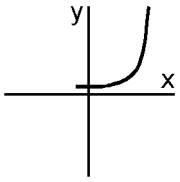
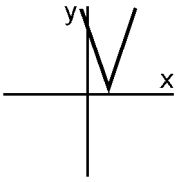
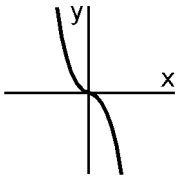
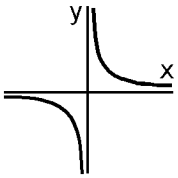
Name: _____

1) Which of the following best represents the graph of an absolute value function?

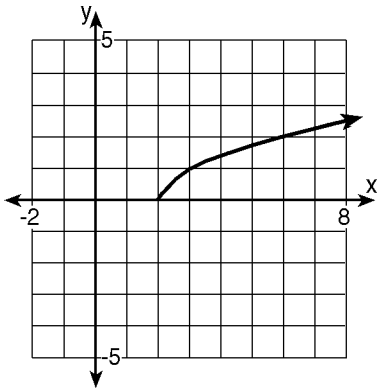
A) 

C) 

B) 

D) 

2) Which one of the following equations could produce the graph shown?



A) $y = \sqrt{x - 2}$

B) $y = \sqrt{2 - x}$

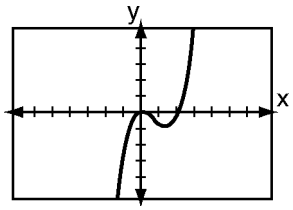
C) $y = -\sqrt{x - 2}$

D) $y = -\sqrt{2 - x}$

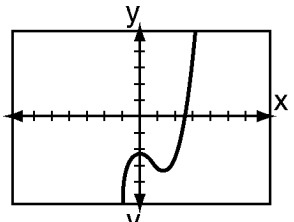
3) What will be the effect on the graph of $y = |x|$ if y is replaced with $-y$?

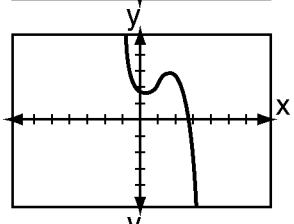
A) a horizontal shift of 1 unit to the left
B) a flip over the x-axis
C) no change
D) a vertical shift

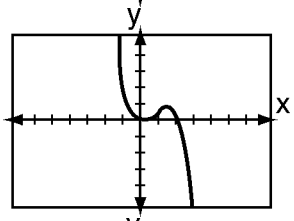
4) The accompanying graph represents the equation $y = f(x)$.

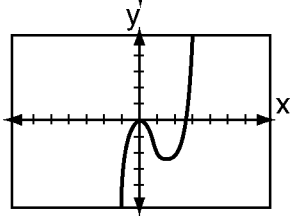


Which of the following graphs represents $g(x)$, if $g(x) = -f(x)$?

A) 

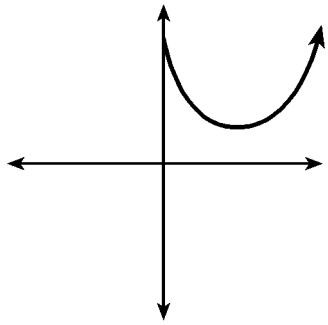
B) 

C) 

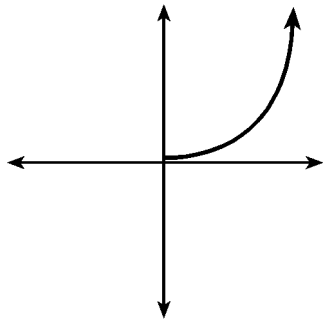
D) 

5) Which of the following graphs represent an exponential growth model?

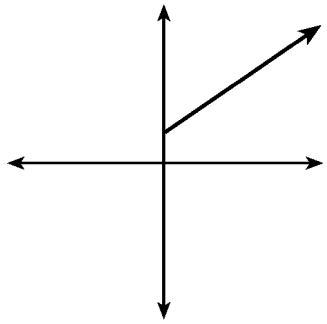
A)



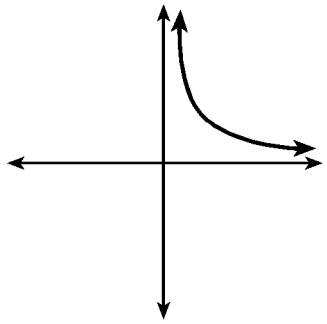
B)



C)

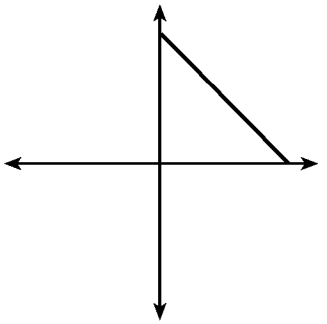


D)

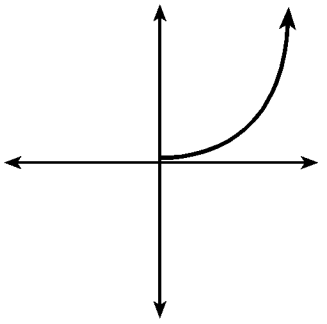


6) Which of the following graphs represent an exponential decay model?

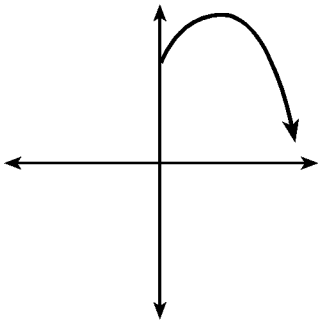
A)



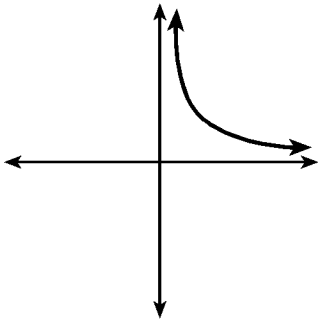
B)



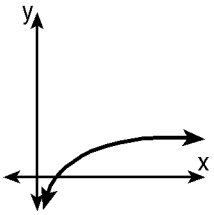
C)

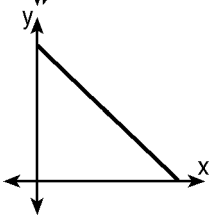


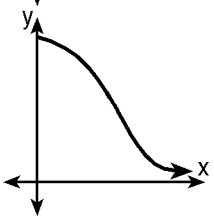
D)

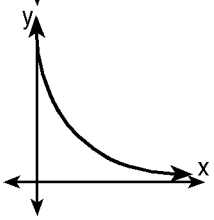


7) The strength of a medication over time is represented by the equation $y = 200(1.5)^{-x}$, where x represents the number of hours since the medication was taken and y represents the number of micrograms per millimeter left in the blood. Which graph *best* represents this relationship?

A)


B)


C)


D)


8) The approximate population growth of a certain bacteria is represented by the function $f(t) = 5(3)^t$. What is the population when $t = 4$?

A) 81 C) 600
B) 405 D) 270

9) A substance doubles in volume every two minutes. At 10:00 AM, a small amount of the substance is placed in a container. At 11:00 AM, the container is completely filled. At what time was the container one-quarter full?

A) 10:56 AM C) 10:58 AM
B) 10:15 AM D) 10:54 AM

10) A radioactive material decays according to the formula $A = A_0 10^{-kt}$ where A is the final amount, A_0 is the initial amount, and t is time in years. Find A, if $A_0 = 700$ grams of this material, $k = 0.0131$, and $t = 8$ years. [*Round the answer to 2 decimal places.*]

A) 891.04 C) 549.92
B) 5,499.18 D) 54.99

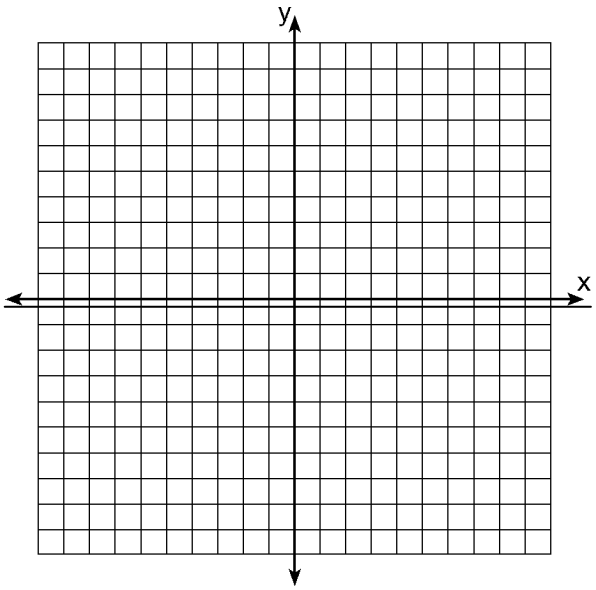
11) Which equation models the data in the accompanying table?

Time in Hours (x)	0	1	2	3	4	5	6
Population (y)	5	10	20	40	80	160	320

A) $y = 2^x$ C) $y = 2x$
B) $y = 2x + 5$ D) $y = 5(2^x)$

12) On the grid provided, sketch a graph of the given function:

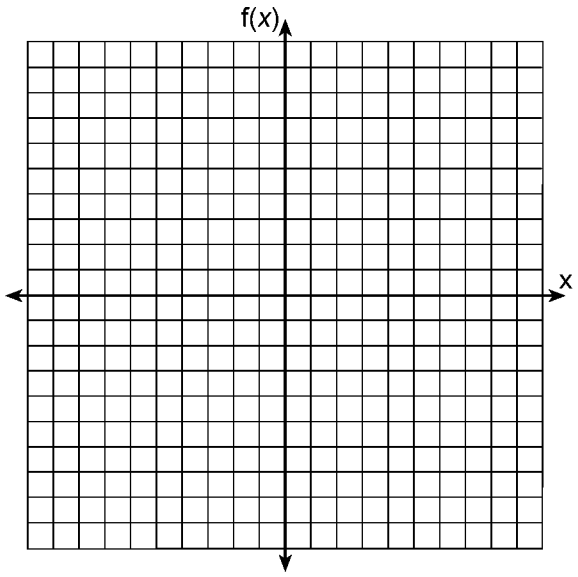
$f(x) = (x - 2)^3$



Questions 13 through 15 refer to the following:

Graph the given absolute value function on a coordinate grid. State the domain and the range of the function.

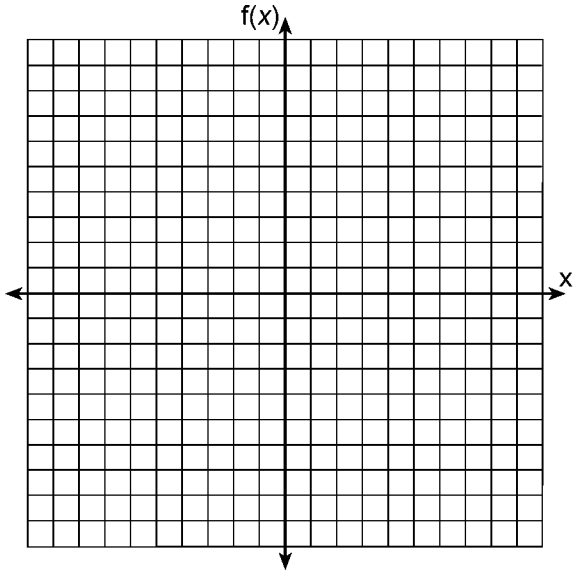
13) $f(x) = |x|$



Domain: _____

Range: _____

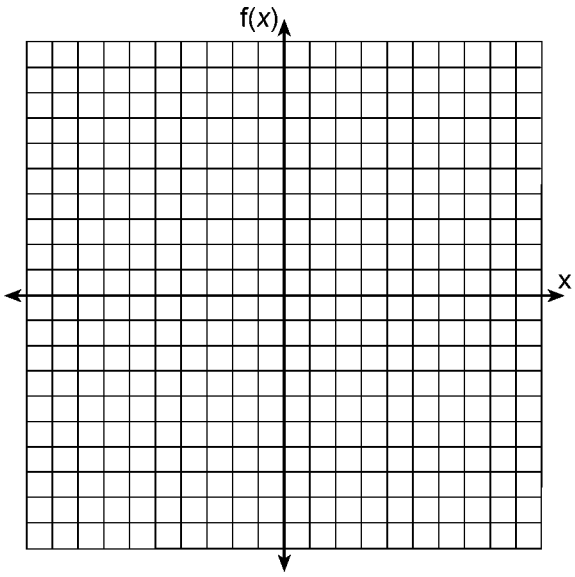
14) $f(x) = -|x|$



Domain: _____

Range: _____

15) $f(x) = |-x|$



Domain: _____

Range: _____

16) Write a function to model exponential growth with the indicated initial value and growth rate:

Initial value = 6, growth rate = 15%

Answer: _____

17) Since January 1980, the population of the city of Brownville has grown according to the mathematical model $y(x) = 720{,}500(1.022)^x$, where x is the number of years since January 1980.

Part A

Explain what the numbers 720,500 and 1.022 represent in this model.

_____

_____

Part B

If this trend continues, use a calculator to predict the year during which the population of Brownville will exceed 1,540,000.

Justify your results in the space below.

Answer: Year _____

18) The half-life of carbon-14 is 5,700 years. If 20 grams are present now, how much will remain in 11,400 years?

Show your work.

Answer: _____ grams

19) Explain how the graphs of $y = f(x)$ and $y = -f(-x)$ relate to each other on the coordinate plane.

_____

_____

_____

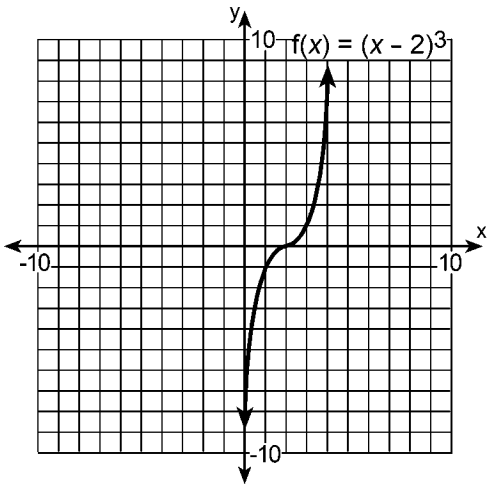
_____

1) C 2) A 3) B 4) C 5) B

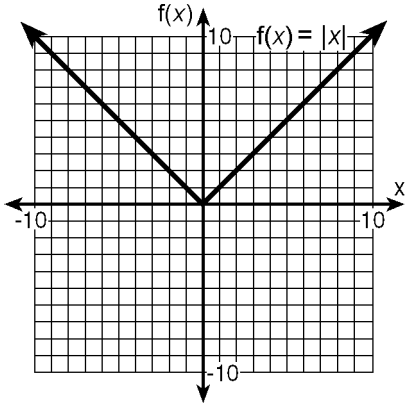
6) D 7) D 8) B 9) A 10) C

11) D

12)

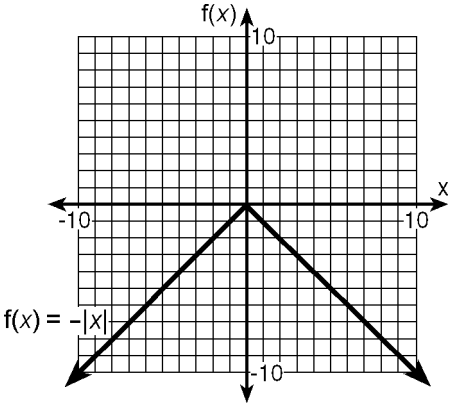


13)

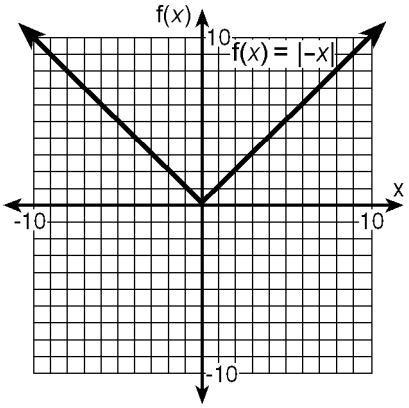


Domain: (−∞,∞)
Range: [0,∞)

14)



Domain: (−∞,∞)
Range: (−∞,0]

15) 

Domain: $(-\infty,\infty)$
Range: $[0,\infty)$

16) SAMPLE ANSWER: $f(t) = 6(1.15)^t$

17) Part A: 720,500 is the initial population in January 1980 and 1.022 represents a growth rate of 2.2%.;
Part B: 2015
SAMPLE ANSWER: $y(34)= 720{,}500(1.022)^{34} = 1{,}509{,}956.522$; $y(35)= 720{,}500(1.022)^{35} = 1{,}543{,}175.565$; 1980 + 35 = 2015

18) 5 grams

19) The graph of $-f(-x)$ is the image of $f(x)$ after a reflection in the origin.