

# Sample Calculus Assessment Questions

## *University of New Hampshire*

1. Find  $g(1)$  if  $g(t) = \frac{t^2-4}{2-t}$ .

A.  $\frac{9}{2}$     B.  $-1$     C.  $1$     D.  $-3$     E.  $3$

2. Which are factors of  $x^3 - 1$ ?

A.  $x + 1$     B.  $x - 1$     C.  $x^2 + x + 1$     D.  $x^2 - 2x + 1$     E. *A and C*    F. *B and C*    G. *B and D*

3.  $\frac{x}{3y} + \frac{2x}{y}$

A.  $\frac{7x}{3y^2}$     B.  $\frac{7x}{3y}$     C.  $\frac{3x}{4y}$     D.  $\frac{7x}{y}$     E.  $\frac{5x}{3y}$

4. Solve the following system of equations:  $\begin{cases} x - y = 1 \\ 2x + y = 0 \end{cases}$

A.  $x = -\frac{1}{3}, y = -\frac{2}{3}$     B.  $x = -\frac{1}{3}, y = \frac{2}{3}$     C.  $x = \frac{1}{3}, y = \frac{2}{3}$     D.  $x = \frac{1}{3}, y = -\frac{2}{3}$     E. *None of these*

5. Let  $g(x) = mx^2 + x + 1$ . Find  $m$  if  $g(1) = \frac{8}{3}$ .

A.  $m = \frac{6}{3}$     B.  $m = \frac{4}{3}$     C.  $m = \frac{2}{3}$     D.  $m = \pm \sqrt{\frac{2}{3}}$     E. *Cannot solve for  $m$*

6. Find the fifth root of  $\frac{32x^{10}y^2}{z^5}$ .

A.  $2x^2yz^{-1}$  B.  $\frac{4x^2}{z}y^{1/5}$  C.  $\frac{4x^2y^{2/5}}{z}$  D.  $\frac{2x^2}{z}y^{2/5}$  E. None of these

7. Rewrite  $(25)^{1/2}(16)^{3/2}$ .

A. 320 B.  $\frac{25}{2} \cdot \frac{16}{2}$  C. 40 D.  $\left(\frac{1}{5}\right)\left(\frac{1}{4}\right)^3$  E.  $(25 \cdot 16)^{3/4}$

8. Simplify  $\frac{s^2+3s+2}{s+1} \cdot \frac{2+2s}{2s+4}$  where  $s \neq -1$  and  $s \neq -2$ .

A.  $2(s+1)$  B.  $\frac{s^2+3s+2}{2(s+2)}$  C.  $\frac{s+1}{2s+4}$  D.  $s+1$  E. None of these

9.  $x^2 < 9$  is equivalent to which of the following?

A.  $x < 3$  B.  $x < -3$  C.  $-3 < x < 3$  D.  $-3 > x > 3$  E.  $x > -3$

10.  $|3 - x| > 1$  is equivalent to which of the following?

A.  $x < 2$  B. Either  $x < 2$  or  $x > 4$  C.  $x = 0$  D.  $2 < x < 4$  E.  $x > 4$

11. Given  $y(t) = 3e^{5t}$ , find the value of  $t$  such that  $y(t) = 6$ .

A.  $5\ln 2$  B.  $\frac{\ln(\frac{1}{2})}{5}$  C.  $\frac{1}{5}e^2$  D.  $\frac{\ln 2}{5}$  E. None of these

12. Find  $x$  such that  $\log_{10} x = \frac{1}{2}$ .

A.  $x = 10$  B.  $x = 100$  C.  $x = \sqrt{10}$  D.  $x = 1$  E.  $x = 0$

13. Given that  $x \neq 0$ , simplify  $x^{-1} + \frac{1}{x^2}$ .

A.  $\frac{x^2 + 1}{x^2}$  B.  $x^{-3}$  C.  $\frac{x + 1}{x^2}$  D.  $\frac{x + 1}{x}$  E. None of these

14. Find  $f(x + h)$  given that  $f(x) = x + x^2$ .

A.  $x^2 + x + 2xh + h + h^2$  B.  $x + x^2 + h$  C.  $x + x^2 + h + h^2$

D.  $x^2 + x + xh + h + h^2$  E. None of these

15. Rewrite  $\log\left(\frac{xy}{z^2}\right)$  given that  $x, y$ , and  $z$  are positive numbers.

A.  $(\log x)(\log y) - \log(z^2)$  B.  $\frac{(\log x)(\log y)}{\log(z^2)}$  C.  $\log x + \log y + 2\log z$

D.  $\log x + \log y - 2\log z$  E. None of these

16.  $2 - 4x < 2x + 3$

A.  $x < -\frac{1}{6}$  B.  $x > -\frac{1}{6}$  C.  $x < -\frac{1}{2}$  D.  $x > -\frac{1}{2}$  E.  $x > -\frac{5}{6}$

17. Find an equivalent expression for  $\sin^2 x$ .

A.  $\cos^2 x$  B.  $\sin 2x$  C.  $(\cos^2 x) + 1$  D.  $1 - \cos^2 x$  E.  $\cos 2x$

18. Suppose  $\sin \theta = \frac{1}{2}$  and  $\theta$  is in the second quadrant. Find  $\cos \theta$ .

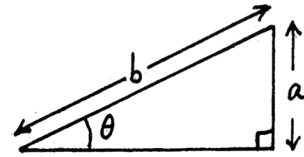
- A.  $-\frac{\sqrt{3}}{2}$  B.  $-\frac{\sqrt{3}}{4}$  C.  $\frac{\sqrt{3}}{2}$  D.  $-\frac{3}{4}$  E.  $-\frac{1}{2}$

19. What is the period of  $y = 4 \cos 3x$ ?

- A.  $2\pi$  B.  $\frac{2\pi}{3}$  C.  $6\pi$  D.  $\frac{\pi}{3}$  E.  $4$

20. In the triangle shown,  $b = 3$  and  $\sin \theta = 0.2$ . What is  $a$ ?

- A.  $\frac{0.2}{3}$  B.  $(0.2)(3)$  C.  $\cos \theta$  D.  $\sin \theta$  E.  $(-0.2)(3)$

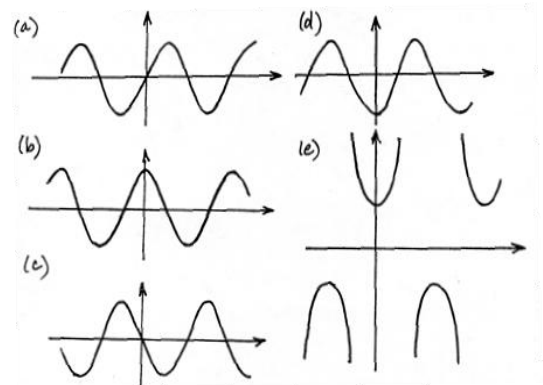


21. If  $\tan \theta > 0$ , which of the following statements is true?

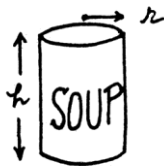
A.  $\sin \theta > 0$  B.  $\cos \theta < 0$  C.  $\theta < \pi$

D.  $\theta$  is in the first or third quadrant E.  $\theta$  is in the second or fourth quadrant

22. Which of the sketches could be the graph of  $y = \cos \theta$ ?

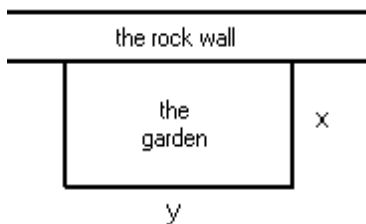


23. A can of tomato soup has radius  $r$  and height  $h$ . Write an expression for the area of its paper label.



- A.  $\pi r^2$  B.  $\pi r h$  C.  $2\pi r h$  D.  $r h$  E.  $\pi r^2 h$

24. A rectangular garden patch of 100 square feet will be dug along a rock wall. The remaining three sides will need to be fenced in. Write a formula for  $f$ , the amount of fencing needed.



- A.  $f = 2x + 2y$  B.  $f = 2x + \frac{100}{x}$  C.  $f = xy$  D.  $f = 100 - xy$  E.  $f = 2x + \frac{100}{2x}$

## Solutions

- |       |       |
|-------|-------|
| 1. D  | 13. C |
| 2. F  | 14. A |
| 3. B  | 15. D |
| 4. D  | 16. B |
| 5. C  | 17. D |
| 6. D  | 18. A |
| 7. A  | 19. B |
| 8. D  | 20. B |
| 9. C  | 21. D |
| 10. B | 22. B |
| 11. D | 23. C |
| 12. C | 24. B |