

1. The slope of the curve  $y^3 - xy^2 = 4$  at the point where  $y = 2$  is
- (A) -2 (B)  $\frac{1}{4}$  (C)  $-\frac{1}{2}$  (D)  $\frac{1}{2}$  (E) 2

2. The slope of the curve  $y^2 - xy - 3x = 1$  at the point  $(0, -1)$  is

- (A) -1 (B) -2 (C) +1 (D) 2 (E) -3

3. The equation of the tangent to the curve  $y = x \sin x$  at the point  $\left(\frac{\pi}{2}, \frac{\pi}{2}\right)$  is

- (A)  $y = x - \pi$  (B)  $y = \frac{\pi}{2}$  (C)  $y = \pi - x$   
 (D)  $y = x + \frac{\pi}{2}$  (E)  $y = x$

4.  $\lim_{x \rightarrow 3} \frac{x-3}{x^2-2x-3}$  is

- (A) 0 (B) 1 (C)  $\frac{1}{4}$  (D)  $\infty$  (E) none of these

5. The point on the curve  $y = \sqrt{2x+1}$  at which the normal is parallel to the line  $y = -3x + 6$  is

- (A)  $(4, 3)$  (B)  $(0, 1)$  (C)  $(1, \sqrt{3})$   
 (D)  $(4, -3)$  (E)  $(2, \sqrt{5})$

6.  $\lim_{x \rightarrow 0} \frac{x}{x}$  is

- (A) 1 (B) 0 (C)  $\infty$  (D) -1 (E) nonexistent

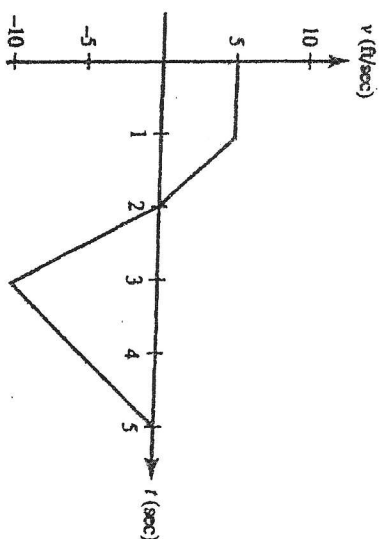
7. The equation of the tangent to the curve  $x^2 = 4y$  at the point on the curve where  $x = -2$  is

- (A)  $x + y - 3 = 0$  (B)  $y - 1 = 2x(x + 2)$  (C)  $x - y + 3 = 0$   
 (D)  $x + y - 1 = 0$  (E)  $x + y + 1 = 0$

8. The equation of the tangent to the hyperbola  $x^2 - y^2 = 12$  at the point  $(4, 2)$  on the curve is

- (A)  $x - 2y + 6 = 0$  (B)  $y = 2x$  (C)  $y = 2x - 6$   
 (D)  $y = \frac{x}{2}$  (E)  $x + 2y = 6$

Use the graph shown for Questions 18-24. It shows the velocity of an object along a straight line during the time interval  $0 \leq t \leq 5$ .



18. The object attains its maximum speed when  $t =$

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 5

19. The speed of the object is increasing during the time interval

- (A)  $(0, 1)$  (B)  $(1, 2)$  (C)  $(0, 2)$  (D)  $(2, 3)$  (E)  $(1, 3)$

20. The acceleration of the object is positive during the time interval

- (A)  $(0, 1)$  (B)  $(1, 2)$  (C)  $(0, 2)$  (D)  $(2, 3)$  (E)  $(3, 5)$

21. How many times on  $0 < t < 5$  is the object's acceleration undefined?

- (A) none (B) 1 (C) 2 (D) 3 (E) more than 3

22. During  $2 < t < 3$  the object's acceleration (in ft/sec<sup>2</sup>) is

- (A) -10 (B) -5 (C) 0 (D) 5 (E) 10

23. The object is furthest to the right when  $t =$

- (A) 0 (B) 1 (C) 2 (D) 3 (E) 5

24. The object's average acceleration (in ft/sec<sup>2</sup>) for the interval  $0 \leq t \leq 3$  is

- (A) -15 (B) -5 (C) -3 (D) -1 (E) none of