

**MULTIPLE CHOICE**

1. Find the slope  $m$  of the line tangent to the graph of the function  $f(x) = 2 - 7x$  at the point  $(-1, 9)$ .
- a.  $m = -7$
  - b.  $m = -2$
  - c.  $m = 2$
  - d.  $m = 7$
  - e.  $m = -9$

ANS: A                      PTS: 1                      DIF: Easy                      REF: Section 2.1  
OBJ: Calculate the slope of a line tangent to the graph of a function at a specified point  
MSC: Skill

2. Find the slope  $m$  of the line tangent to the graph of the function  $g(x) = 9 - x^2$  at the point  $(4, -7)$ .
- a.  $m = 4$
  - b.  $m = 9$
  - c.  $m = -8$
  - d.  $m = -7$
  - e.  $m = -18$

ANS: C                      PTS: 1                      DIF: Medium                      REF: Section 2.1  
OBJ: Calculate the slope of a line tangent to the graph of a function at a specified point  
MSC: Skill

3. Find the derivative of the function  $g(x) = -2$  by the limit process.
- a.  $g'(x) = 2$
  - b.  $g'(x) = 2x$
  - c.  $g'(x) = -2x$
  - d.  $g'(x) = 0$
  - e.  $g'(x) = -2$

ANS: D                      PTS: 1                      DIF: Easy                      REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process    MSC: Skill

4. Find the derivative of the function  $h(s) = 7 + \frac{6}{7}s$  by the limit process.

- a.  $h'(s) = 7$
- b.  $h'(s) = 7s + \frac{6}{7}s^2$
- c.  $h'(s) = \frac{6}{7}$
- d.  $h'(s) = \frac{55}{7}$
- e.  $h'(s) = 7s + \frac{6}{7}$

ANS: C                      PTS: 1                      DIF: Easy                      REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process    MSC: Skill

5. Find the derivative of the following function  $f(x) = -3x^2 + 6x - 8$  using the limiting process.

- a.  $f'(x) = -6x + 6$
- b.  $f'(x) = -3x + 6$
- c.  $f'(x) = -6x + 6x - 8$
- d.  $f'(x) = -3x - 6$
- e.  $f'(x) = -6x - 6$

ANS: A                      PTS: 1                      DIF: Easy                      REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process    MSC: Skill

6. Find the derivative of the following function using the limiting process.

$$f(x) = -4x^2 + 5x$$

- a.  $-4$
- b.  $-4x + 5$
- c.  $-8x - 5$
- d.  $-8x$
- e.  $-8x + 5$

ANS: E                      PTS: 1                      DIF: Easy                      REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process    MSC: Skill

7. Find the derivative of the following function using the limiting process.

$$f(x) = 3x^3 - 9x^2 - 8$$

- a.  $f'(x) = 9x^2 + 18x$
- b.  $f'(x) = 6x^2 - 18x$
- c.  $f'(x) = 9x^2 - 18x - 8$
- d.  $f'(x) = 6x^2 + 18x$
- e.  $f'(x) = 9x^2 - 18x$

ANS: E                      PTS: 1                      DIF: Medium                      REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process    MSC: Skill

8. Find the derivative of the following function using the limiting process.

$$f(x) = \frac{2}{x-3}$$

- a.  $f'(x) = \frac{2}{(x+3)^2}$
- b.  $f'(x) = -\frac{2x}{(x-3)^2}$

c.  $f'(x) = -\frac{2}{(x-3)^2}$

d.  $f'(x) = \frac{2}{(x-3)^2}$

e.  $f'(x) = -\frac{2}{(x+3)^2}$

ANS: C PTS: 1 DIF: Medium REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process MSC: Skill

9. Find the derivative of the following function using the limiting process.

$$f(x) = \frac{1}{x^4}$$

a.  $f'(x) = \frac{4}{x^5}$

b.  $f'(x) = -\frac{4}{x^3}$

c.  $f'(x) = \frac{4}{x^3}$

d.  $f'(x) = -\frac{5}{x^5}$

e.  $f'(x) = -\frac{4}{x^5}$

ANS: E PTS: 1 DIF: Medium REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process MSC: Skill

10. Find the derivative of the function  $f(x) = \sqrt{7x-3}$  using the limiting process.

a.  $f'(x) = \frac{7}{2\sqrt{7x-3}}$

b.  $f'(x) = -\frac{7}{2\sqrt{7x-3}}$

c.  $f'(x) = -\frac{7x}{\sqrt{7x-3}}$

d.  $f'(x) = \frac{7}{2}\sqrt{7x-3}$

e.  $f'(x) = -\frac{7}{\sqrt{7x-3}}$

ANS: A PTS: 1 DIF: Medium REF: Section 2.1  
OBJ: Calculate the derivative of a function by the limit process MSC: Skill

11. Find the derivative of the function  $f(x) = \frac{20}{\sqrt{x}}$  by the limit process.

- a.  $f'(x) = \frac{20}{x}$
- b.  $f'(x) = -\frac{10\sqrt{x}}{x}$
- c.  $f'(x) = \frac{10}{x}$
- d.  $f'(x) = -\frac{10}{x\sqrt{x}}$
- e.  $f'(x) = -\frac{20}{x\sqrt{x}}$

ANS: D      PTS: 1      DIF: Difficult      REF: Section 2.1  
 OBJ: Calculate the derivative of a function by the limit process      MSC: Skill

12. Find an equation of the tangent line to the graph of the function  $f(x) = x^2 + 5x + 2$  at the point  $(-5, 2)$ .

- a.  $y = -23$
- b.  $y = -5x - 23$
- c.  $y = 15x$
- d.  $y = 5x$
- e.  $y = -15x - 73$

ANS: B      PTS: 1      DIF: Medium      REF: Section 2.1  
 OBJ: Write an equation of a line tangent to the graph of a function at a specified point  
 MSC: Skill

13. Find an equation of the tangent line to the graph of the function  $f(x) = \sqrt{x-2}$  at the point  $(18, 4)$ .

- a.  $y = \frac{x}{4} + \frac{7}{2}$
- b.  $y = \frac{x}{8} + \frac{7}{4}$
- c.  $y = \frac{x}{8} + \frac{9}{2}$
- d.  $y = \frac{x}{4} + \frac{9}{2}$
- e.  $y = \frac{x}{8} + \frac{9}{4}$

ANS: B      PTS: 1      DIF: Medium      REF: Section 2.1  
 OBJ: Write an equation of a line tangent to the graph of a function at a specified point  
 MSC: Skill

14. Find an equation of the line that is tangent to the graph of the function  $f(x) = 8x^2$  and parallel to the line  $16x + y + 6 = 0$ .

- a.  $16x + y + 8 = 0$
- b.  $12x - y + 6 = 0$

- c.  $16x - y + 8 = 0$
- d.  $16x + y + 6 = 0$
- e.  $12x + y + 6 = 0$

ANS: A                      PTS: 1                      DIF: Medium                      REF: Section 2.1  
 OBJ: Write an equation of a line tangent to the graph of a function that is parallel to a given line  
 MSC: Skill

15. Find an equation of the line that is tangent to the graph of  $f$  and parallel to the given line.

$$f(x) = 3x^3, \quad 9x - y + 9 = 0$$

- a.  $y = -9x + 6$
- b.  $y = -3x + 6$
- c.  $y = 9x - 3$  and  $y = 9x + 3$
- d.  $y = -9x - 6$
- e.  $y = 9x - 6$  and  $y = 9x + 6$

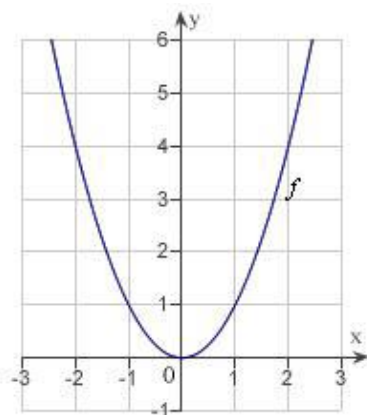
ANS: E                      PTS: 1                      DIF: Medium                      REF: Section 2.1  
 OBJ: Write an equation of a line tangent to the graph of a function that is parallel to a given line  
 MSC: Skill

16. Find an equation of the line that is tangent to the graph of the function  $f(x) = \frac{7}{\sqrt{x}}$  and parallel to the line  $7x + 2y - 18 = 0$ .

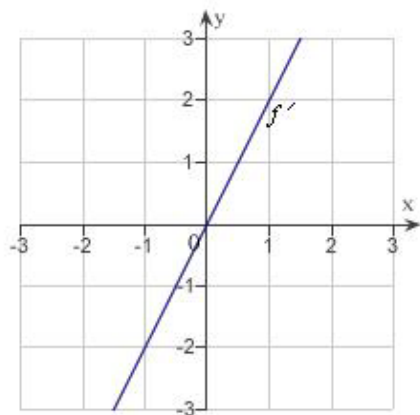
- a.  $7x + y + 21 = 0$
- b.  $9x + y - 18 = 0$
- c.  $9x + 2y + 9 = 0$
- d.  $7x + 2y - 21 = 0$
- e.  $7x + 2y - 14 = 0$

ANS: D                      PTS: 1                      DIF: Medium                      REF: Section 2.1  
 OBJ: Write an equation of a line tangent to the graph of a function that is parallel to a given line  
 MSC: Skill

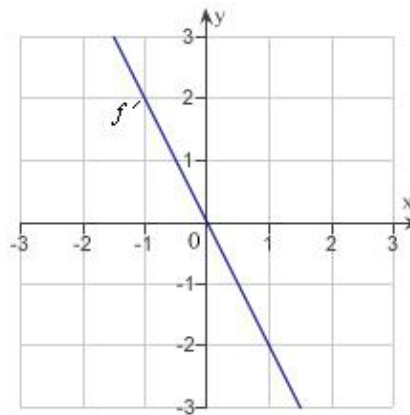
17. The graph of the function  $f$  is given below. Select the graph of  $f'$ .



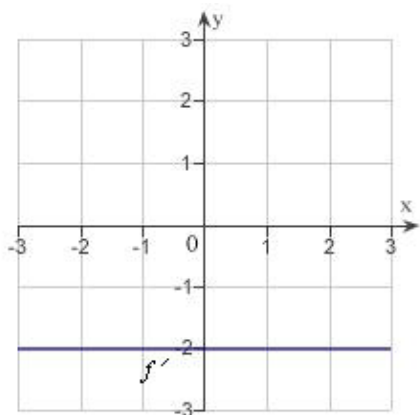
a.



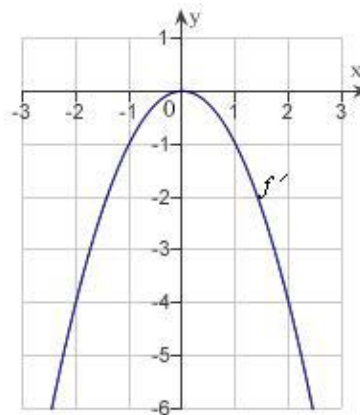
d.



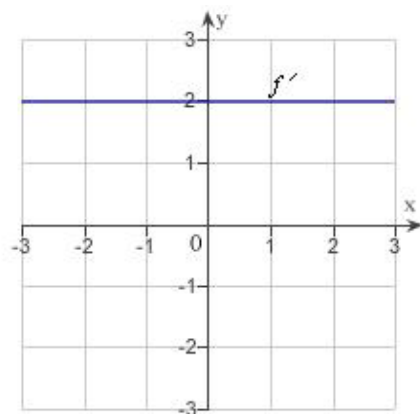
b.



e.



c.



ANS: A

PTS: 1

DIF: Medium

REF: Section 2.1

OBJ: Identify the graph of  $f'$  using the given graph of  $f$

MSC: Skill

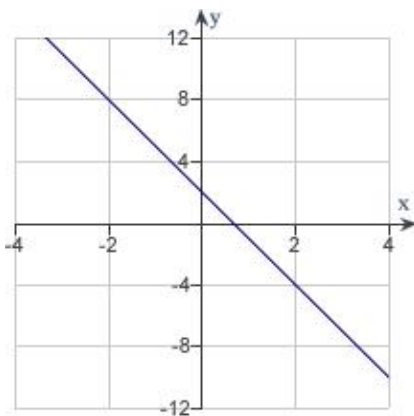
18. Identify the graph which has the following characteristics.

$$f(0) = -2$$

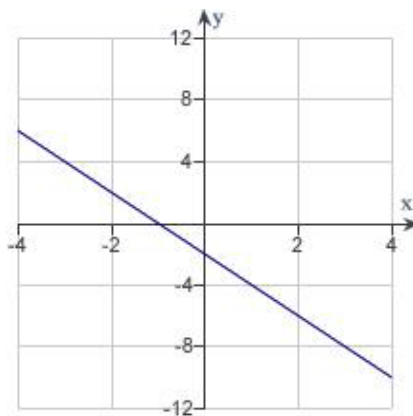
$$f'(x) = 2, -\infty < x < \infty$$

Graph 1

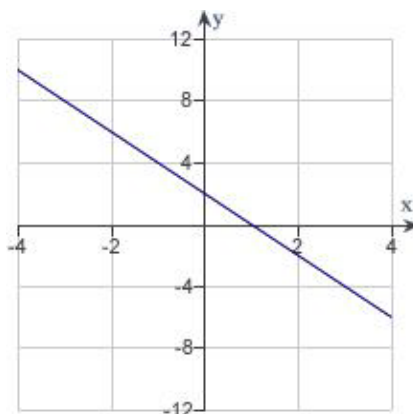
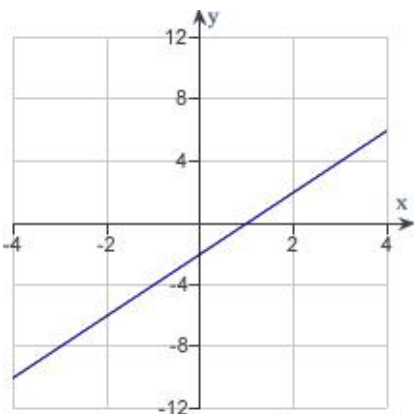
Graph 2



Graph 3



Graph 4



- a. Graph 2
- b. Graph 3
- c. Graph 1
- d. Graph 4
- e. none of the above

ANS: B

PTS: 1

DIF: Easy

REF: Section 2.1

OBJ: Identify the graph of a function given information about the function and its derivative

MSC: Skill

19. Use the alternative form of the derivative to find the derivative of the function  $f(x) = x^2 - 9$  at  $x = 5$ .

- a.  $f'(5) = 1$
- b.  $f'(5) = 250$
- c.  $f'(5) = 2$
- d.  $f'(5) = 125$
- e.  $f'(5) = 10$

ANS: E

PTS: 1

DIF: Easy

REF: Section 2.1

OBJ: Calculate the derivative of a function at a specified point using the alternative form

MSC: Skill

20. Use the alternative form of the derivative to find the derivative of the function  $f(x) = \frac{3}{x^2}$  at  $x = 2$ .

- a.  $f'(2) = \frac{3}{4}$
- b.  $f'(2) = -\frac{3}{4}$
- c.  $f'(2) = \frac{3}{8}$
- d.  $f'(2) = -\frac{3}{2}$
- e.  $f'(2) = -\frac{9}{16}$

ANS: B

PTS: 1

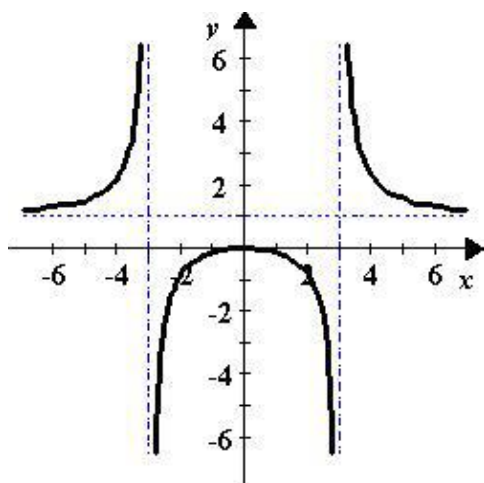
DIF: Medium

REF: Section 2.1

OBJ: Calculate the derivative of a function at a specified point using the alternative form

MSC: Skill

21. Describe the  $x$ -values at which the graph of the function  $f(x) = \frac{x^2}{x^2 - 9}$  given below is differentiable.



- a.  $f(x)$  is differentiable at  $x = \pm 3$ .
- b.  $f(x)$  is differentiable everywhere except at  $x = \pm 3$ .
- c.  $f(x)$  is differentiable everywhere except at  $x = 0$ .
- d.  $f(x)$  is differentiable on the interval  $(-2, 2)$ .
- e.  $f(x)$  is differentiable on the interval  $(2, \infty)$ .

ANS: B

PTS: 1

DIF: Medium

REF: Section 2.1

OBJ: Identify the  $x$ -value (or values) at which a function is differential

MSC: Skill