

28. Which of the following is the solution to the differential equation $\frac{dy}{dx} = \frac{x}{y}$, where $y(-2) = -1$?

- (A) $y = \sqrt{x^2 - 3}$ for $-\sqrt{3} < x < \sqrt{3}$
- (B) $y = -\sqrt{x^2 - 3}$ for $x > \sqrt{3}$
- (C) $y = \sqrt{x^2 - 3}$ for $x > \sqrt{3}$
- (D) $y = \sqrt{x^2 - 3}$ for $x < -\sqrt{3}$
- (E) $y = -\sqrt{x^2 - 3}$ for $x < -\sqrt{3}$

27. A solution of the equation $\frac{dy}{dx} + 2xy = 0$ that contains the point $(0, e)$ is

- (A) $y = e^{1-x^2}$
- (B) $y = e^{1+x^2}$
- (C) $y = e^{1-x}$
- (D) $y = e^{1+x}$
- (E) $y = e^{x^2}$

12. Which of the following is the solution to the differential equation $\frac{dy}{dx} = y^2$, where $y(-1) = 1$?

- (A) $y = \frac{1}{x}$ for $x \neq 0$
- (B) $y = -\frac{1}{x}$ for $x < 0$
- (C) $y = -\frac{1}{x}$ for $x > 0$
- (D) $y = \frac{1}{x}$ for $x > 0$
- (E) $y = \frac{1}{x}$ for $x < 0$

21. If $\frac{dy}{dx} = -10y$ and if $y = 50$ when $x = 0$, then $y =$

- (A) $50e^x$
- (B) $50e^{10x}$
- (C) $50e^{-10x}$
- (D) $50 - 10x$
- (E) $50 - 5x^2$

10. If $\frac{dy}{dx} = \frac{x \sin(x^2)}{y}$, then y could be

- (A) $\sqrt{2 - \cos(x^2)}$
- (B) $\sqrt{2} - \cos(x^2)$
- (C) $2 - \cos(x^2)$
- (D) $\cos(x^2)$
- (E) $\sqrt{2 - \cos x}$

23. If $g'(x) = 2g(x)$ and $g(-1) = 1$, then $g(x) =$

- (A) e^{2x}
- (B) e^{-x}
- (C) e^{x+1}
- (D) e^{2x+2}
- (E) e^{2x-2}