

1) If $f(x) = 3 - \sqrt{x+4}$, then $(f \circ f^{-1})(-8) + f^{-1}(0)$ is equal to

A) -3

B) -7

C) -21

D) 7

E) 13

2) If $f(x) = 3x^2 - 4x + k$, $x > \frac{2}{3}$ and $f^{-1}(4) = 2$, then $f^{-1}(-1) =$

A) 1

B) $\frac{1}{3}$

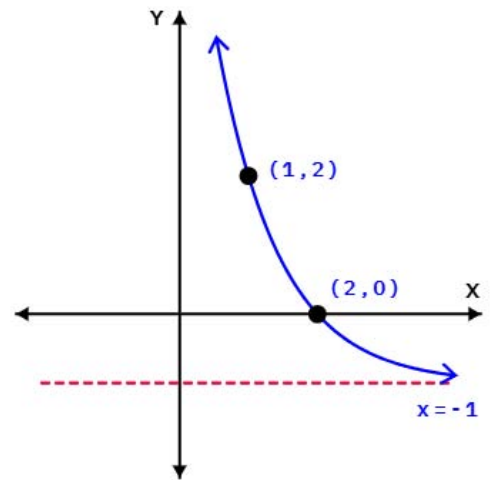
C) $-\frac{1}{2}$

D) 3

E) $\frac{3}{2}$

- 3) If the adjacent figure represents the graph of $f(x) = b^{x+h} + k$, then the y -intercept of the function, is

- A) 8
- B) 3
- C) 15
- D) 10
- E) 5



- 4) The graph of the function $f(x) = 1 - 2^{-|x-1|}$ is **decreasing** on the interval
- A) $(-\infty, 1)$
 - B) $(1, \infty)$
 - C) $(-\infty, 2)$
 - D) $(0, 2)$
 - E) $(2, \infty)$

- 5) If $(a, 0)$ is the x -intercept of $f(x) = 125 - 25^{x+3}$ and $(0, b)$ is the y -intercept of $g(x) = 2e^{2x + \ln 5}$, then $2a + b =$
- A) 7
- B) 13
- C) -1
- D) -3
- E) 5
- 6) Which one of the following statements is FALSE about the graph of the function $f(x) = -\log(x+2)^2$
- A) The graph of f is above the x -axis on $(-3, -2) \cup (-2, 0)$
- B) The range of f is $(-\infty, \infty)$
- C) The graph of f has two x -intercepts
- D) The graph of f is increasing on the interval $(-\infty, -2)$
- E) The domain of f is $(-\infty, -2) \cup (-2, \infty)$

7) The **domain** of the function $f(x) = \log_3 \left(\frac{4 - x^2}{|x|} \right)$, is

- A) $(-2, 0) \cup (0, 2)$
- B) $(-2, 2)$
- C) $(-\infty, 0) \cup (0, 2)$
- D) $(-\infty, 2) \cup (2, \infty)$
- E) $(-\infty, -2) \cup (0, 2)$

8) Which one of the following statements is TRUE ?

- A) $\log_2(4^x) = 2x$
- B) $\ln(x^3 + 2) = (3 \ln x)(\ln 2), x > 0$
- C) $\ln x^2 = 2 \ln x$, for any real number x
- D) $\ln x > 0$, if $x > 0$
- E) $\frac{\log x}{\log y} = \log x - \log y$

9) If $\log 2 = x$ and $\log 7 = y$, then $\log_5 \left(\frac{49}{8} \right) =$

A) $\frac{3x - 2y}{x - 1}$

B) $\frac{3x + 2y}{x - 1}$

C) $\frac{2y - 3x}{x - 1}$

D) $\frac{2y - 3x}{x + 1}$

E) $\frac{2y + 3x}{x + 1}$

10) $\log_4 \left[\log_2 \left(\log_{\sqrt{3}} 9 \right) \right] =$

A) $\frac{1}{2}$

B) 2

C) $\frac{2}{3}$

D) 3

E) 0

11) The solution set of the equation $3^{2x+1} - 26(3^x) = 9$ consists of

- A) one positive real number only
- B) one negative real number only
- C) two positive real numbers
- D) two negative real numbers
- E) one positive and one negative real numbers

12) The **sum** of all the solution(s) of the equation $\log_{4x}(16) + \log_{\frac{x}{2}}(16) = 2$, is

- A) $\frac{33}{2}$
- B) $\frac{9}{2}$
- C) $\frac{31}{2}$
- D) 16
- E) 15

- 13) If an object moves on a circular path making a 13π cm arc that subtends a central angle of 130° , then the radius of the circular path, in cm, is
- A) 18
 - B) 9
 - C) 6
 - D) 13
 - E) 12
- 14) If a scooter with 10 cm radius tires moves 4800π cm per minute, then the number of revolutions per second the scooter's tires are making is
- A) 4
 - B) 8
 - C) 2
 - D) 40
 - E) 80

- 15) If the angle of elevation from a point 60 meters from the base of a tower to the top of the tower is θ , where $\sec \theta = \frac{2\sqrt{3}}{3}$. How high must the tower be raised so the angle of elevation from the same point changes to 60° ?

- A) $40\sqrt{3}$
- B) $20\sqrt{3}$
- C) $60\sqrt{3}$
- D) $80(\sqrt{3} - 1)$
- E) $20(\sqrt{3} - 1)$

- 16) If β is an acute angle in a right triangle, then $\frac{\sin \beta + \cos(90^\circ - \beta)}{\cos(\beta - 90^\circ)} =$

- A) 2
- B) -2
- C) 0
- D) $2 \tan \beta$
- E) $\sin \beta - 1$

17) The exact value of $\left[\tan\left(\frac{11\pi}{4}\right) + \sin\left(-\frac{13\pi}{6}\right) \right] \div (\csc^2 25^\circ - \cot^2 25^\circ)$, is

A) $-\frac{3}{2}$

B) $\frac{1}{2}$

C) 0

D) $\frac{3}{2}$

E) $-\frac{1}{2}$

18) If $\cot \theta = \frac{2\sqrt{5}}{5}$ and $\sec \theta < 0$, then $\sin \theta + \tan \theta =$

A) $\frac{\sqrt{5}}{6}$

B) $\frac{5\sqrt{5}}{6}$

C) $-\frac{\sqrt{5}}{3}$

D) 0

E) -1

19) Which one of the following statements is TRUE ?

- A) $\sin \frac{5\pi}{2} = 1$
- B) $\sec 3\pi = 0$
- C) $\cos 4\pi = -1$
- D) $\tan 3\pi$ is undefined
- E) $\csc \frac{7\pi}{2}$ is undefined

20) If $f(x) = \sqrt[3]{x} \csc(x)$ and $g(x) = \cot(\sec x)$, then

- A) f is an even function and g is an even function
- B) f is an even function and g is an odd function
- C) f is an odd function and g is an odd function
- D) f is an even function and g is neither even nor odd function
- E) f is neither even nor odd function and g is an even function