

4.3: (Logarithmic Functions)

If $f(x) = \log_{1/3} (1 - x)$, then $f^{-1}(-1)$ is equal to

A) -2

B) 2

C) 0

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

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

The interval on which the graph of $f(x) = \left(\frac{1}{2}\right)^{x-2} - 3$ is below the x-axis is

A) $(2 - \log_2 3, \infty)$

B) $(-\infty, 2 - \log_2 3)$

C) $(-2 + \log_2 3, \infty)$

D) $(0, \infty)$

E) $(-\infty, 3 - \log_3 2)$

If $x = e^{(-\ln 3 + 2\ln 5)}$ and $y = \ln \sqrt[4]{e^5}$, then $x + y =$

(a) $\frac{115}{12}$

(b) $\frac{101}{12}$

(c) $\frac{30}{7}$

(d) $\frac{100}{11}$

(e) $\frac{100}{7}$

The graph of the function $f(x) = |-e^{-x} + 4|$, is decreasing on the interval

A) $(-\infty, -2\ln 2)$

B) $(2\ln 2, \infty)$

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

D) $(-2\ln 2, \infty)$

E) $(-\infty, 2\ln 2)$

The graph of $f(x) = 3 - 2^{-x}$ is above the x -axis on the interval

A) $(-\log_2 3, \infty)$

B) $(-1, \infty)$

C) $(-\infty, 3)$

D) $(-\infty, \log_2 \frac{1}{3})$

E) $(-\log_3 2, \infty)$

The graph of the function $y = -\ln |x - 2|$ is above the x - axis on

A) $(3, \infty)$

B) $(-\infty, 1)$

C) $(1, 3)$

D) $(1, 2) \cup (2, 3)$

E) $(-\infty, 1) \cup (3, \infty)$

The graph of the function $f(x) = \left| \log_{\frac{1}{2}}(-x + 2) \right|$ is increasing on the interval

A) $(1, 2)$

B) $(1, \infty)$

C) $(-1, -2)$

D) $(-\infty, 2)$

E) $(-\infty, 1)$

If the adjacent figure represents the graph of the function $f(x) = \log_b(a - x)$, then $a + b =$

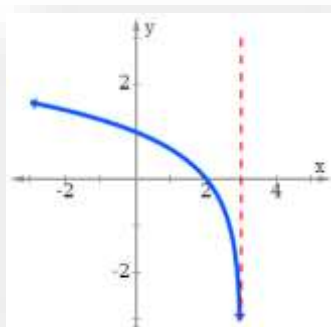
A) 6

B) 4

C) 3

D) 0

E) 9



The graph of the function $y = -\log |2 - x|$ is decreasing on the interval

A) $(2, \infty)$

B) $(-\infty, 2)$

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

D) $(0, \infty)$

E) $(-\infty, 0)$

The graph of the function $f(x) = |\log_2 (x - 2)|$ is decreasing on the interval

A) $(0, 2)$

B) $(-\infty, 2)$

C) $(2, 3)$

D) $(3, \infty)$

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

The domain of the function $f(x) = \log \left(\frac{x+2}{x-1} \right)^2$

A) $(-\infty, -2) \cup (-2, 1) \cup (1, \infty)$

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

C) $(-\infty, -2) \cup (1, \infty)$

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

E) $(-2, 1)$

The domain of the function $y = 1 + \log_2 \left(\frac{2-x}{x+1} \right)$ is

A) $(-1, 2)$

B) $(-2, 2)$

C) $(-\infty, -2) \cup (1, \infty)$

D) $(-\infty, 1) \cup (2, \infty)$

E) $(-\infty, -1) \cup (2, \infty)$

The domain of the function $f(x) = \ln \left(\frac{(1-x)^2}{4x-x^2} \right)$

A) $(0,1) \cup (1,4)$

B) $(0,4)$

C) $(1,4)$

D) $(0,1)$

E) $(-\infty, 0) \cup (1,4) \cup (4, \infty)$

If $(p, 0)$ is the x -intercept and $(0, q)$ is the y -intercept of the graph of $f(x) = \log_{1/3} (3 - x)$, then $p - q =$

A) 3

B) -1

C) 1

D) 2

E) $1/3$

If the domain of $f(x) = \frac{\ln(x^2 - x - 2)}{\ln(x - 2)}$ is $(a, b) \cup (b, \infty)$, then $a + b =$

A) 6

B) 7

C) 4

D) -1

E) 5

If the inverse of $f(x) = 1 + e^{2x-3}$ is $f^{-1}(x) = a + b \ln(x + c)$, then $a + b + c =$

A) 4

B) -2

C) 2

D) 3

E) 1

If $(a, 0)$ and $(0, b)$ are points on the graph of the function $f(x) = \log_3 (x + 1) - 1$, then $a + b =$

A) -2

B) 3

C) 1

D) -1

E) 2

The domain of the function $y = 3 + \log_2 \left(\frac{4-2x}{x-1} \right)$, is

A) $(1, 2)$

B) $(-\infty, 1) \cup (2, \infty)$

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

D) $(-\infty, 1) \cup (4, \infty)$

E) $(1, 4)$

The domain, in interval notation, of the function $f(x) = \ln(x - x^2)$ is

- A) $(1, \infty)$
- B) $(0, 1)$
- C) $(-\infty, \infty)$
- D) $(-\infty, 1)$
- E) $(-\infty, 0)$

The graph of $f(x) = -\ln|x + 2|$ lies above the x -axis on the interval

- A) $(-3, -2) \cup (-2, -1)$
- B) $(-\infty, -3) \cup (-1, \infty)$
- C) $(-2, -1) \cup (-1, \infty)$
- D) $(-2, 0)$
- E) $(-3, 0)$

The graph of the function $y = \log_2 |x - 2| - 1$ is above the x -axis on

A) $(-\infty, 0) \cup (4, \infty)$

B) $(-\infty, 4) \cup (8, \infty)$

C) $(2, 6)$

D) $(2, \infty)$

E) $(-\infty, 6)$

The domain of $f(x) = \ln \left| \frac{3}{4-x^2} \right|$ is

A) $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

B) $(-2, 2)$

C) $(-2, 0) \cup (0, 2)$

D) $(0, 2)$

E) $(-\infty, -2) \cup (2, \infty)$

The graph of $y = |\log (x + 1)^2|$ is increasing on the interval

A) $(-2, -1) \cup (0, \infty)$

B) $(-\infty, -2) \cup (-1, 0)$

C) $(-2, \infty)$

D) $(-\infty, -2)$

E) $(-1, \infty)$

If the adjacent figure is the graph of the function $f(x) = -\log_a (x + b)$ then $a + b =$

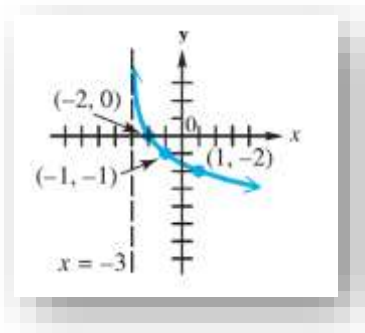
A) 5

B) -1

C) 13

D) 6

E) $\frac{7}{2}$



The domain D and the range R of the function $f(x) = |\log_{1/3} (2 - x)| + 1$ are given by

A) $D = (-\infty, 2); R = [1, \infty)$

B) $D = (-\infty, \infty); R = [0, \infty)$

C) $D = (-\infty, 2) \cup (2, \infty); R = (-\infty, 1]$

D) $D = (2, \infty); R = (-\infty, \infty)$

E) $D = (-\infty, 1); R = (-\infty, 0]$

The graph given on the right can be represented by

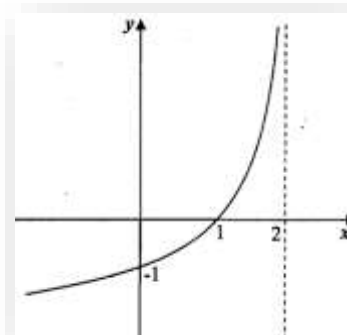
A) $y = \log_2 (x - 2)$

B) $y = -\log_2 |(2 - x)|$

C) $y = -\log_2 (3 - x)$

D) $y = -\log_2 (2 - x)$

E) $y = |\log_2 (2 - x)|$



The graph of the function $y = \log |x - 2|$ lies below the x -axis over the interval

A) $(-\infty, 1) \cup (3, \infty)$

B) $(0, 1) \cup (1, 2)$

C) $(1, 2) \cup (2, 3)$

D) $(-\infty, 1) \cup (2, \infty)$

E) $(1, 3)$

The domain of the function $f(x) = \log_4 \left(\frac{|3-x|}{x^2+x-2} \right)$ is

A) $(-\infty, -2) \cup (1, 3)$

B) $(-\infty, 3) \cup (3, \infty)$

C) $(-\infty, -2) \cup (1, 3) \cup (3, \infty)$

D) $(-2, 1) \cup (1, 3)$

E) $(-\infty, -2) \cup (3, \infty)$

The function $f(x) = \log_2 \left(\frac{3+x}{8} \right)$ is

- A) increasing and passing through the quadrants I and IV.
- B) decreasing and passing through the quadrants III and IV.
- C) increasing and passing through the quadrants II and III.
- D) decreasing and passing through the quadrants II, III and IV.
- E) increasing and passing through the quadrants I, III and IV.

The domain of the function $f(x) = \ln(e^{-x} - e^x)$ is

- A) $(-\infty, \infty)$
- B) $(-\infty, 0)$
- C) $(-\infty, 0]$
- D) $(0, \infty)$
- E) $(0, 1)$

The domain in interval notation of the function $f(x) = \ln \left| \frac{x-5}{x} \right|$

- A) $(-\infty, 0) \cup (5, \infty)$
- B) $(-\infty, 0) \cup (0, 5) \cup (5, \infty)$
- C) $(-\infty, 0) \cup [5, \infty)$
- D) $(-\infty, \infty)$
- E) $(5, \infty)$

If $f(x) = \log_2 (4 - x)$, which one of the following statements is true?

- A) The graph of f is below the x -axis on the interval $(3, 4)$.
- B) The graph of f is below the x -axis on the interval $(-\infty, 3)$.
- C) The domain of f is $(4, \infty)$.
- D) The domain of f is $(0, \infty)$.
- E) The graph of f is above the x -axis on the interval $(3, \infty)$.

If $f(x) = -\log_{1/2}(-x)$, then

- A) the graph of f is decreasing over the interval $(-\infty, 0)$
- B) the graph of f neither decreasing nor increasing.
- C) Point $(\frac{1}{2}, 1)$ is on the graph of f
- D) the range of f is $(0, \infty)$
- E) x -axis is a horizontal asymptote.

The graph of the function $f(x) = \log_{1/3}(3 - x)$

- A) is increasing over the entire domain
- B) has domain $(-\infty, 0)$
- C) has vertical asymptote at $x = 2$
- D) has x intercept - 1
- E) has range $(0, \infty)$

If $f(x) = \log(x - 3)^2$ then:

A) the graph of f is above x -axis on the interval $(-\infty, 2) \cup (4, \infty)$.

B) the graph of f is below x -axis on the interval $(-3, 0) \cup (0, 3)$.

C) the graph of f is above x -axis on the interval $(3, 4)$.

D) the line $x = 0$ is a vertical asymptote of f .

If $f(x) = e^x - 1$, then the graph of $f^{-1}(x)$ lies below the x -axis over the interval

A) $(-1, 0)$

B) $(-\infty, 0)$

C) $(-1, \infty)$

D) $(0, \infty)$

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

If $f(x) = \ln(2\sqrt{x} - e)$, then $f(e^{2\ln e}) =$

A) 1

B) 0

C) e

D) $\ln 2$

E) -1

The graph of the function $f(x) = \log_2(x - 1)^2$ is completely below x -axis on the interval:

(a) $(0,1) \cup (1,2)$

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

(c) $(1,2)$

(d) $(-2, -1) \cup (-1,0)$

(e) $(-\infty, 0) \cup (2, \infty)$

The domain of the function $f(x) = \ln \left(\frac{x-3}{x} \right) - 2$, in interval notation, is:

A) $(-\infty, 0) \cup (3, \infty)$

B) $(-\infty, 0) \cup (0, 3)$

C) $(3, \infty)$

D) $(-\infty, 0)$

E) $(0, 3)$

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

(a) $\log_{\frac{1}{2}}(x + 2)$

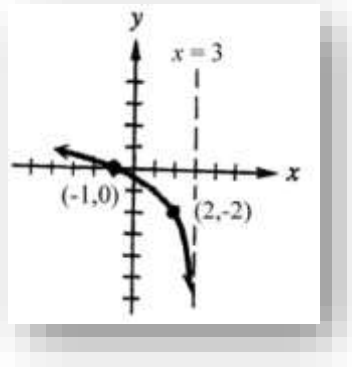
(b) $\log_2 \left(x + \frac{1}{2}\right)$

(c) $\log_{\frac{1}{2}}(x - 2)$

(d) $\log_2(x - 2)$

(e) $\log_{\frac{1}{2}} x$

If the adjacent figure represents the graph of $y = \log_2(-x + a) + b$, then $a + b =$



A) 1

B) 5

C) 3

D) 2

E) $3/2$

If $x = \ln(ke)$ is the x -intercept of the graph of $f(x) = -e^{-x+1} + 2$, then $k =$

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

B) 2

C) e

D) 1

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

If $(u, 0)$ is the x -intercept and $(0, v)$ is the y -intercept of $y = -1 + \log_2 \left(\frac{x-1}{x-4} \right)$, then $u - v =$

A) 10

B) -4

C) 4

D) 9

E) 5