4.1: (Exponential Functions and The Natural Exponential)

If the two points $(-2, 1)$ and $(2, 81)$ lie on the graph of the exponential function $y = b^{x+c}$, then $b + c =$

A) 3

B) 6

C) 5

D) -2

E) 0

The range of the function $f(x) = 1 + e^{-|x-2|}$ is

A) $(2, \infty)$

B) $(0,2]$

C) $(1, \infty)$

D) $(1,2]$

E) $(-\infty, 2]$

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

A) 4

B) 2

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

D) 8

E) -2

If $f(x) = a^{2x-3}$ and $f\left(\frac{1}{2}\right) = \frac{1}{4}$, then $f^{-1}(32) =$

A) 2

B) 4

C) -2

D) -4

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

The range of the function $f(x) = 2 - \left(\frac{1}{3}\right)^{x-1}$ is

A) $(2, \infty)$

B) $(-3, \infty)$

C) $(-\infty, 2)$

D) $(-\infty, 0)$

E) $(-\infty, 3)$

If $f(x) = -\left(\frac{1}{3}\right)^{x+2} + 3$, then $f^{-1}(2)$ is equal to:

(a) -2

(b) 1

(c) 3

(d) 0

(e) -1

If $f(x) = 2 + e^{(x-3)}$, then the domain of f^{-1} is

A) $(3, \infty)$

B) $(2, \infty)$

C) $(-\infty, 2)$

D) $[2, \infty)$

E) $(-\infty, 3)$

Let $f(x) = a - 2^{bx}$, If $f^{-1}(0) = 0$ and $f^{-1}(-3) = -1$, then $a + b =$

A) -1

B) 0

C) -2

D) 1

E) 2

If $f(x) = -\left(\frac{1}{2}\right)^{2-x} + 2$, then the domain of the inverse function f^{-1} is

A) $(-\infty, 2)$

B) $[2, \infty)$

C) $(-\infty, \infty)$

D) $(2, \infty)$

E) $(-\infty, 2]$

The graph of $f(x) = 1 - 2^{x+1}$ is below the x-axis on the interval

A) $(-1, \infty)$

B) $(1, \infty)$

C) $(-\infty, \infty)$

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

E) $(-\infty, 1)$

The graph of the function $y = 1 - \left(\frac{1}{2}\right)^{2-x}$ lies below the x-axis on the interval

A) $(2, \infty)$

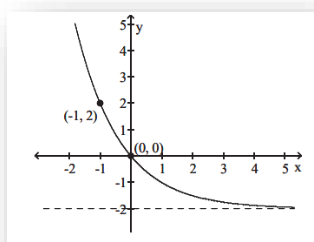
B) $(-\infty, 2)$

C) $(-\infty, 1)$

D) $(1, \infty)$

E) $(1,2)$

If the function $f(x) = 2^{(ax+b)} + c$ represents the graph below, then $a + b + c =$



A) -2

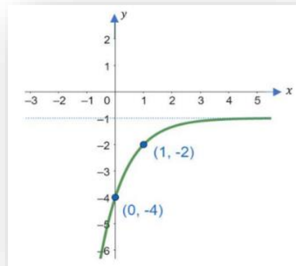
B) -1

C) 0

D) 2

E) 1

The equation of the adjacent graph is



A) $y = -3^{1-x} - 1$

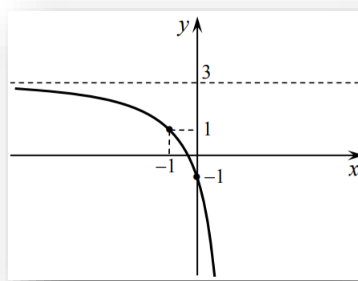
B) $y = -3^{x+1} - 1$

C) $y = 3^{x-1} - 1$

D) $y = -\left(\frac{1}{3}\right)^{1-x} - 1$

E) $y = 3^{1+x} - 1$

If $y = -\left(\frac{1}{2}\right)^{ax+b} + 3$ is the function of the graph below, then $a + b =$



A) -3
B) -1
C) 1
D) 2
E) -2

If $f(x) = a^x$ is an exponential function and $f^{-1}\left(\frac{1}{9}\right) = -2$, then $f(4) =$

A) 81

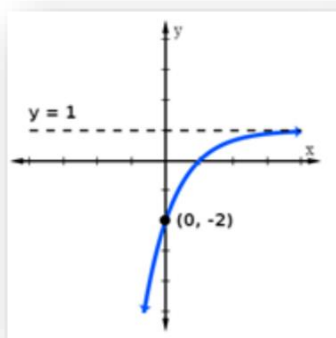
B) 27

C) 16

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

E) $\frac{1}{16}$

The equation of the adjacent graph is



A) $y = -\left(\frac{1}{3}\right)^{x-1} + 1$

B) $y = -\left(\frac{1}{3}\right)^{x+1} + 1$

C) $y = -\left(\frac{1}{3}\right)^{x-1} - 1$

D) $y = -\left(\frac{1}{3}\right)^{x+1} - 1$

E) $y = -\left(\frac{1}{3}\right)^{1-x} + 1$

Which one of the following statements is FALSE about the graph of the function $f(x) = \left(\frac{1}{3}\right)^{-x+1} - 9$

A) The x-intercept is -1

B) The y-intercept is $-\frac{26}{3}$

C) The graph of f increases on the interval $(-\infty, \infty)$

D) The graph of f has a horizontal asymptote $y = -9$

E) The range of f is $(-9, \infty)$

If $f(x) = a^x$ and the graph of f passes through the point $(-3,64)$, then $f\left(\frac{5}{2}\right) =$

A) $\frac{1}{32}$

B) $\frac{1}{16}$

C) -16

D) -32

E) $\frac{1}{243}$

The range of the function $f(x) = 3 + 2^{-|x|}$ is

A) $(3,4]$

B) $[3, \infty)$

C) $(-\infty, 3]$

D) $(-3,2]$

E) $(0,3)$

If $f(x) = 3^{k-x}$ and $f(-3) = 3$, then $f(2) =$

A) $\frac{1}{32}$

B) $\frac{1}{9}$

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

D) $\frac{1}{81}$

E) $\frac{1}{27}$

If $g(x) = \left[\frac{1}{3}\right]^{3-x} - 27$, then which one of the following statements is TRUE?

A) x-intercept of g is 6.

B) g is a decreasing function.

C) Range of g is $(27, \infty)$

D) the line of $y = 27$ is a horizontal asymptote of g.

E) domain of g is $(3, \infty)$

If $f(x) = a^x, a > 0$ and $a \neq 1$, then $\frac{f(x+2)}{f(x+1)} + \frac{2f(x+1)}{f(x)}$ is equal to:

A) $3a$

B) $2a$

C) $3\mathrm{a}^x$

D) 3

E) $3a^{x+1}$

Which one of the following statements is TRUE about the function $f(x) = \left(\frac{1}{2}\right)^{1-x} - 1$?

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

B) The x-intercept of f is -1.

C) f is decreasing on $(-\infty, \infty)$.

D) The domain of f is $(-\infty, 1)$.

E) The y-intercept of f is -1.

If $(a, 0)$ is the x-intercept and $(0, b)$ is the y-intercept of the function $f(x) = -2^{-x+2} + 8$, then $b - a =$

A) 5
B) 0
C) -3
D) 3
E) -4

If $f(x) = 2^{3-x}$ is written in the form $f(x) = ka^x$, then

A) $k = 8, a = \frac{1}{2}$

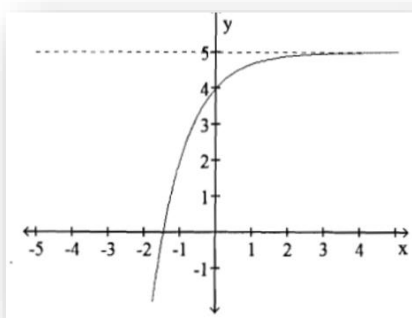
B) $k = 9, a = \frac{1}{2}$

C) $k = 2, a = \frac{1}{8}$

D) $k = 8, a = -\frac{1}{2}$

E) $k = 8, a = -2$

The adjacent figure represents the graph of:



A) $5 - 3^{-x}$

B) $5 + 3^{-x}$

C) $-3 + 5^x$

D) $5 - 3^x$

E) $3 + 5^x$

Let $f(x) = a^x$ be an exponential function. If $f(5/2) = 4\sqrt{2}$ and $f(-3) = k$ then $a + k =$

(A)) $\frac{17}{8}$

B) $\frac{8}{17}$

C) $\frac{17}{2}$

D) $\frac{2}{17}$

E) $\frac{65}{32}$

If $a > 0, a \neq 1$, which one of the following statements is TRUE?

A) The base of the exponential function $f(x) = a^x$ whose graph contains the point $\left(-4, \frac{1}{16}\right)$ is 2 .

B) The range of $f(x) = a^x$ is $[0, \infty)$.

C) The graph of $f(x) = a^{x+2}$ has $x = 2$ as a vertical asymptote.

D) The graph of the exponential function $y = a^x$ is the same as the graph of $y = -\left(\frac{1}{a}\right)^x$.

E) The domain of $f(x) = a^x$ is $(0, \infty)$.

If $f(x) = \left(\frac{1}{2}\right)^{1-2x}$, then $f(x)$ can be written as

(a) $f(x) = \left(\frac{1}{2}\right) 4^{x}$

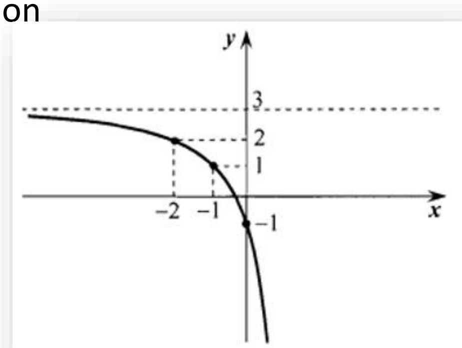
(b) $f(x) = \left(\frac{1}{2}\right) 4^{-x}$

(c) $f(x) = \left(\frac{1}{4}\right) 2^{x}$

(d) $f(x) = \left(\frac{1}{4}\right) 2^{-4}$

(e) $f(x) = \left(\frac{1}{2}\right) 2^{x}$

The adjacent graph represents the function



A) $y = -2^{x+2} + 3$

B) $y = -2^{2-x} + 3$

C) $y = 2^{-x} - 3$

D) $y = 2^{x+1} - 3$

E) $y = -2^{-x} + 5$

Which one of the following statements is false about the function $f(x) = -2^{x-1} + 4$?

A) the graph of f has an x-intercept 3 and y-intercept 3

B) f is a decreasing function over the interval $(-\infty, \infty)$

C) the range of f is $(-\infty, 4)$

D) the horizontal asymptote of the graph of f is $y = 4$

E) the graph of f is above the x-axis on the interval $(-\infty, 3)$

Let $(a, 0)$ and $(0, b)$ be the x - and y-intercepts of the graph of $y = -4 + \left(\frac{1}{2}\right)^{x-3}$ then $a + b =$

A) $\frac{11}{4}$

B) 5
C) -3
D) -6
E) 9

Which of the following statements is NOT TRUE about the function $f(x) = -\left(\frac{1}{8}\right)^x$?

A) f is a one-to-one function.

B) The graph of f is asymptotic to the negative x-axis.

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

D) The function f is increasing on $(-\infty, \infty)$.

E) The graph of f passes through the point $(0, -1)$.

The graph of $y = 2^{4-x} - 4$

A) is below the x-axis on the interval $(2, \infty)$

B) is increasing on the interval $(-\infty, \infty)$

C) has an x-intercept at $(12,0)$

D) is decreasing on the interval $(0, \infty)$ only

E) has a horizontal asymptote $y = 0$

If $f(x) = \left(\frac{2}{3}\right)^{2-3x}$ is written as $f(x) = ka^x$, then $8a - 27k =$

A) 15

B) 39

C) 19

D) -15

E) -19

Which one of the following statements is true for the function $f(x) = -\left(\frac{1}{5}\right)^{x-3} + 25$?

A) The range is $(-\infty, 25)$

B) The x-intercept is -1

C) The y-intercept is -10

D) The graph of f is decreasing

E) The graph of f has horizontal asymptote $y = -25$

If the points $(3,4)$ and $(4,16)$ lie on the graph of $f(x) = b^{x+3c}$, then $f(2) =$

A) 1

B) -2

C) 6

D) 7

E) -6

The graph of the function $y = 3\left(\frac{1}{3}\right)^{1-x} - 1$ is below the x-axis on the interval

A) $(-\infty, 0)$

B) $(0, \infty)$

C) $(-\infty, 1)$

D) $(1, \infty)$

E) $(0,1)$

The graph of the function $y = |e^{-x} - 1|$ is increasing on the interval

A) $(0, \infty)$

B) $(-\infty, 0)$

C) $(-\infty, 1)$

D) $(-1, \infty)$

E) $(-\infty, \infty)$

Which one of the following statements is TRUE about $f(x) = 1 - 2^{-|x|}$?

A) the range of $f(x)$ is $[0,1)$

B) the range of $f(x)$ is $(-1,0\,]$

C) the graph of $f(x)$ is increasing on $(-\infty, 0)$

D) the graph of $f(x)$ is decreasing on $(0, \infty)$

E) the line $y = -1$ is an asymptote to the graph of $f(x)$

If the graph of the function $f(x) = 1 + |2^x - b|$, where $b > 0$, has a horizontal asymptote at $y = 3$, then $b + 1 =$

(a) 3

(b) 2

(c) 4

(d) 5

(e) 1