

1. What is the center and radius of the circle given by the following equation?

$$4x^2 + 4y^2 + 4x - 4y + 2 = 64$$

- A. $(-1/2, 1/2)$, $r = 8$
- B. $(1/2, -1/2)$, $r = 8$
- C. $(-1/2, 1/2)$, $r = 4$
- D. $(1/2, 1/2)$, $r = 4$
- E. $(-1/2, -1/2)$, $r = 4$

2. For $0 \leq \theta < \pi/2$ and $\cos(\theta) = 1/3$, what is $\tan(\theta)$?

- A. $\sqrt{2}/2$
- B. $\sqrt{3}/2$
- C. $\sqrt{2}/3$
- D. $\sqrt{3}$
- E. $2\sqrt{2}$

3. Solve $|x - 3| < 2$

- A. $(-\infty, 5)$
- B. $(1, 5)$
- C. $(-\infty, 1) \cup (5, \infty)$
- D. $(5, \infty)$
- E. $(-1, 5)$

4. Evaluate $\frac{f(1+h) - f(1)}{h}$ where $f(x) = 2x^2 + 1$.

- A. $h + 1$
- B. $2h + 1$
- C. $h + 2$
- D. $2h + 4$
- E. $2h + 3$

5. If f is a linear function containing the points $(1, 4)$ and $(6, 14)$, what is $f(-1)$?

A. -2

B. -1

C. 0

D. 1

E. 2

6. What is $(g \circ f)(x)$ where $f(x) = x^2 + 1$ and $g(x) = 2x + 1$?

A. $2x^2 + 3$

B. $2x^3 + x^2 + 2x + 1$

C. $2x^2 + 4x + 3$

D. $4x^2 + 4x + 5$

E. $4x^2 + 2$

7. If $f(x) = Ca^x$ for some $a > 0$ and C where f contains the points $(1, 8)$ and $(-1, 2)$ what are C and a ?

- A. $C = 2, a = 2$
- B. $C = 2, a = 4$
- C. $C = 4, a = 4$
- D. $C = 4, a = 2$
- E. $C = -2, a = 4$

8. If f is function, which of the following represent f being reflected about the x -axis and then shifted down 3 units.

- A. $-f(x) - 3$
- B. $-f(x - 3)$
- C. $f(-x) - 3$
- D. $f(-(x - 3))$
- E. $f(-x - 3)$

9. Solve for x :

$$\ln(x^2 - 4) - \ln(x + 2) = 1.$$

- A. $e^2 - 2$
- B. $e^2 + 4$
- C. $e^2 - 1$
- D. $e + 4$
- E. $e + 2$

10. If $f(x) = \frac{x}{1 + 2x}$ then $f^{-1}(x)$ equals

- A. $\frac{1 + 2x}{x + 2}$
- B. $\frac{x}{1 + 2x}$
- C. $\frac{1 + 2x}{x}$
- D. $\frac{1 - 2x}{x}$
- E. $\frac{x}{1 - 2x}$

11. Let

$$f(x) = \begin{cases} 2x + 1 & \text{if } x \leq -1, \\ x^3 & \text{if } -1 < x \leq 1, \\ 2 - 4x & \text{if } 1 < x \leq 2, \\ 6 & \text{if } 2 < x. \end{cases}$$

Then f has discontinuities only at x equal to

- A. 1 and 2
- B. 0, 1, and 2
- C. -1, 1, and 2
- D. -1
- E. -1 and 1

12. Find $\lim_{x \rightarrow -1} \frac{x^2 + 3x + 2}{x + 1}$.

- A. 4
- B. -2
- C. 2
- D. 1
- E. does not exist

13. Find $\lim_{x \rightarrow 0^+} \frac{\sqrt{1+3x} - 1}{x}$.

A. 3

B. 2

C. $\frac{3}{2}$ D. $\frac{2}{3}$ E. $\frac{1}{2}$

14. If $3x - x^2 \leq f(x) \leq x + 1$ for $x \neq 1$ then $\lim_{x \rightarrow 1} f(x)$.

A. $= \infty$ B. $= 2$ C. $= 1$ D. $= 0$

E. cannot be determined

15. If $f(x) = \frac{6x+1}{\sqrt{9x^2+1}}$, $\lim_{x \rightarrow \infty} f(x) = a$, and $\lim_{x \rightarrow -\infty} f(x) = b$ then
- A. $a = 2, b = -2$
 - B. $a = b = 0$
 - C. $a = b = 2$
 - D. $a = \frac{2}{3}, b = \frac{-2}{3}$
 - E. neither limit exists

16. Let $f(x) = \frac{\cos x}{1 + e^{1/x}}$ for $x \neq 0$. Set $\lim_{x \rightarrow 0^+} f(x) = a$ and $\lim_{x \rightarrow 0^-} f(x) = b$, then
- A. $a = \infty$ and $b = 0$
 - B. $a = 0$ and $b = 1$
 - C. $a = 1$ and $b = 0$
 - D. $a = 1$ and $b = \infty$
 - E. $a = \infty$ and $b = 1$