Multiple Choice: Calculators Permitted

19. If the point (-2, 5) lies on the graph of y = f(x), what point must be on the graph of $f^{-1}(x - 1)$?

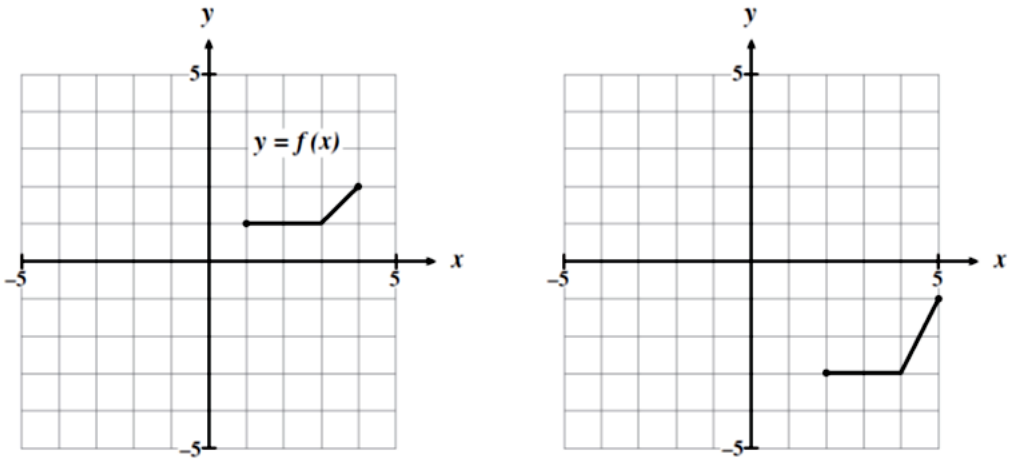
A. (6, 2) B. (6, -2) C. (5, -1) D. (5, -3)

20. The point (-3, 6) is on the graph of y = f(x). What point must be on the graph of y = 2f(-3x)?

A. (1, 3) B. (1, 12) C. (9, 3) D. (9, 12)

21.

The graph of $y = f(x)$ is shown on the left. Determine an equation of the function graphed on the right.



A. $y = \frac{1}{2}f(x-1)-5$

B. $y = \frac{1}{2}f(x-1)-4$

C. $y = 2f(x-1)-5$

D. $y = 2f(x-1)-4$

22. Solve: log x = 2cos x, $0<x<2\pi$

A. 0.17, 0.71 B. 1.38 C. 1.48, 5.07 D. 1.57, 5.11

23.

The height above the ground, h metres, of a person on a Ferris wheel at time t seconds, is given by the formula $h(t) = -20\cos\frac{2\pi}{40}t + 23$, where $t \geq 0$. Determine the earliest time at which the person will be 15 m above the ground.

A. 7.38 s
B. 12.62 s
C. 32.62 s
D. 37.14 s

24.

A circle has a radius of 18 cm. If the length of arc AB is 21π cm, as shown in the diagram, determine the measure of the central angle θ in degrees.

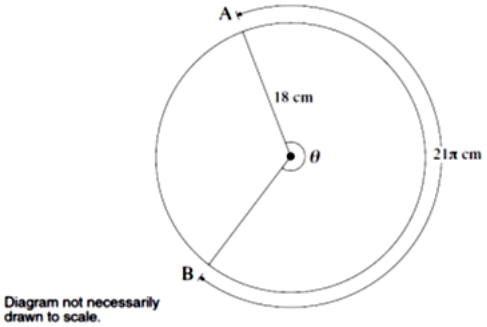


Diagram not necessarily drawn to scale.

A. 120°
B. 150°
C. 210°
D. 240°

25.

Determine the restriction(s) for the expression $\frac{\sec x}{2\sin x + 1}$.

A. $\sin x \neq -\frac{1}{2}$

B. $\sin x \neq 0, \quad \sin x \neq -\frac{1}{2}$

C. $\cos x \neq 0, \quad \sin x \neq -\frac{1}{2}$

D. $\cos x \neq 0, \quad \sin x \neq 0, \quad \sin x \neq -\frac{1}{2}$

26. Which statement is true for $P(x) = 3x^3 + 4x^2 + 2x - 9$?

A. When $P(x)$ is divided by $x + 1$, the remainder is 6.
B. $x - 1$ is a factor of $P(x)$.
C. $P(3) = 36$
D. $P(x) = (x + 3)(3x^2 - 5x + 17) + 42$

27. Which of the following functions is the correct inverse for the function $f(x) = \sqrt{x-2}$, {x | x ? 0, x ? R}?

A $f^{-1}(x) = \sqrt{x+2}$
B $f^{-1}(x) = \sqrt{x} + 2$
C $f^{-1}(x) = x^2 + 2$
D $f^{-1}(x) = (x-2)^2$

28. The 20th term of a geometric sequence is 524 288 and the 14th term is 8 192. The value of the third term could be:

A. 4 only B. 8 only C. +4 and -4 D. +8 and -8

29. A population grows continuously according to the formula $P = P_0 e^{kt}$, where P is the final population at the end of t years. P_0 is the initial population, and k is the annual growth rate. If the initial population is 5000 and the population grew to 6750 in 10 years, determine the value of k.

A. 3% B. 0.3% C. 13% D. 30%

30. The pH scale measures the acidity (0-7) or alkalinity (7-14) of a solution. It is a logarithmic scale in base 10. Thus, a pH of 5 is 10 times more **acidic** than a pH of 6. If solution A has a pH of 3.5, how many times more **acidic** is it than solution B which has a pH of 5?

A. 1.49 B. 1.50 C. 30.90 D. 31.62