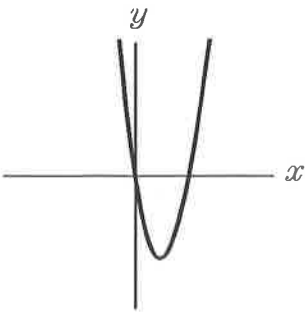


Calculus TEST  
MID-TERM  
PRACTICE

Name \_\_\_\_\_

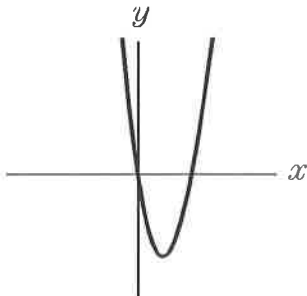
Date \_\_\_\_\_

1.

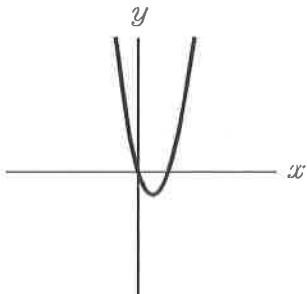


Given the graph of  $f$  shown above, which of the following is the graph of the derivative,  $f'$ ?

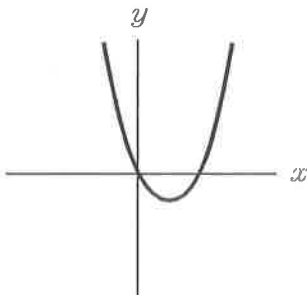
a)



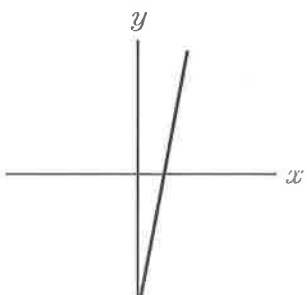
b)



c)



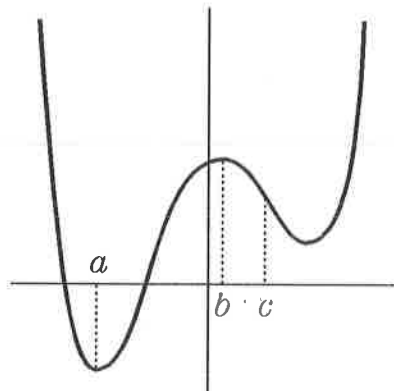
d)



e)



2.



Which of the following tables best goes with the graph of  $f$  shown?

a)

$x$	$f'(x)$
$a$	0
$b$	0
$c$	4

b)

$x$	$f'(x)$
$a$	0
$b$	0
$c$	-2

c)

$x$	$f'(x)$
$a$	does not exist
$b$	0
$c$	6.2

d)

$x$	$f'(x)$
$a$	does not exist
$b$	does not exist
$c$	-1

3. Given  $f(0) = 1$  and

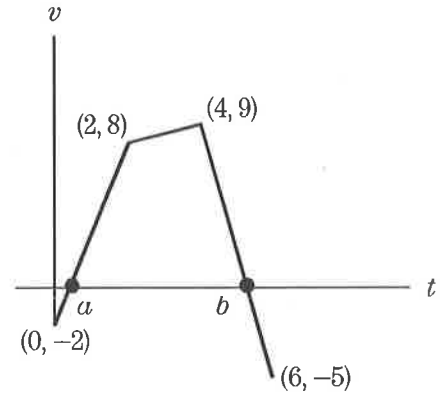
$$f'(x) = \begin{cases} 2x & \text{for } x < 0, \\ x^2 & \text{for } x > 0 \end{cases}$$

sketch the graph of the continuous function  $f$ .

4. The graph shows the velocity of an object that is moving along a straight line for  $t$  on  $[0, 6]$ .

At what time(s)  $t$  does the object reverse direction?

- a) 2 and 4
- b)  $a$  and  $b$
- c) 4 only
- d) 5 only
- e)  $a$  only



5. A projectile starts at time  $t = 0$  and moves along the  $x$ -axis so that its position at any time  $t \geq 0$  is  $x(t) = (2t^2 - 5t + 3)(t - 1)^2$ . What is the velocity of the particle at time  $t = 3$ .
- a) 13
  - b) 14
  - c) 18
  - d) 20
  - e) 52
6. A moving particle travels along the  $x$ -axis so that its position at any time is  $x(t) = 2 \cos 3t - \ln(3x - 2) + \sin x$  on the interval  $[1, 5]$ . How many times does the particle change direction?
- a) 1
  - b) 2
  - c) 3
  - d) 4
  - e) 0
7. 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 1 second.
- a)  $6 \text{ ft/sec}^2$
  - b)  $12 \text{ ft/sec}^2$
  - c)  $16 \text{ ft/sec}^2$
  - d)  $20 \text{ ft/sec}^2$
  - e)  $42 \text{ ft/sec}^2$

8. If  $f(x) = \sin x \cos x$ , then  $f'(\frac{\pi}{6}) =$

a)  $\sqrt{3} - 1$

b)  $\sqrt{3}$

c)  $\frac{\pi^2}{3} - 1$

d)  $\frac{1}{2}$

e)  $\frac{\pi^2}{3}$

9. Differentiate:  $\frac{1 + \cos x}{1 - \cos x}$

a)  $-1$

b)  $-2 \csc x$

c)  $2 \csc x$

d)  $\frac{-2 \sin x}{(1 - \cos x)^2}$

e)  $\frac{-\sin^2 x}{(1 + \cos x)^2}$

10. Find  $D_x^3 y$ , given  $y = \sqrt{5 + 4x}$ .

a)  $\frac{12}{(5 + 4x)^{5/2}}$

b)  $\frac{-12}{(5 + 4x)^{5/2}}$

c)  $\frac{-24}{(5 + 4x)^{5/2}}$

d)  $\frac{24}{(5 + 4x)^{5/2}}$

e)  $\frac{-48}{(5 + 4x)^{5/2}}$

11. Find  $\frac{dy}{dx}$  for  $y = x^3\sqrt{x+1}$ .

a)  $\frac{3x^2}{2\sqrt{x+1}}$

b)  $\frac{x^2(7x+6)}{2\sqrt{x+1}}$

c)  $\frac{7x^3+x^2}{2\sqrt{x+1}}$

d)  $3x^2\sqrt{x+1}$

e)  $\frac{x^2\sqrt{x+1}}{\sqrt{x^6+1}}$

12. Find the derivative:  $s(t) = \sec \sqrt{t}$

a)  $\tan^2 \sqrt{t}$

b)  $\frac{\sec \sqrt{t} \cdot \tan \sqrt{t}}{2\sqrt{t}}$

c)  $\sec \frac{1}{2\sqrt{t}} \cdot \tan \frac{1}{2\sqrt{t}}$

d)  $\sec \sqrt{t} \cdot \tan \sqrt{t}$

e)  $\frac{\csc \sqrt{t}}{\sqrt{t}}$

13. If  $y = \frac{-4x}{\cos^2 x + \sin^2 x}$ , then  $y' =$

a)  $-4$

b)  $\frac{-4}{(\cos^2 x + \sin^2 x)^2}$

c)  $-4x$

d)  $4 \cos 4x$

e)  $0$

14. If  $x^2y + 9y^2 = 3 - x$  then  $\frac{dy}{dx} =$

a)  $\frac{-2xy - 1}{x^2 + 18y}$

b)  $\frac{-2xy}{x^2 + 18y}$

c)  $\frac{-xy}{x^2 + 18y}$

d)  $\frac{-x + y}{x^2 + 9y}$

e)  $\frac{-2xy + 1}{x^2 + 18y}$

15. Find the point on the curve  $y = 5 \ln(4 - x^2)$  where the tangent is horizontal.

a)  $(5, \ln 4)$

b)  $(5, 5 \ln 4)$

c)  $(0, 5 \ln 2)$

d)  $(0, 10 \ln 2)$

e)  $(0, \ln 4)$

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PRACTICE  
Calculus TEST    MID-TERM    2/15/2017

**Answer List**

- |       |       |       |
|-------|-------|-------|
| 1. d  | 2. b  | 3.    |
| 4. b  | 5. e  | 6. d  |
| 7. e  | 8. d  | 9. d  |
| 10. d | 11. b | 12. b |
| 13. a | 14. a | 15. d |

**Catalog List**

- |               |              |               |
|---------------|--------------|---------------|
| 1. APC DD 9   | 2. APC DD 16 | 3. APC DD 33  |
| 4. APC EI 1   | 5. APC EI 23 | 6. APC EI 33  |
| 7. APC EI 42  | 8. APC EB 11 | 9. APC EB 21  |
| 10. APC ED 10 | 11. APC EF 9 | 12. APC EF 21 |
| 13. APC EF 50 | 14. APC EG 8 | 15. APC EC 25 |

