1) If $f^{-1}(x) = \frac{1}{x} - 1$, then the graph of $f(x)$ is **below** the x–axis on the interval:

A) $(-\infty, -1)$

B) $(-\infty, 1)$

C) $(0, 1)$

D) $(-1, \infty)$

E) $(1, \infty)$

2) If $f(x) = a^{-2x}$ and $f(1) = \frac{1}{4}$, then $f^{-1}(16) =$

A) -2

B) 4

C) 2

D) -4

E) $\frac{5}{2}$

3) The **range** of the graph of $y = -1 + 2^{-|x|}$, in interval notation, is

A) $(-1, 0]$

B) $[-2, -1)$

C) $(-2, -1]$

D) $(0, 1]$

E) $[-1, 0)$

4) If the function $f(x) = e^{b-x} + c$ represents the given graph, then $b + c =$

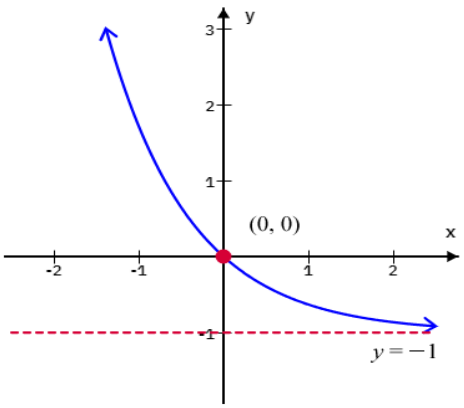
A) -1

B) -2

C) 0

D) 1

E) 2



5) Which one of the following statements is **FALSE** about the graph of the function $f(x) = 1 - 2^{-x}$

A) The graph of f is decreasing on the interval $(-\infty, \infty)$

B) The range of f is $(-\infty, 1)$

C) The domain of f is $(-\infty, \infty)$

D) The graph of f has x–intercept $(0, 0)$

E) The graph of f has y–intercept $(0, 0)$

6) The **domain** of $y = \log\left(\frac{x+1}{x^2+1}\right)$ is

A) $(-1, \infty)$

B) $(-1, 1) \cup (1, \infty)$

C) $(1, \infty)$

D) $(-\infty, 1)$

E) $(-1, 1)$

7) For the function $f(x) = \log_3 (x + 1) - 1$, if the x and y intercepts are $(a, 0)$ and $(0, b)$, then $a + b =$

A) 1

B) 2

C) -1

D) 3

E) -2

8) $3 (\log_4 2x + 6 \log_{16} y - 2 \log_4 z) =$

A) $\log_4 \frac{8x^3y^9}{z^6}$

B) $\log_4 \frac{2x^3y^6}{z^6}$

C) $\log_4 \frac{4x^2y^9}{z^3}$

D) $\log_4 \frac{8x^3y^6}{z^2}$

E) $\log_4 \frac{4x^3y^9}{z^3}$

9) The graph of $f(x) = \left| \log_2 (x - 2) \right|$ is **decreasing** on the interval

A) $(2, 3)$

B) $(2, \infty)$

C) $(3, \infty)$

D) $(-\infty, 3)$

E) $(0, 3)$

10) If $\ln 5 = x$, then $\dfrac{\log_2 (\sqrt{5})}{\log_2 (e)} =$

A) $\dfrac{1}{2}x$

B) $2x - 1$

C) $\dfrac{1}{2}x - 1$

D) $2x$

E) $\dfrac{1}{2}x + 1$

11) $\left(2 \ln \frac{1}{2}\right)\ \left(\log_4 \sqrt{e}\right) =$

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

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

C) $\frac{1}{4}$

D) $-\frac{1}{4}$

E) -2

12) If k is the solution of $64^{x} + 4^{3x+1} = 25$, then $3k =$

A) $\log_4 5$

B) $\log \frac{5}{3}$

C) $\log_4 \frac{5}{3}$

D) 5

E) $-\frac{5}{3}$

13) The **sum** of the solution(s) of $\log(x+7) = 1 + \log(x-2)$ is

A) 3

B) 1

C) -3

D) 0

E) -1

14) The measure of the central angle θ in a circle of diameter of 6 cm that is subtended by an arc length of 6 cm is

A) $\left(\frac{360}{\pi}\right)^{o}$

B) 2^{o}

C) $(2\pi)^{o}$

D) $\left(\frac{180}{\pi}\right)^{o}$

E) 1^{o}

15) The coterminal angle of $\theta = \frac{20\pi}{3}$ is

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

B) $\frac{3\pi}{4}$

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

D) $\frac{7\pi}{3}$

E) $\frac{4\pi}{3}$

16) In the adjacent figure , the value of $\frac{x}{y}$ is

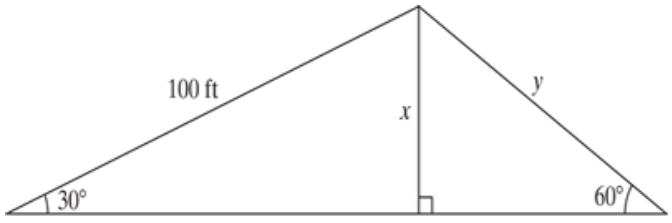
A) $\frac{\sqrt{3}}{2}$

B) $\frac{2\sqrt{3}}{3}$

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

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

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



17) If the angle of **depression** from the top of a tower to a point on the ground 36 meters from the bottom of the tower is θ, where $\cot\theta = \frac{3}{4}$, then the height of the tower, in meters, is

A) 48

B) 27

C) $12\sqrt{3}$

D) $36\sqrt{3}$

E) 24

18) $\tan^2(-420°) - \sec^2\left(\frac{\pi}{3}\right) =$

A) -1

B) 1

C) $-\frac{1}{4}$

D) $\frac{3}{4}$

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

19) $\cos 36° + \cos 144° =$

A) 0

B) -1

C) undefined

D) $\sqrt{2}$

E) $2\cos 36°$

20) If $2\sin\theta = \cos\theta, \quad \pi < \theta < \frac{3\pi}{2}$, then $\sin\theta + \cos\theta =$

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

B) $\frac{3\sqrt{5}}{5}$

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

D) $\frac{\sqrt{5}}{5}$

E) $\frac{2\sqrt{5}}{5}$