Name: _____

F.IF.C.7: Graphing Exponential Functions 2

1 Which function represents exponential decay?
1) $y = 2^{0.3t}$
2) $y = 1.2^{3t}$
3) $y = \left(\frac{1}{2}\right)^{-t}$
4) $y = 5^{-t}$

2 Which function represents exponential decay?
1) $p(x) = \left(\frac{1}{4}\right)^{-x}$
2) $q(x) = 1.8^{-x}$
3) $r(x) = 2.3^{2x}$
4) $s(x) = 4^{\frac{x}{2}}$

3 The population of bacteria, $P(t)$, in hundreds, after t hours can be modeled by the function $P(t) = 37e^{0.0532t}$. Determine whether the population is increasing or decreasing over time. Explain your reasoning.

4 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(\ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

5 If the function $g(x) = ab^x$ represents exponential growth, which statement about $g(x)$ is *false*?
1) $a > 0$ and $b > 1$
2) The y-intercept is $(0, a)$.
3) The asymptote is $y = 0$.
4) The x-intercept is $(b, 0)$.

6 Which statement about the graph of the equation $y = e^x$ is *not* true?
1) It is asymptotic to the x-axis.
2) The domain is the set of all real numbers.
3) It lies in Quadrants I and II.
4) It passes through the point $(e, 1)$.

7 Which statement is true about the graph of $f(x) = \left(\frac{1}{8}\right)^x$?
1) The graph is always increasing.
2) The graph is always decreasing.
3) The graph passes through $(1, 0)$.
4) The graph has an asymptote, $x = 0$.

8 The graph of $y = 2^x - 4$ is positive on which interval?
1) $(-\infty, \infty)$
2) $(2, \infty)$
3) $(0, \infty)$
4) $(-4, \infty)$

9 Given $f(x) = 3^{x-1} + 2$, as $x \to -\infty$
1) $f(x) \to -1$
2) $f(x) \to 0$
3) $f(x) \to 2$
4) $f(x) \to -\infty$

10 If $y = 2^x$ and $y = \left(\frac{1}{2}\right)^x$ are graphed on the same set of coordinate axes, which transformation would map one of these curves onto the other?
1) reflection in the y-axis
2) reflection in the x-axis
3) reflection in the line $y = x$
4) reflection in the origin

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11 If $a > 0$, which function represents the reflection of $y = a^x$ in the y-axis?

1) $y = -a^x$

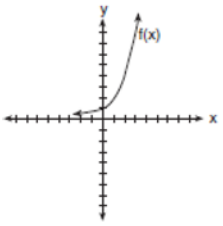
2) $y = \left(\frac{1}{a}\right)^x$

3) $y = \left(\frac{1}{a}\right)^{-x}$

4) $x = a^y$

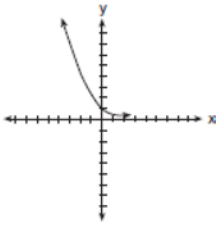
12 Describe the transformation applied to the graph of $p(x) = 2^x$ that forms the new function $q(x) = 2^{x-3} + 4$.

13 The graph of f(x) is shown in the accompanying diagram.



Which graph represents $f(x)_{r_{x-\text{axis}} \circ r_{y-\text{axis}}}$?

1)



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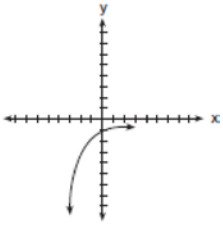

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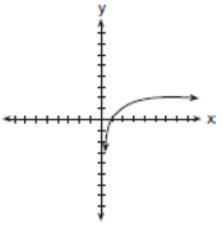

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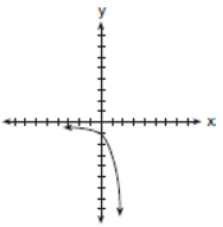

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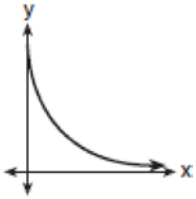
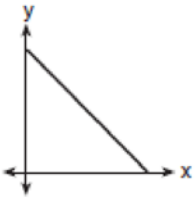
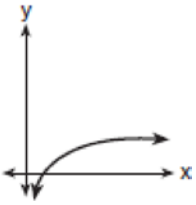
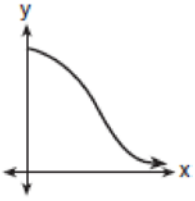
14 The strength of a medication over time is represented by the equation $y = 200(1.5)^{-x}$, where x represents the number of hours since the medication was taken and y represents the number of micrograms per millimeter left in the blood. Which graph best represents this relationship?

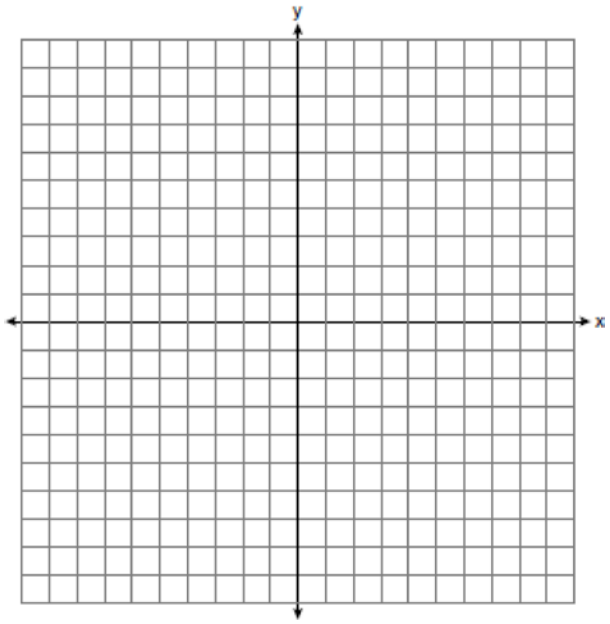
1) 

2) 

3) 

4) 

15 The graph of the equation $y = \left(\frac{1}{2}\right)^x$ has an asymptote. On the grid below, sketch the graph of $y = \left(\frac{1}{2}\right)^x$ and write the equation of this asymptote.



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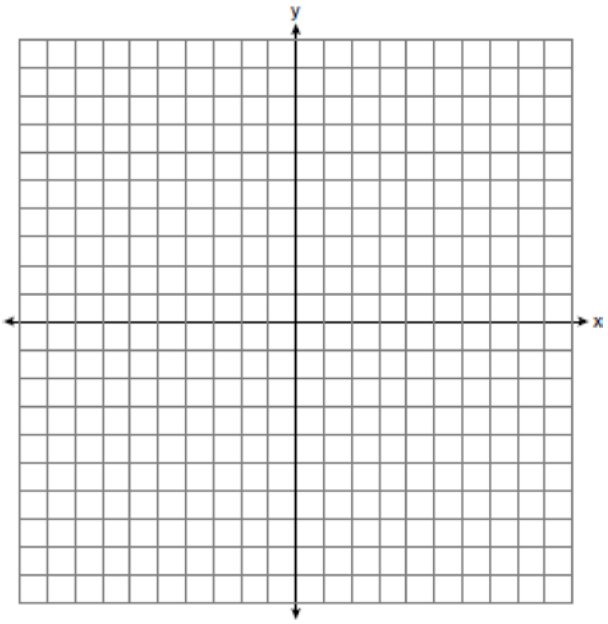
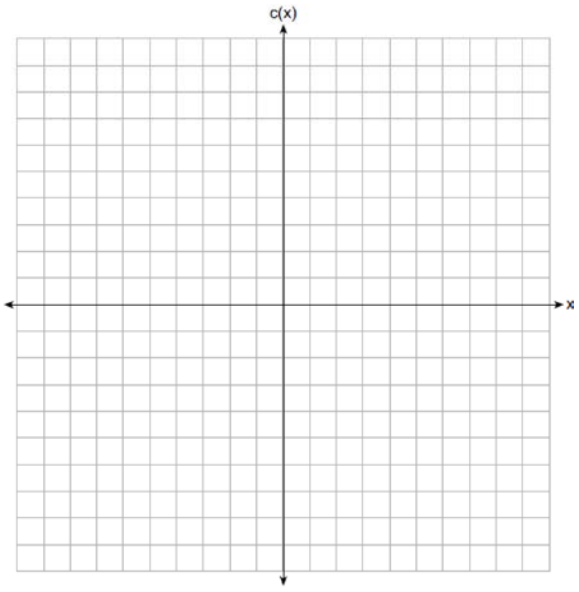
16 On the axes below, for $-2 \le x \le 2$, graph $y = 2^{x+1} - 3$.

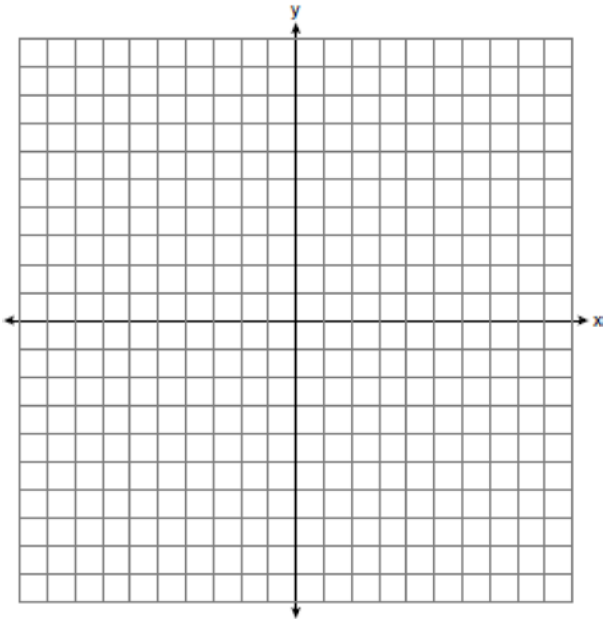


17 Graph $c(x) = -9(3)^{x-4} + 2$ on the axes below.

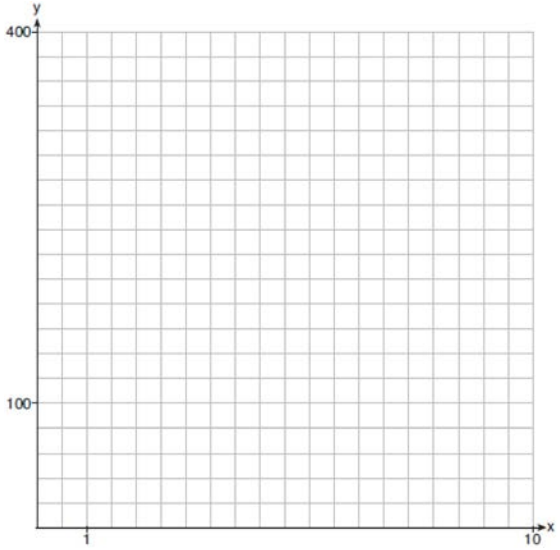


Describe the end behavior of $c(x)$ as x approaches positive infinity. Describe the end behavior of $c(x)$ as x approaches negative infinity.

18 On the axes below, graph $y = 3.2(1.8)^x$.

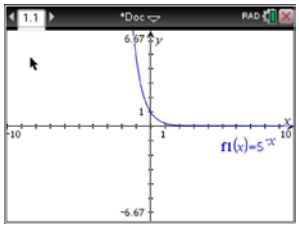


19 Graph $y = 400(.85)^{2x} - 6$ on the set of axes below.



F.IF.C.7: Graphing Exponential Functions 2
Answer Section

1 ANS: 4



$y = 5^{-t} = \left(\frac{1}{5}\right)^t$

REF: 061615aii

2 ANS: 2

$p(x) = 4^x$, $q(x) = \left(\frac{5}{9}\right)^x$, $r(x) = 5.29^x$, $s(x) = 2^x$

REF: 012304aii

3 ANS:

$e^{0.0532} > 1$, so $P(t)$ is increasing.

REF: 062327aii

4 ANS:

$0 < e^{\frac{\left(\ln \frac{1}{2}\right)}{1590}} < 1$, so $M(t)$ represents decay.

REF: 011728aii

5 ANS: 4

There is no x-intercept.

REF: 011823aii

6 ANS: 4 REF: 011219a2

7 ANS: 2 REF: 061802aii

8 ANS: 2

$2^x - 4 > 0$

$2^x > 4$

$x > 2$

REF: 082402aii

9 ANS: 3 REF: 082214aii

10 ANS: 1

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

REF: fall9908b

11 ANS: 2 REF: 080919b

12 ANS:

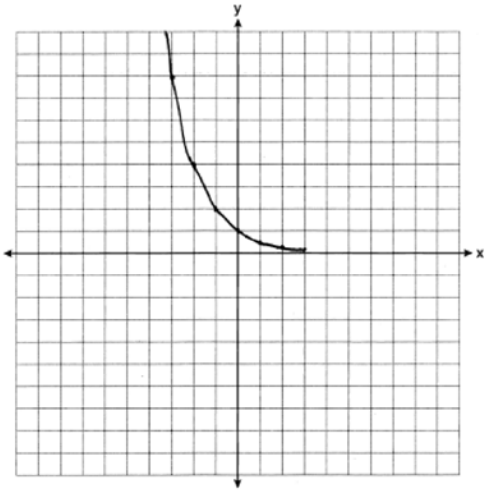
Translation 3 units right and 4 units up

REF: 012027aii

13 ANS: 2 REF: 080115b

14 ANS: 1 REF: 080304b

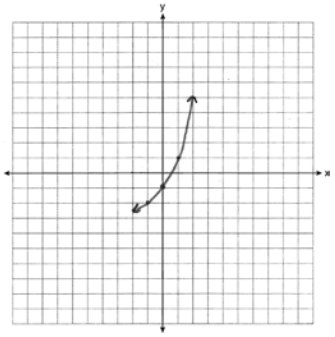
15 ANS:



$y = 0$

REF: 061031a2

16 ANS:



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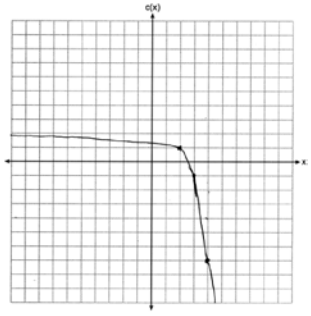
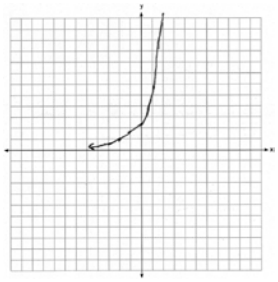
17 ANS:



As $x \to \infty, c(x) \to -\infty$. As $x \to -\infty, c(x) \to 2$.

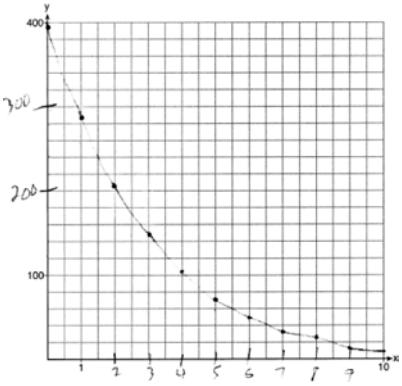
REF: 012335aii

18 ANS:



REF: 082425aii

19 ANS:



REF: 061729aii