

1. y varies jointly with the cube of m and the square root of w . If $y = 12$ when $m=2$ and $w = 9$, find y when $m=-1$ and $w = 36$.

A. $y = \frac{60}{11}$

B. $y = 3$

C. $y = -2$

D. $y = -\frac{60}{11}$

E. $y = -3$

2. Find the domain of the function $f(x) = \sqrt{4-x}$.

A. $[4, \infty)$

B. $(-\infty, 4]$

C. $(-\infty, -4]$

D. $[-4, \infty)$

E. None of these.

3. The weight W (in kg) of a cocker spaniel puppy is a linear function of t , the time in months since birth. If $W = 3$ when $t = 0$ and $W = 9$ when $t = 5$, express W as a function of t .

A. $W = \frac{6}{5}t + 9$

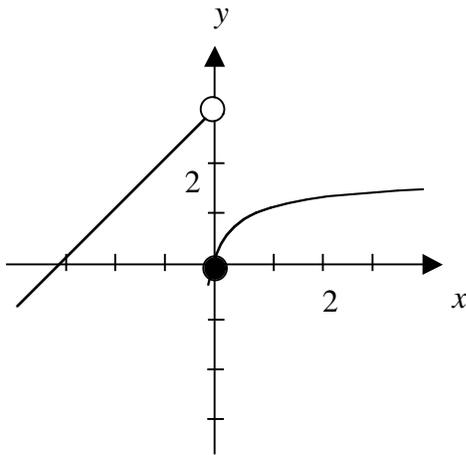
B. $W = \frac{6}{5}t + 3$

C. $W = 5t + 3$

D. $W = \frac{5}{6}t + 9$

E. $W = 5t + 6$

4. Choose the correct function for this graph.



$$\text{A. } f(x) = \begin{cases} 3x & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$$

$$\text{B. } f(x) = \begin{cases} x+3 & \text{if } x \leq 0 \\ \sqrt{x} & \text{if } x > 0 \end{cases}$$

$$\text{C. } f(x) = \begin{cases} 3x & \text{if } x < 0 \\ \sqrt{x} & \text{if } x \geq 0 \end{cases}$$

$$\text{D. } f(x) = \begin{cases} x+3 & \text{if } x < 0 \\ \sqrt{x} & \text{if } x \geq 0 \end{cases}$$

E. None of these.

5. Let $f(x) = 3 - x$ and $g(x) = 2x^2 + x$. Find $(f \cdot g)(-5)$.

A. -90

B. 440

C. -110

D. 360

E. -440

6. Let $f(x) = 8 - x$ and $g(x) = 3x - 1$. Find $g \circ g$.

A. $23 - 3x$

B. $9 - 3x$

C. $9x - 4$

D. $7 - 3x$

E. $9x - 2$

7. A function is defined by $f(x) = \frac{4x-2}{3}$. Find f^{-1} .

A. $f^{-1}(x) = \frac{2x-4}{3}$

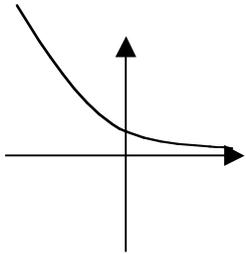
B. $f^{-1}(x) = 3(4x+2)$

C. $f^{-1}(x) = \frac{3x-2}{4}$

D. $f^{-1}(x) = \frac{3x+2}{4}$

E. None of these.

8. If this graph represents the function $f(x) = \left(\frac{1}{3}\right)^x$ what is the y-intercept?



A. (0,1)

B. $\left(\frac{1}{3}, 0\right)$

C. $\left(0, \frac{1}{3}\right)$

D. (1,0)

E. (0, 3)

9. If the population of the earth is 6 billion people and is growing at an annual rate of 1.8%, estimate the population in 20 years. Use the formula $P = P_0 e^{kt}$ where P_0 is the initial population in billions and k is the annual growth rate. Round your answer to the nearest tenth of a billion.

A. 86.2 billion

B. 58.7 billion

C. 2.6 billion

D. 44.5 billion

E. 8.6 billion

10. Write this equation in logarithmic form.

$$3^{-4} = \frac{1}{81}$$

A. $\log_3\left(\frac{1}{81}\right) = -4$

B. $\log_3(-4) = \frac{1}{81}$

C. $\log_4 3 = -\frac{1}{81}$

D. $\log_{81} 3 = -4$

E. $\log_{81}(-4) = 3$

11. Find the value of x . $\log_5 \frac{1}{25} = x$

A. $x = -2$

B. $x = \frac{1}{5}$

C. $x = \frac{1}{2}$

D. $x = -\frac{1}{5}$

E. $x = 2$

12. An investment of \$9,000 in Hightech Trailers in 1998 is worth \$11,500 in 2003. Find the average growth rate during this period. Use the formula $r = \frac{1}{t} \ln \frac{P}{P_0}$ where P is the current value, P_0 is the amount originally invested, t is the number of years, and r is the growth rate. Round your answer to the nearest tenth of a percent.

A. 2.8%

B. 0.2%

C. 4.9%

D. 1.2%

E. 1.4%

13. Which of the following statements is true about any one-to-one function?

- I. It passes the vertical line test.
- II. It passes the horizontal line test.
- III. It has an inverse.

- A. Only statement I is true.
- B. Only statement II is true.
- C. Only statement III is true.
- D. Only statements II and III are true.
- E. All of the statements are true.

14. Write this expression as the logarithm of one quantity.

$$\log_b x + 2\log_b y - \frac{1}{3}\log_b z$$

- A. $\log_b \left(\frac{xy^2}{\sqrt[3]{z}} \right)$
- B. $\log_b \left(-\frac{x+2y}{3z} \right)$
- C. $\log_b \left(\frac{x+y^2}{z^3} \right)$
- D. $\log_b \left(\frac{x+2y}{\sqrt[3]{z}} \right)$
- E. $\log_b \left(\frac{3xy^2}{z} \right)$

15. Solve for x . $5^{2x} = 11$

- A. $x = \frac{2\log 5}{\log 11}$
- B. $x = \frac{2\log 11}{\log 5}$
- C. $x = \frac{\log 11}{2\log 5}$
- D. $x = \frac{\log 5}{\log 22}$
- E. $x = \frac{\log 10}{\log 11}$