

Test Form C

Name _____ Date _____

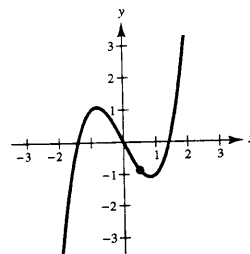
Chapter 2

Class _____ Section _____

A graphing calculator is needed for some problems.

1. Determine whether the slope at the indicated point is positive, negative, or zero.

- (a) Zero
 (b) No slope
 (c) Positive
 (d) Negative
 (e) None of these



2. Find the slope of the graph of $f(x) = x^2 - 2x$ at the point $(a, f(a))$.

- (a) 0
 (b) $2a - 2$
 (c) $f(a)$
 (d) $a^2 - 2a$
 (e) None of these

3. Use a graphing calculator to find the x -values at which f is not differentiable for $f(x) = (2x + 6)^{4/5}$.

- (a) 3
 (b) 0
 (c) f is differentiable everywhere.
 (d) -3
 (e) None of these

4. Use a graphing calculator to graph $f(x) = \frac{3x^2 - 8}{x^2 - 4}$ and its derivative, f' , on the same coordinate axes.

Then use the graph to describe the behavior of f at that value of x where $f'(x) = 0$.

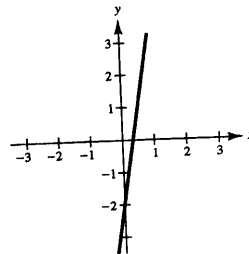
- (a) $f(x) = 0$
 (b) f increases without bound.
 (c) f has a horizontal tangent line.
 (d) f has no tangent line.
 (e) None of these

5. Find the value of the derivative of the function $f(t) = \frac{t^3 + 2}{t}$ at the point $(-2, 3)$.

- (a) $-\frac{9}{2}$
 (b) $-\frac{7}{2}$
 (c) 12
 (d) $-\frac{11}{16}$
 (e) None of these

6. The graph at the right represents the graph of the derivative of which of the following functions?

- (a) $f(x) = 2x^2 + 1$
 (b) $f(x) = 2x - 3$
 (c) $f(x) = 3x^2 - 2x - 1$
 (d) $f(x) = x^3 + x^2$
 (e) None of these



7. Find $\frac{dy}{dx}$: $y = 4 \sin y - 5 \cos x + x$.

- (a) $\frac{5 \sin x}{1 + 4 \cos y}$ (b) $4 \cos y + 5 \sin x + 1$ (c) $\frac{-5 \sin x}{4 \cos y}$
 (d) $\frac{5 \sin x}{4 \cos y}$ (e) None of these

8. The position function for a particular object is $s = -\frac{35}{2}t^2 + 58t + 91$. Which statement is true?

- (a) The initial velocity is -35 . (b) The velocity is a constant.
 (c) The velocity at time $t = 1$ is 23 . (d) The initial position is $-\frac{35}{2}$.
 (e) None of these

9. Find $\frac{dy}{d\theta}$ for $y = \csc \theta - \cot \theta$.

- (a) 0 (b) $-\cot^2 \theta + \csc \theta \cot \theta$ (c) $\sec \theta \tan \theta - \sec^2 \theta$
 (d) $-\csc \theta \cot \theta + \csc^2 \theta$ (e) None of these

10. Find an equation of the tangent line to the graph of $f(\theta) = \tan \theta$ at the point $(\frac{\pi}{4}, 1)$.

- (a) $4x - 4y = \pi - 4$ (b) $4\sqrt{2}x - 4y = \pi - 4$ (c) $4x - 2y = \pi - 2$
 (d) $y = x$ (e) None of these

11. Let $f(3) = 0$, $f'(3) = 6$, $g(3) = 1$ and $g'(3) = \frac{1}{3}$. Find $h'(3)$ if $h(x) = \frac{f(x)}{g(x)}$.

- (a) 18 (b) 6 (c) -6
 (d) -2 (e) None of these

12. Find the derivative: $f(x) = \frac{1}{\sqrt[3]{3-x^3}}$.

- (a) $\frac{-1}{3(3-x^3)^{4/3}}$ (b) $\frac{x^2}{(3-x^3)^{4/3}}$ (c) $\frac{-x^2}{(3-x^3)^{2/3}}$
 (d) $\frac{-x^2}{(3-x^3)^{4/3}}$ (e) None of these

13. Find the derivative: $f(\theta) = \sqrt{\sin 2\theta}$.

- (a) $\frac{\cos 2\theta}{\sqrt{\sin 2\theta}}$ (b) $\sqrt{\sec 2\theta}$ (c) $\frac{\cos 2\theta}{2\sqrt{\sin 2\theta}}$
 (d) $\cos \theta$ (e) None of these

14. Determine the slope of the graph of the relation $2x^2 - 3xy + y^3 = -1$ at the point $(2, -3)$.

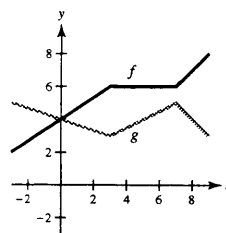
- (a) $-\frac{17}{21}$ (b) $\frac{5}{7}$ (c) $-\frac{1}{3}$
 (d) $\frac{4}{3}$ (e) None of these

15. A machine is rolling a metal cylinder under pressure. The radius of the cylinder is decreasing at a constant rate of 0.05 inches per second and the volume V is 128π cubic inches. At what rate is the length h changing when the radius r is 1.8 inches? [Hint: $V = \pi r^2 h$]

- (a) -2.195 in./sec (b) 39.51 in./sec (c) 2.195 in./sec
 (d) -43.90 in./sec (e) None of these

16. Let $p(x) = f(x)g(x)$. Use the figure to find $p'(8)$.

- (a) 3 (b) -1
 (c) 28 (d) 11
 (e) None of these



Test Form D
Chapter 2

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- Use the definition of a derivative to find the derivative of $f(x) = \frac{1}{x}$.
- Differentiate: $y = \frac{2x}{1 - 3x^2}$.
- Find $\frac{dy}{dx}$ for $y = (x^3)\sqrt{2x + 1}$.
- Find $f'(x)$ for $f(x) = \cot^3 \sqrt{x}$.
- Calculate $\frac{d^2y}{dx^2}$ for $y = \frac{1 - x}{2 - x}$.
- The position equation for the movement of a particle is given by $s = (t^3 + 1)^2$ where s is measured in feet and t is measured in seconds. Find the acceleration of this particle at one second.
- Find y' if $y = \frac{x}{x + y}$.
- Find $\frac{dy}{dx}$ if $x = \cos y$.
- Find the derivative: $f(\theta) = \sec \theta^2$.
- Differentiate and simplify: $y = \sin^2 x - \cos^2 x$.
- Find an equation for the tangent line to the graph of $f(x) = \sqrt{x + 1}$ at the point where $x = 3$.
- Find the values of x for all points on the graph of $f(x) = x^3 - 2x^2 + 5x - 16$ at which the slope of the tangent line is 4.
- Find the instantaneous rate of change of R with respect to x if $R = 2x^2 + \frac{1}{x}$.
- An object is thrown (straight down) from the top of a 220-foot building with an initial velocity of 26 feet per second.
 - Write the position equation for the movement described.
 - What is the velocity at one second?

15. As a balloon in the shape of a sphere is being blown up, the volume is increasing at the rate of 4 cubic inches per second. At what rate is the radius increasing when the radius is 1 inch?

16. Analytically show that the graph of the function $f(x) = x^3 + 2x^2 + 6x$ does not have a tangent line with a slope of 4.