1. Find an equation of the line through $(1, -3)$ and perpendicular to the line $4x + y + 7 = 0$.

   A. $4x + y - 1 = 0$

   B. $4x - y - 7 = 0$

   C. $x + 4y + 11 = 0$

   D. $x - 4y - 13 = 0$

   E. $x - 3y + 7 = 0$

2. Solve the inequality $2 - 3x < 5$.

   A. $x < -1$

   B. $x < 1$

   C. $x > -1$

   D. $x > 1$

   E. $x > \frac{7}{3}$

3. Find the domain of the function $f(x) = \dfrac{\ln(x-1) + \sqrt{x}}{\sqrt{x+2}}$.

   A. $x > 1$

   B. $x > 0$

   C. $x > -2$

   D. $0 < x < 1$

   E. all real numbers x

4. Find all numbers x such that $\sin x = \sin \frac{\pi}{5}$ and $0 \leq x \leq 2\pi$.

A. $\frac{\pi}{5}$ only

B. $\frac{\pi}{5}$ and $\frac{4\pi}{5}$

C. $\frac{\pi}{5}$ and $\frac{6\pi}{5}$

D. $\frac{\pi}{5}$ and $\frac{9\pi}{5}$

E. $\frac{\pi}{5}$, $\frac{4\pi}{5}$, $\frac{6\pi}{5}$, and $\frac{9\pi}{5}$

5. Find $\tan\left(\sin^{-1}\left(\frac{3}{4}\right)\right)$.

A. $\frac{3}{5}$

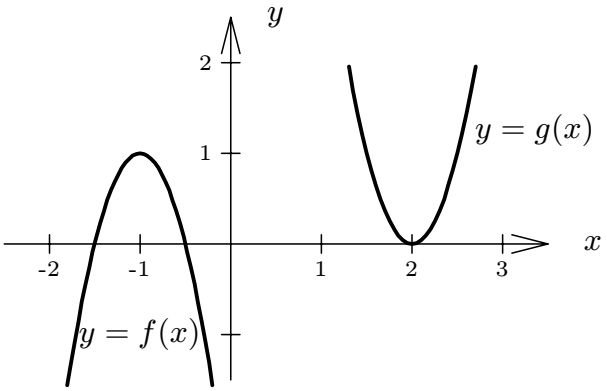
B. $\frac{4}{5}$

C. $\frac{4}{3}$

D. $\frac{3}{\sqrt{7}}$

E. $\frac{4}{\sqrt{7}}$

6. Given the following graph of two functions f and g, $g(x) =$



A. $-f(x-2)$

B. $1 - f(x-2)$

C. $f(x+3) - 1$

D. $-f(x+3) - 1$

E. $-f(x-3) + 1$

7. Starting with the graph of $y = e^{-2x}$, write the equation of the graph that results from reflecting about the x–axis and then about the y–axis.

   A. $y = -e^{2x}$
   B. $y = -e^{-2x}$
   C. $y = e^{2x}$
   D. $y = e^{-2x}$
   E. $y = \ln(2x)$

8. Under ideal conditions a certain bacteria population is known to double every 5 hours. Suppose there are initially 150 bacteria. Then, after t hours the number of bacteria in the population is

   A. e^{5t}
   B. $150e^{5t}$
   C. 2^{5t}
   D. $2^{t/5}$
   E. $150 \cdot 2^{t/5}$

9. The solution of $4^{2x-3} = 3$ is $x =$

   A. $\ln 6^2$
   B. $\log_4 3^2$
   C. $\log_3 4^2 + 3$
   D. $\frac{1}{2}[3 + \log_4 3]$
   E. $\frac{1}{2}[3 + \log_3 4]$

10. $\lim_{t\to 0} \dfrac{\sqrt{2-t}-\sqrt{2}}{t} =$

A. $\dfrac{1}{4}$

B. $-\dfrac{1}{2\sqrt{2}}$

C. $\dfrac{1}{2}$

D. $-\dfrac{1}{\sqrt{2}}$

E. $2\sqrt{2}$

11. $\lim_{x\to 0} |x| \sin\left(\dfrac{1}{x^2}\right) =$

A. 0

B. 1

C. 2

D. ∞

E. does not exist

12. $\lim_{x\to 0^+} \dfrac{\ln x}{x} =$

A. $-\infty$

B. 0

C. 1

D. 2

E. ∞

13. There are two values of a such that the function

$$f(x) = \begin{cases} x^3 & \text{if } x \leq a \\ x^2 & \text{if } x > a \end{cases}$$

is continuous at the point $x = a$. These values are

A. $-2, 2$

B. $1, 2$

C. $-1, 1$

D. $0, 1$

E. $-1, 0$

14. Suppose you drive for 60 miles at 60 miles per hour and then for 60 miles at 30 miles per hour. In miles per hour, your average velocity is

A. 30

B. 40

C. 42

D. 45

E. 50