 200

400

37. 200% of 10

20

38. 200% of 1

2