

Functions

Non-Calculator: Multiple Choice

1. Which of the following is an example of a function whose graph in the xy -plane has no x -intercepts?
A) A quadratic function with 2 real zeros
B) A line with one real zero
C) A quadratic function with no real zeros
D) A linear function whose rate of change is not zero
2. Which of the following is an example of a function whose graph has two real zeros?
A) $y = 2x + 1$
B) $y = 2x^2 - 4$
C) $y = 2x^2$
D) $y = x^3 + 1$
3. Which of the following is an example of a function whose graph has two real zeros and two imaginary zeros?
A) $y = x^4 - 1$
B) $y = x^4 - 2x + 1$
C) $y = x^2 - 1$
D) $y = x^2 + 2x + 1$

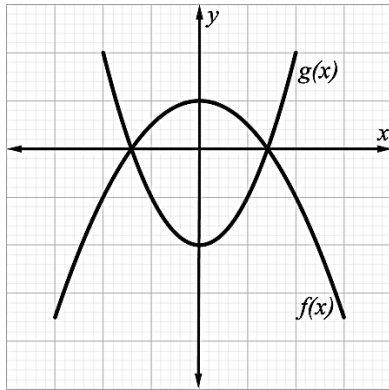
$$g(x) = ax^2 + 12$$

4. For the function g defined above, a is constant, and $g(2) = 20$. What is the value of $g(3)$?
A) 20
B) 24
C) 30
D) 36

$$f(x) = ax^3 - 4$$

5. For the function f defined above, a is constant, and $f(3) = 50$. What is the value of $f(2)$?
A) 4
B) 8
C) 12
D) 14

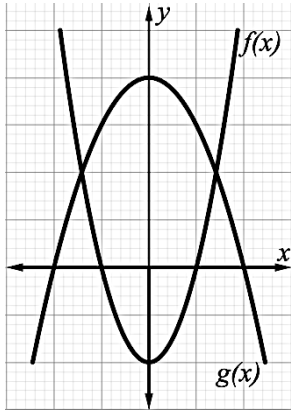
6. The graphs of $f(x) = -\frac{1}{2}x^2 + 1$ and $g(x) = x^2 - 2$ are shown below:



The graphs of f and g intersect at the points $(-k, 0)$ and $(k, 0)$. What is the value of k ?

- A) 1.5
 B) 2
 C) $\sqrt{3}$
 D) $\sqrt{2}$
7. If $f(x) = 2x + 1$ and $g(x) = x^2 + 2$, what is the value of $f(g(2))$?
- A) 5
 B) 13
 C) 27
 D) 38
8. Which of the following equations has more than one real zero?
- A) $y = x^3 + 1$
 B) $y = x + 3$
 C) $y = x^2 - 1$
 D) $y = -x^3 - 3$

9. The graphs of $f(x) = 2x^2 - 4$ and $g(x) = -x^2 + 8$ are shown below:



The graphs of f and g intersect at the points $(-k, 4)$ and $(k, 4)$. What is the value of k ?

- A) 1
B) 2
C) 4
D) 6

n	-4	-3	-2	-1
$f(n)$	-5	-3	-1	1

10. The table above shows some values of the linear function f . Which of the following defines f ?

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

11. Camilla makes earrings from 8:00AM to 4:00PM. She writes down how many earrings she has completed (total) at 4 random hours throughout the day. The table below shows Camilla's earring production.

n	8:00AM	11:00AM	2:00PM	4:00PM
$f(n)$	0	9	18	24

On average, how many earrings did Camilla produce each hour throughout the day?

- A) 2
B) 2.25
C) 3
D) 4.5

Population of Glenwood Springs, CO

Year	Population
2010	9,550
2015	10,000

12. The table above shows the population of Glenwood Springs, Colorado, for the years 2010 and 2015. If the relationship between population and year is linear, which of the following functions P models the population of Glenwood Springs t years after 2010?
- A) $P(t) = 9550 + 90t$
B) $P(t) = 9550 + 75t$
C) $P(t) = 9550 - 90t$
D) $P(t) = 9550 + 9.0t$
13. The solar energy industry experienced annual growth from 2011 to 2016. In 2011, the growth rate was approximately 9 percent and by 2016, the growth rate was 25 percent. Assuming that solar energy production increased at a constant rate, which of the following linear functions f best models the growth rate, as a percent, t years after the year 2011?
- A) $f(t) = \frac{16}{500}t + .09$
B) $f(t) = \frac{16}{5}t + 9$
C) $f(t) = -\frac{16}{50}t + .9$
D) $f(t) = -\frac{16}{5}t + 9$

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

$$h(x) = 1 + g(x)$$

14. The functions g and h are defined above. What is the value of $h(-2)$?
- A) -12
B) 1
C) -2
D) -11

15. One pound of kiwi fruits costs \$3.00. At this rate, how many dollars will c pounds of kiwis cost?

- A) $3 + c$
- B) $3c$
- C) $\frac{3}{c}$
- D) $\frac{c}{3}$

16. The range of the polynomial function f is the set of real numbers less than or equal to 9. If the zeros of f are -4 and 2 , which of the following could be the graph of $y = f(x)$ in the xy -plane?

