

Functions Practice Questions

NO CALCULATOR USAGE IS PERMITTED ON THE FOLLOWING QUESTIONS.

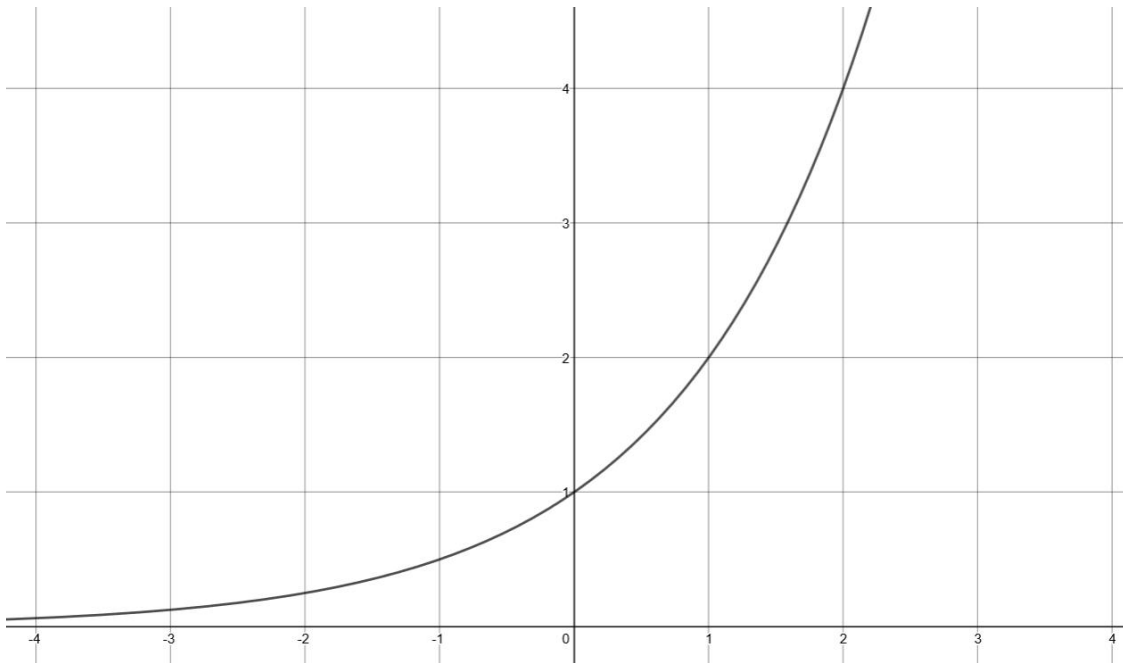
$$f(x) = \frac{12}{12+3x}$$

1. For the function f defined above, what is the value of $f(-3)$?

- (A) 4
- (B) 1
- (C) -1
- (D) -4

2. If $f(x) = \frac{x^2 - 4x + 12}{2 - 2x}$, what is $f(-2)$?

- (A) -12
- (B) -5
- (C) -2
- (D) 4



3. The graph of $y = f(x)$ is shown in the xy -plane. What is the value of $f(1)$?

- (A) 0
- (B) 1
- (C) 2
- (D) 4

4. If $f(x) = 10 - 3x$, what is $f(2x + 1)$ equal to?

- (A) $7 - 6x$
- (B) $11 - x$
- (C) $11 - 5x$
- (D) $13 - 6x$

$$f(x) = \frac{5}{4}x - 2a$$

7. FREE RESPONSE: For the function above, a is a constant. If $f(-8) = -11$, what is the value of $f(16)$?

x	$f(x)$
1	1
5	13
12	34

5. FREE RESPONSE: Some values of the linear function f are shown in the table above. What is the value of $f(6)$?

8. A function f satisfies $f(5) = 7$ and $f(7) = 5$. A function g satisfies $g(5) = -5$ and $g(7) = 9$. What is the value of $g(f(7))$?

- (A) -5
- (B) 5
- (C) 7
- (D) 9

$$p(x) = 2^x$$

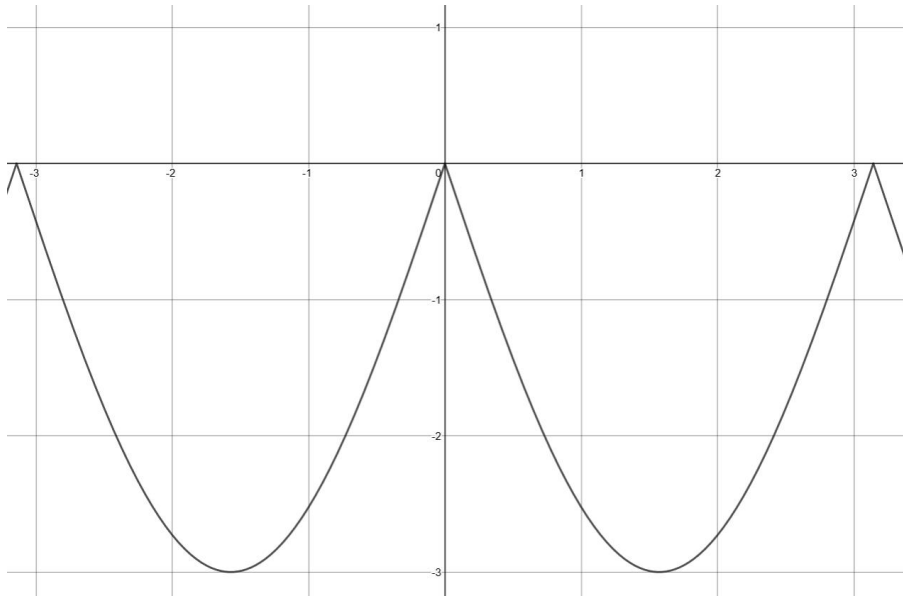
6. The function p is defined above. What is $p(4) - p(-1)$?

- (A) 5
- (B) 5.5
- (C) 10
- (D) 15.5

x	$f(x)$	$g(x)$
-2	-5	1
-1	0	4
0	2	7
1	0	10
2	-5	13

9. The table above shows some values of the functions f and g . For which value of x is $f(x) + g(x) = 2x$?

- (A) 2
- (B) 1
- (C) 0
- (D) -2



10. The figure above shows a portion of the graph of the function f in the xy -plane. The function g (not shown) is defined by $g(x) = f(x) - 4$ for the portion of f that is shown above. What is the minimum value of the function g ?

- (A) -7
- (B) -4
- (C) 1
- (D) 4

11. If $f(x+b) = 2x^2 + 20x + 44$ and $f(x) = 2x^2 - 6$, what is the value of b ?

- (A) -10
(B) -5
(C) 5
(D) 10

x	$f(x)$
0	6
2	10
6	18

13. Some values of the linear function f are shown in the table above. Which of the following defines f ?

- (A) $f(x) = 3x$
(B) $f(x) = 2x + 6$
(C) $f(x) = 3x + 6$
(D) $f(x) = 5x$

$$g(x) = 6 - 3x$$
$$h(x) = 7 - g(x)$$

12. The functions g and h are defined above.

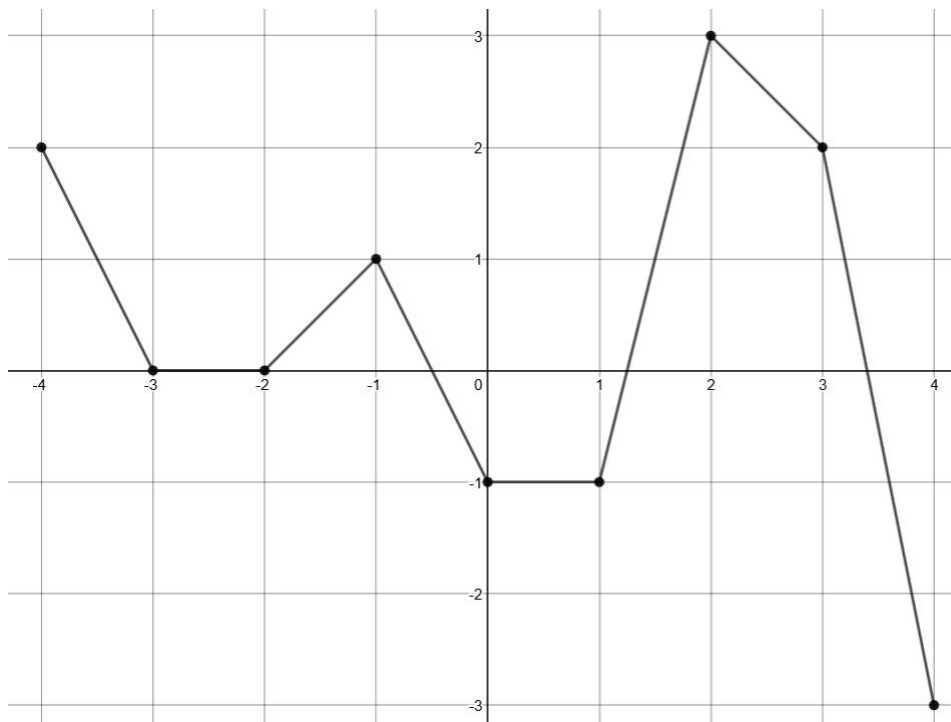
What is the value of $h(1)$?

- (A) -1
(B) 1
(C) 3
(D) 4

$$f(x) = ax^2 - 4$$

14. For the function f defined above, a is a constant and $f(3) = 41$. What is the value of $f(-2)$?

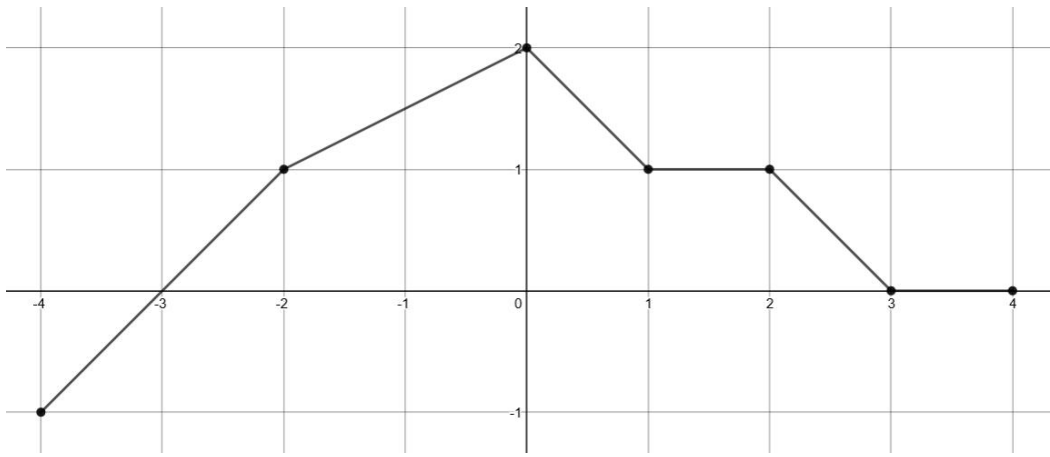
- (A) -20
(B) 0
(C) 16
(D) 36



15. The complete graph of the function f is shown in the xy -plane above. For what value of x is the value of $f(x)$ at its maximum?

- (A) -4
- (B) 2
- (C) 3
- (D) 4

16. FREE RESPONSE: In the xy -plane, the point $(-1, 4)$ lies on the graph of the function f (not shown). If $f(x) = t + x^3$, where t is a constant, what is the value of t ?



17. The complete graph of the function f is shown in the xy -plane above. Which of the following are equal to 0?

- I. $f(-3)$
 - II. $f(0)$
 - III. $f(3)$
- (A) I only
 - (B) II only
 - (C) I and III only
 - (D) I, II, and III

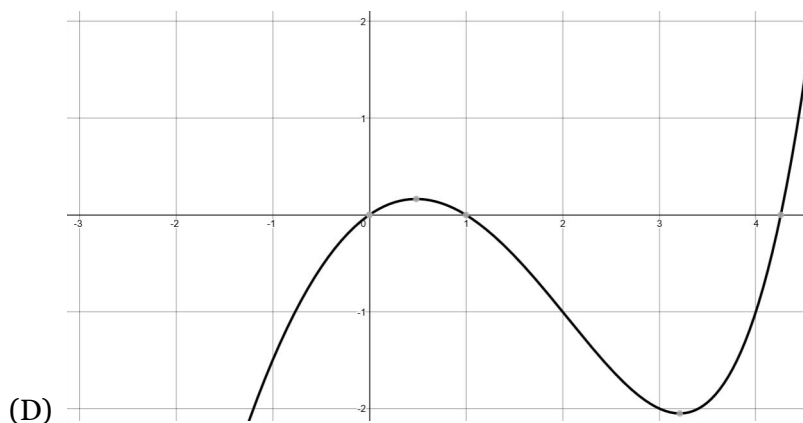
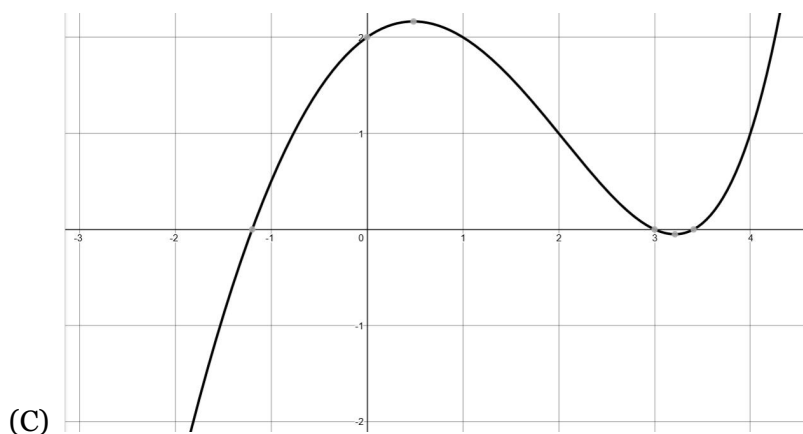
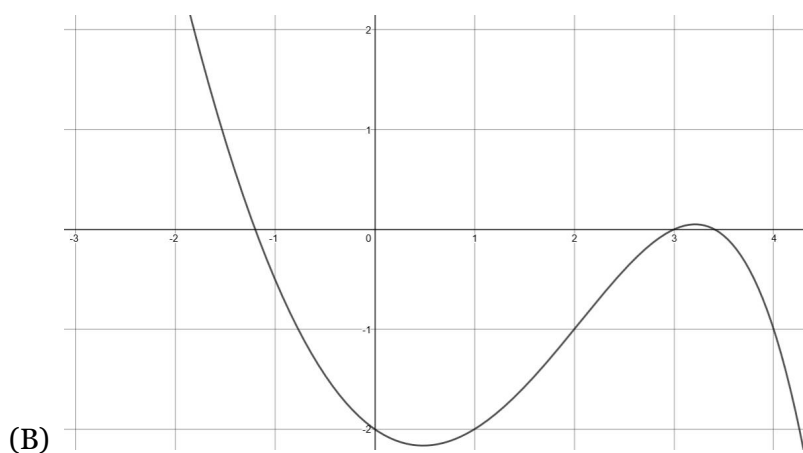
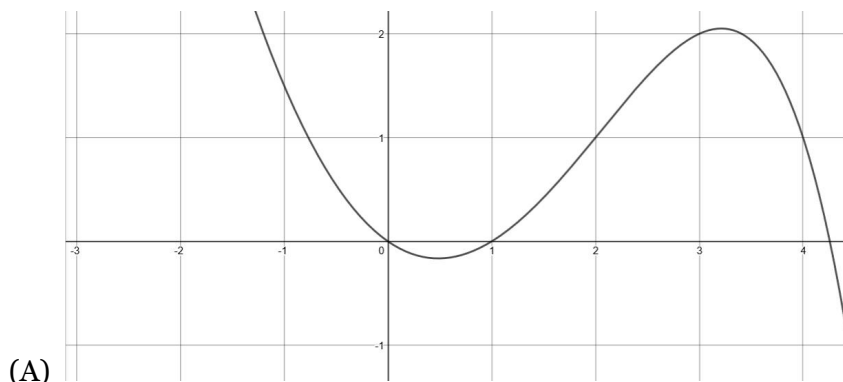
18. The table to the right shows some values of the function f . If $g(x) = x + 1$, what is the value of $f(g(3))$?

- (A) 2
- (B) 5
- (C) 6
- (D) 7

x	$f(x)$
1	-2
2	4
3	6
4	5
5	-3

$$g(x) = x^2 - 2^x$$

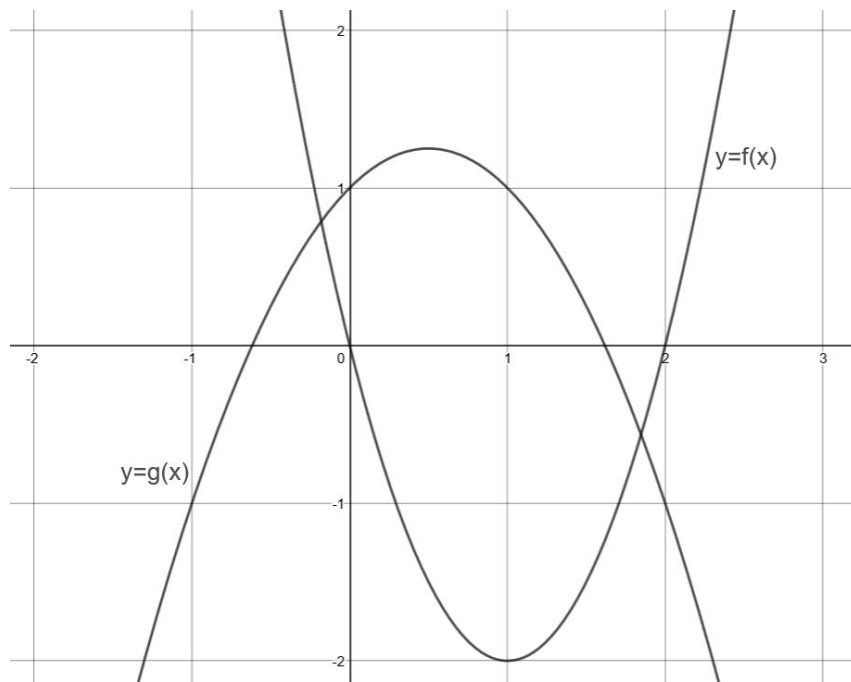
19. The function g is defined by the equation above. Which of the following is the graph of $y = -g(x) - 1$ in the xy -plane?



x	$f(x)$
-4	2
-2	0
0	1
2	-4
4	3

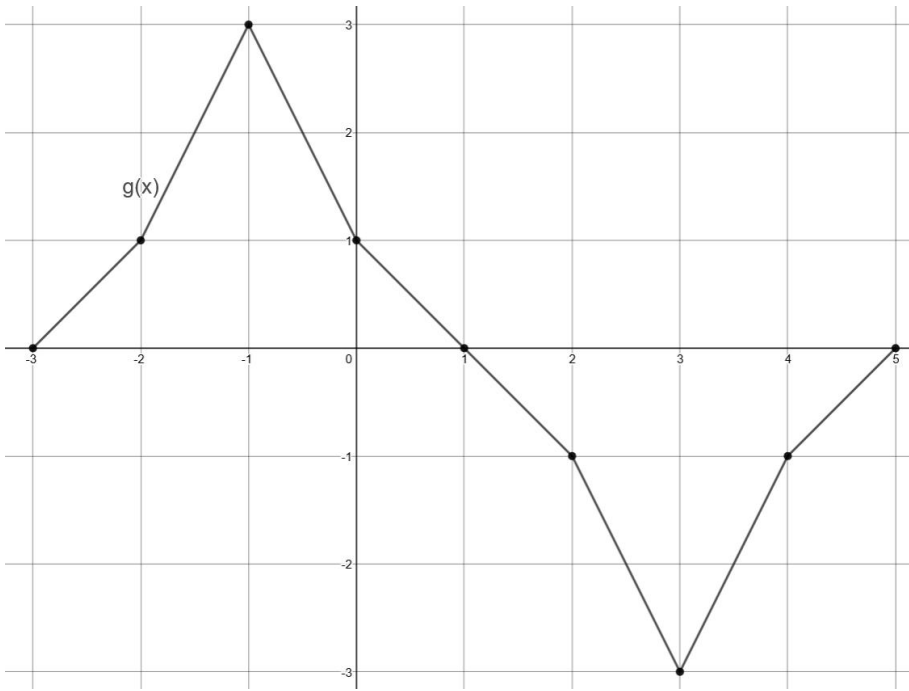
20. The function f is defined by a polynomial. Some values of x and $f(x)$ are shown in the table above. Which of the following must be a factor of $f(x)$?

- (A) $x+2$
- (B) $x-1$
- (C) $x-2$
- (D) $2x-2$



21. Graphs of the functions f and g are shown in the xy -plane above. For which of the following values of x does $f(x)+g(x)=1$?

- (A) -1
- (B) 0
- (C) 1
- (D) 2



x	$f(x)$
-3	5
-2	4
-1	3
0	2
1	1
2	0
3	-1
4	-2
5	-3

22. A table of values for the function f and the complete graph of the function g are shown above.

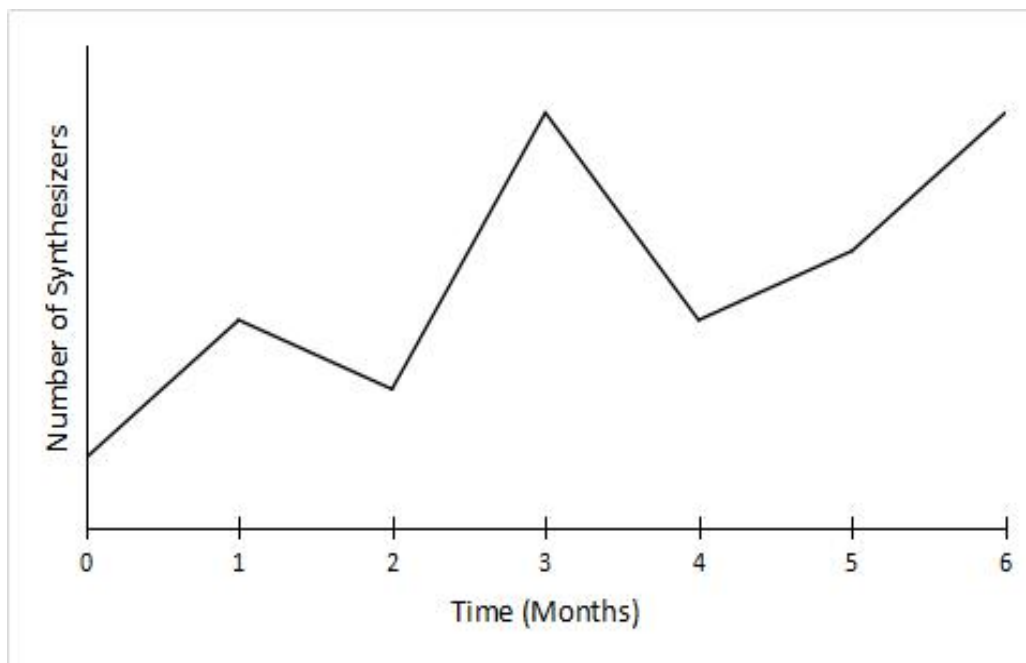
The maximum value of g is n . What is the value of $f(n)$?

- (A) -3
- (B) -1
- (C) 3
- (D) 5

Graphs (Other / Mixed) Practice Questions

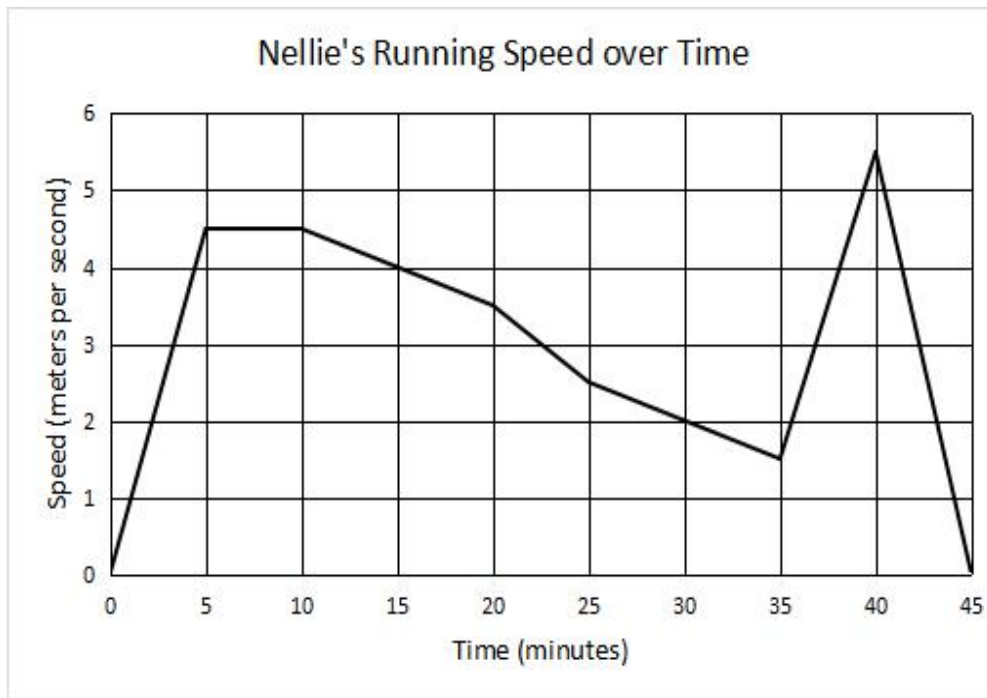
NO CALCULATOR IS PERMITTED ON THE FOLLOWING PROBLEMS.

1. Christian buys, sells, and trades electronic synthesizers. The graph below tracks the number of synthesizers in his collection.



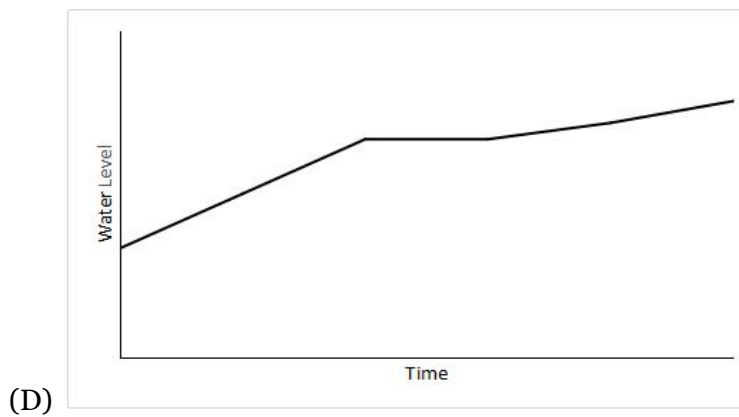
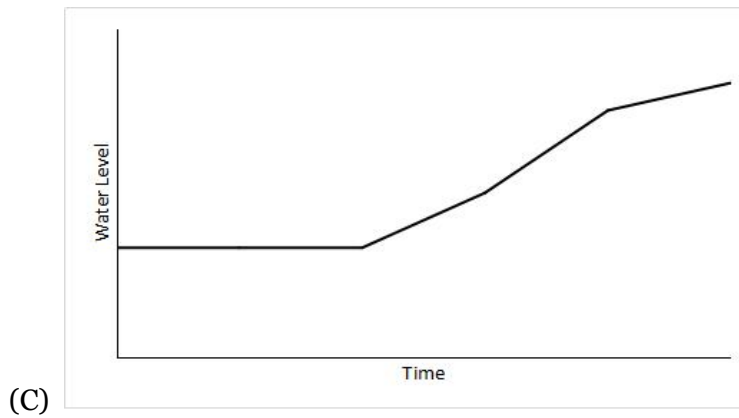
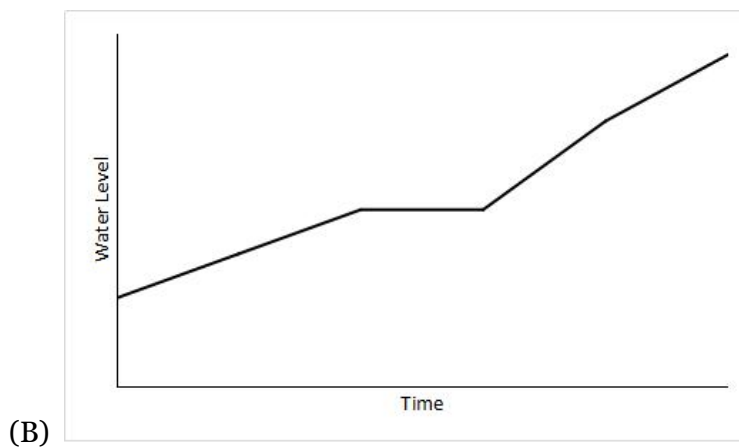
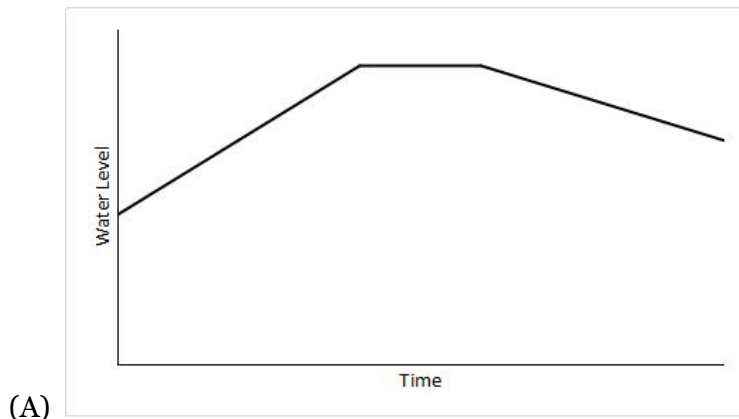
On what interval did the number of synthesizers increase the fastest?

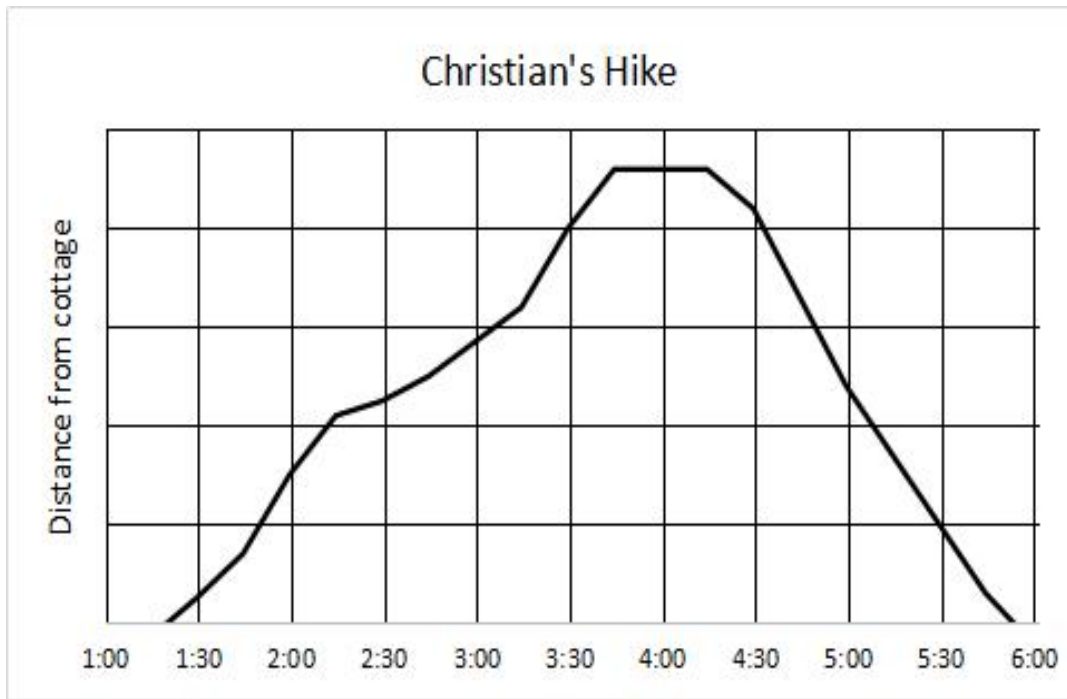
- (A) Between 0 and 1 month
- (B) Between 2 and 3 months
- (C) Between 3 and 4 months
- (D) Between 5 and 6 months



2. Nellie ran around a field for forty-five minutes, and her time and speed are shown on the graph above. According to the graph, which of the following statements is NOT true concerning Nellie's run?
- (A) Nellie's distance from the starting point was greatest at 40 minutes.
 - (B) Nellie's speed remained constant for five minutes.
 - (C) Nellie's speed was decreasing for a longer period of time than it was increasing.
 - (D) Nellie's speed decreased at a constant rate during the last 5 minutes.

3. Due to rain, the water level of a lake in Texas rose and then stopped for a time. When it began to rain again, the water level rose at a slower rate than it had initially. Assuming that none of the water evaporated during the time indicated, which of the following graphs could model the water level in the lake versus time?

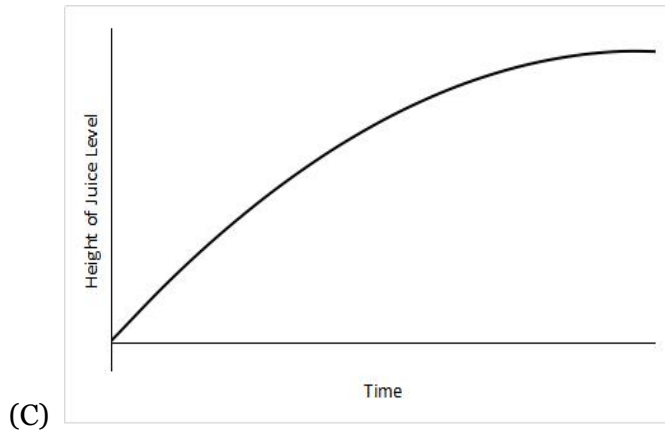
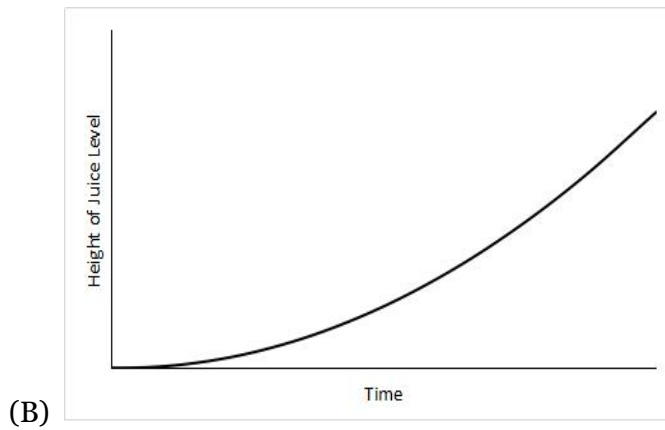
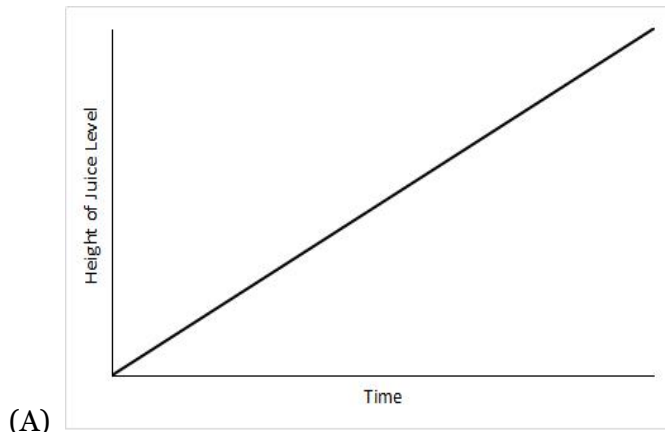




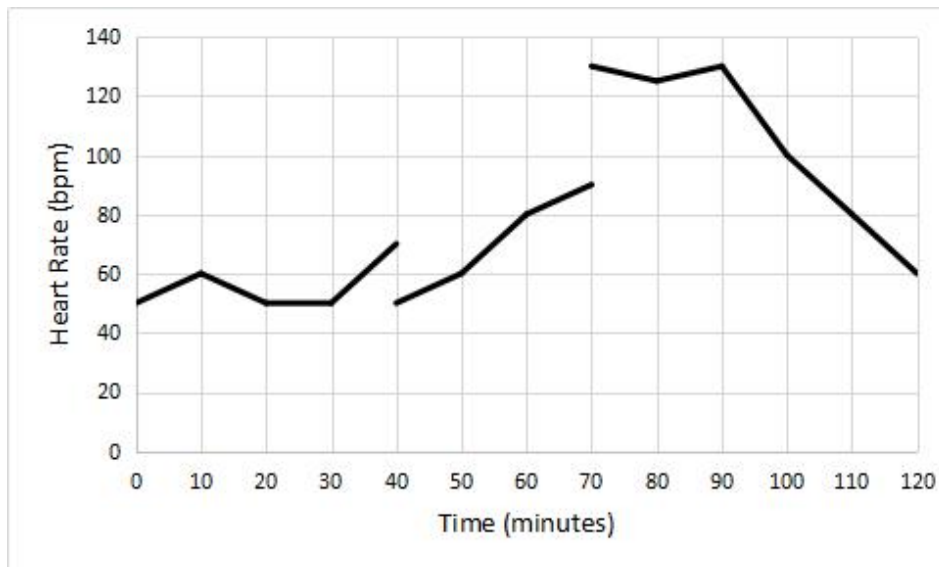
4. The graph above shows Christian's distance from his cottage during a hike that lasted just under five hours. He stopped for a period of time during his hike to eat lunch. Based on the graph, which of the following is the closest to the time he stopped hiking to start his lunch?

- (A) 2:10
- (B) 3:40
- (C) 4:15
- (D) 5:50

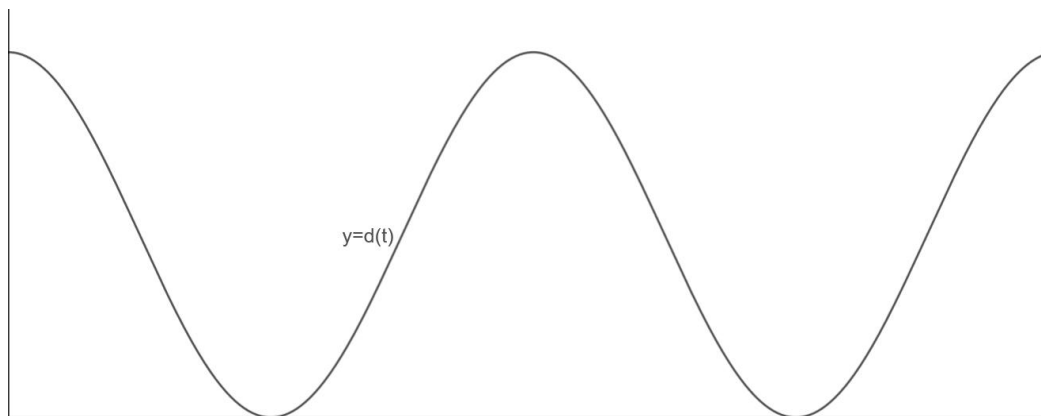
5. Juice is slowly poured into a conical paper cup at a constant rate. Which of the following graphs best illustrates the height of the juice level in the paper cup as it fills?



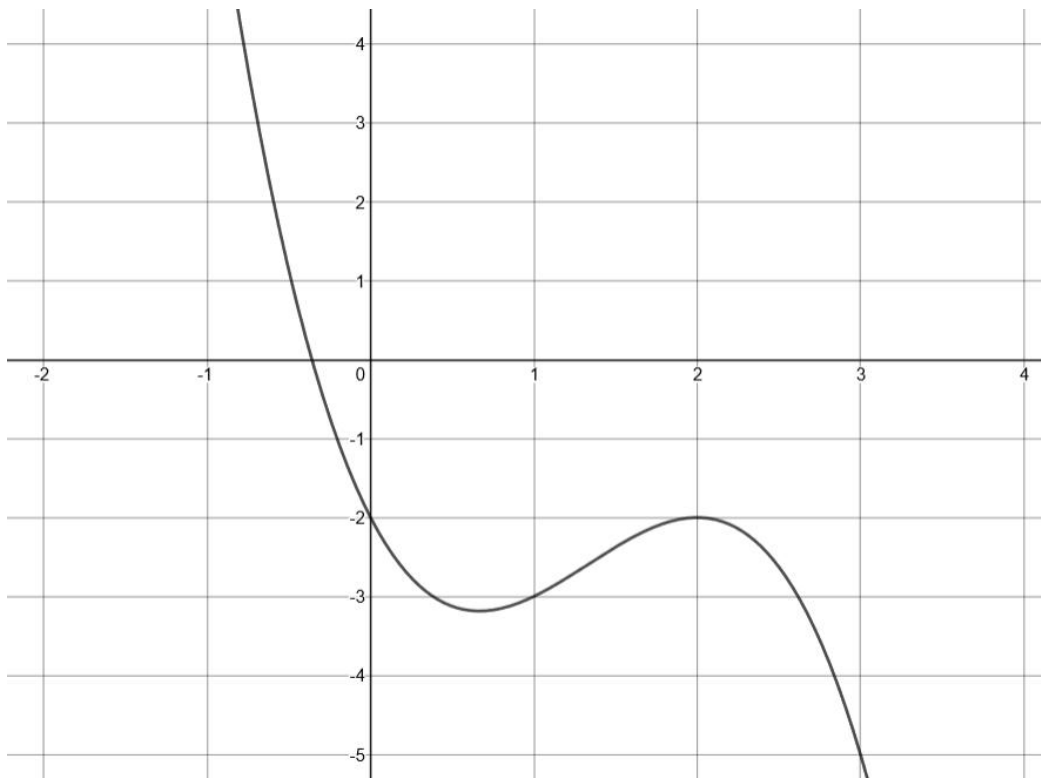
6. A dog named Nellie runs at different speeds around the park. The graph below shows her heart rate at different times during the run. On which of the following intervals is Nellie's heart rate strictly decreasing, then increasing?



- (A) Between 0 and 20 minutes
 (B) Between 20 and 40 minutes
 (C) Between 70 and 90 minutes
 (D) Between 90 and 120 minutes



7. A student marks a point on his bicycle tire with a dab of paint. He rides the bicycle at a constant rate along a straight and level path from a starting point to an ending point. The graph above of $y = d(t)$ could represent which of the following as a function of time from when the bicycle began to move?
- (A) The velocity of the bicycle
 (B) The distance of the bicycle from its starting point
 (C) The velocity of the paint mark around the center of the wheel.
 (D) The height of the paint mark above the ground



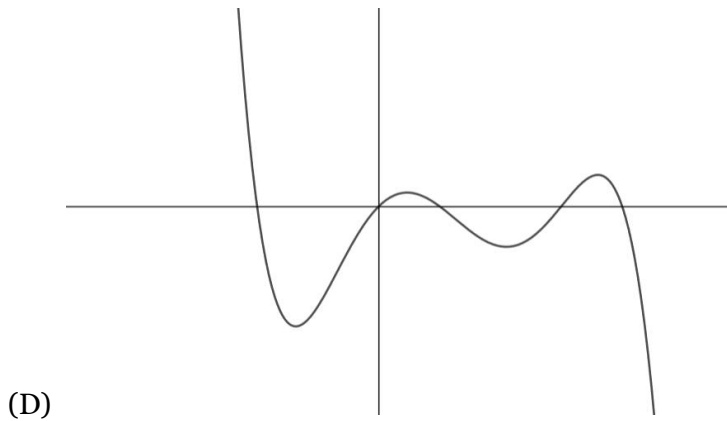
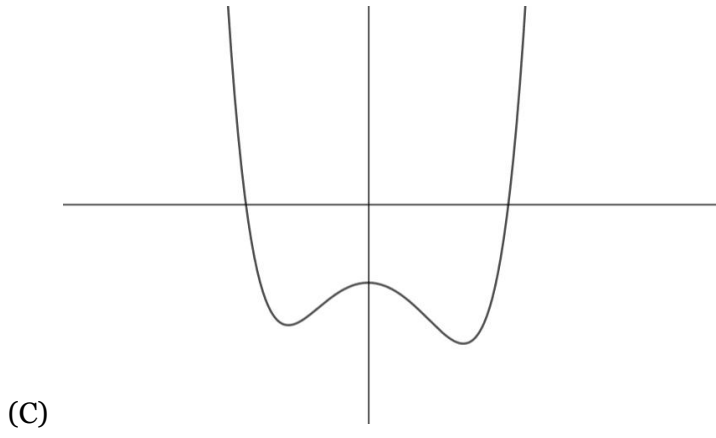
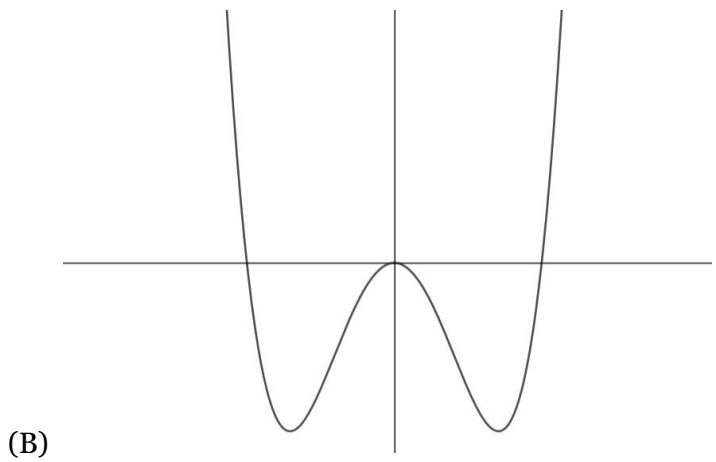
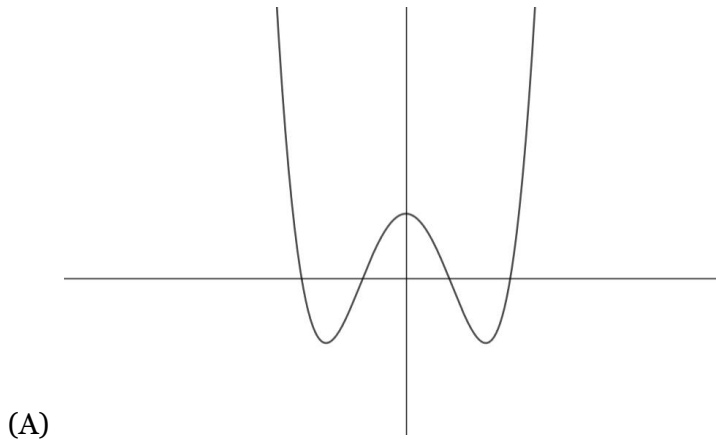
8. The function $f(x) = -x^3 + 4x^2 - 4x - 2$ is graphed in the xy -plane above. If n is a constant such that the equation $f(x) = n$ has three real solutions, what is the value of n ?

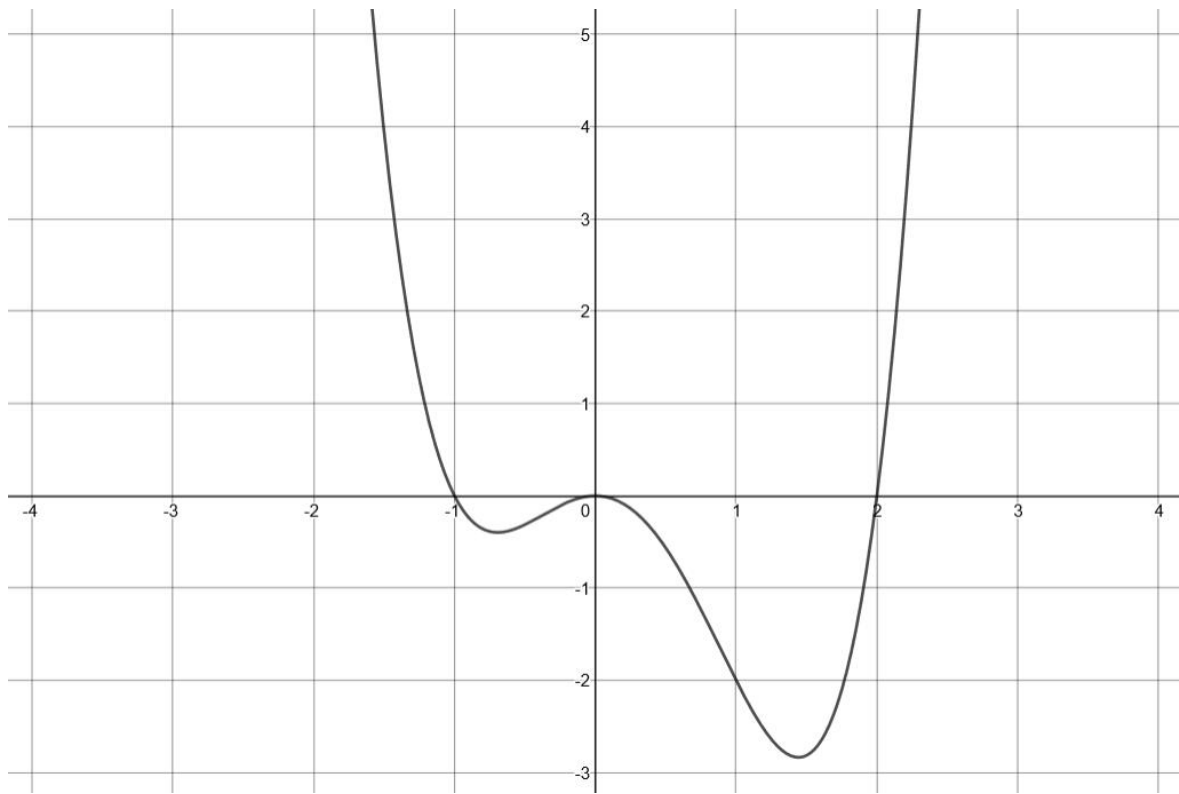
- (A) 1.5
- (B) -2
- (C) -2.5
- (D) -3.5

9. Which of the following is an example of a function whose graph in the xy -plane has no x -intercepts?

- (A) A linear function with a negative slope and a y -intercept of -3
- (B) A quadratic function with no real zeros
- (C) A quadratic function with one real zero
- (D) A quadratic function with two real zeros

10. If the function f has five distinct zeros, which of the following could represent the graph of f in the xy -plane?





11. Which of the following could be the equation of the graph above?

- (A) $x(x+2)(x-1)$
- (B) $x^2(x-2)(x+1)$
- (C) $x(x-2)(x+1)$
- (D) $x^2(x+2)(x-1)$

12. Which of the following graphs shows a strong positive association between g and n ?

