

# Classroom Voting Questions: Calculus I

## 3.1 Powers and Polynomials

1. If  $f(x) = 2x^2$ , then what is  $f'(x)$ ?
  - (a)  $2x$
  - (b)  $2x^2$
  - (c)  $4$
  - (d)  $4x$
  - (e)  $4x^2$
  - (f) Cannot be determined from what we know
  
2. If  $f(x) = 7$ , then what is  $f'(x)$ ?
  - (a)  $7$
  - (b)  $7x$
  - (c)  $0$
  - (d)  $1$
  - (e) Cannot be determined from what we know
  
3. If  $f(x) = 2x^{2.5}$ , then what is  $f'(x)$ ?
  - (a)  $2.5x^{2.5}$
  - (b)  $5x^{2.5}$
  - (c)  $2.5x^{1.5}$
  - (d)  $5x^{1.5}$
  - (e) Cannot be determined from what we know
  
4. If  $f(x) = \pi^2$ , then what is  $f'(x)$ ?
  - (a)  $2\pi$
  - (b)  $\pi^2$
  - (c)  $0$
  - (d)  $2$

(e) Cannot be determined from what we know

5. If  $f(x) = 3^x$ , then what is  $f'(x)$ ?

- (a)  $x \cdot 3^{x-1}$
- (b)  $3^x$
- (c)  $3x^2$
- (d) 0
- (e) None of the above

6. If  $f(x) = 4\sqrt{x}$ , then what is  $f'(x)$ ?

- (a)  $4\sqrt{x}$
- (b)  $2\sqrt{x}$
- (c)  $2x^{1/2}$
- (d)  $4x^{-1/2}$
- (e)  $2x^{-1/2}$
- (f) Cannot be determined from what we know

7. If  $f(t) = 3t^2 + 2t$ , then what is  $f'(t)$ ?

- (a)  $3t^2 + 2$
- (b)  $6t + 2$
- (c)  $9t^2 + 2t$
- (d)  $9t + 2$
- (e) Cannot be determined from what we know

8. Let  $f(x) = -16x^2 + 96x$ . Find  $f'(2)$ .

- (a) 0
- (b) 32
- (c) 128
- (d)  $f'(2)$  does not exist.

9. If  $a + b^2 = 3$ , find  $\frac{da}{db}$ .

- (a)  $\frac{da}{db} = 0$
- (b)  $\frac{da}{db} = 2b$
- (c)  $\frac{da}{db} = -2b$
- (d) Cannot be determined from this expression

10. If  $r(q) = 4q^{-5}$ , then what is  $r'(q)$ ?

- (a)  $5q^{-5}$
- (b)  $-20q^{-4}$
- (c)  $-20q^{-5}$
- (d)  $-20q^{-6}$
- (e) Cannot be determined from what we know

11. If  $f(x) = x(x + 5)$ , then what is  $f'(x)$ ?

- (a)  $x + 5$
- (b) 1
- (c)  $2x + 5$
- (d)  $2x$
- (e) Cannot be determined from what we know

12. If  $f(x) = \frac{2}{x^3}$ , then what is  $f'(x)$ ?

- (a)  $\frac{2}{3x^2}$
- (b)  $\frac{-6}{x^4}$
- (c)  $6x^{-2}$
- (d)  $-3x^{-4}$
- (e) Cannot be determined from what we know

13. If  $f(x) = x^2 + \frac{3}{x}$ , then what is  $f'(x)$ ?

- (a)  $2x - 3x^{-2}$
- (b)  $2x + 3x^{-1}$
- (c)  $2x - 3x^2$
- (d)  $x^2 - 3x^{-1}$

(e) Cannot be determined from what we know

14. If  $f(x) = 4\sqrt{x} + \frac{5}{x^2}$ , then what is  $f'(x)$ ?

(a)  $2x^{-1/2} - 10x^{-3}$

(b)  $4x^{1/2} + 5x^{-2}$

(c)  $2x^{1/2} - 10x^{-3}$

(d)  $2x^{-1/2} + 10x^{-3}$

(e) Cannot be determined from what we know

15. If  $f(x) = \frac{x^2+5x}{x}$ , then what is  $f'(x)$ ?

(a)  $2x + 5$

(b)  $x + 5$

(c) 1

(d) 0

(e) Cannot be determined from what we know

16. If  $f(x) = \frac{x}{x^2+5x}$ , then what is  $f'(x)$ ?

(a)  $\frac{1}{2x+5}$

(b)  $-x^{-2}$

(c)  $\frac{1}{x} + \frac{1}{5}$

(d) 1

(e) Cannot be determined from what we know

17. If  $f(m) = am^2 + bm$ , then what is  $f'(m)$ ?

(a)  $m^2 + m$

(b)  $2am + b$

(c)  $am$

(d) 0

(e) Cannot be determined from what we know

18. If  $p(q) = \frac{2q-8}{q^2}$ , then what is  $p'(2)$ ?

- (a)  $\frac{2}{2q}$
- (b)  $-2q^{-2} + 16q^{-3}$
- (c)  $\frac{1}{2}$
- (d)  $\frac{3}{2}$
- (e) 0
- (f) Cannot be determined from what we know

19. If  $f(d) = ad^2 + bd + d + c$ , then what is  $f'(d)$ ?

- (a)  $2ad + b + d$
- (b)  $2ad + b + 1$
- (c)  $2ad + b + c$
- (d)  $2ad + b$
- (e)  $2ad + b + 1 + c$
- (f)  $2ad + b + 2$

20. If  $g(d) = ab^2 + 3c^3d + 5b^2c^2d^2$ , then what is  $g''(d)$ ?

- (a)  $3c^3 + 10b^2c^2d$
- (b)  $10b^2c^2$
- (c)  $42 + 18cd$
- (d)  $2ab + 9c^2d + 40bcd$
- (e) Cannot be determined from what we know

21. Find the equation of the line that is tangent to the function  $f(x) = 3x^2$  when  $x = 2$ . Recall that this line not only has the same slope as  $f(x)$  at  $x = 2$ , but also has the same value of  $y$  when  $x = 2$ .

- (a)  $y = 12x - 12$
- (b)  $y = 6x$
- (c)  $y = 3x + 6$
- (d)  $y = 12x$
- (e)  $y = 6x + 6$

22. Which is the equation of the line tangent to  $y = x^2$  at  $x = 4$ ?

- (a)  $y = (2x)x + 4$
- (b)  $y = 8x + 4$
- (c)  $y = 8x - 16$
- (d)  $y = 16x - 48$

23. A ball is thrown into the air and its height  $h$  (in meters) after  $t$  seconds is given by the function  $h(t) = 10 + 20t - 5t^2$ . When the ball reaches its maximum height, its velocity will be zero. At what time will the ball reach its maximum height?

- (a)  $t = 0$  seconds
- (b)  $t = 1$  second
- (c)  $t = 2$  seconds
- (d)  $t = 3$  seconds
- (e)  $t = 4$  seconds

24. A ball is thrown into the air and its height  $h$  (in meters) after  $t$  seconds is given by the function  $h(t) = 10 + 20t - 5t^2$ . When the ball reaches its maximum height, its velocity will be zero. What will be the ball's maximum height?

- (a)  $h = 10$  meters
- (b)  $h = 20$  meters
- (c)  $h = 30$  meters
- (d)  $h = 40$  meters
- (e)  $h = 50$  meters

25. Suppose a stone is thrown vertically upward with an initial velocity of 64 ft/s from a bridge 96 ft above a river. By Newton's laws of motion, the position of the stone (measured as the height above the ground) after  $t$  seconds is  $s(t) = -16t^2 + 64t + 96$ . How many seconds after it is thrown will the stone reach its maximum height?

- (a)  $(2 - \sqrt{10})$  s
- (b) 2 s
- (c)  $(2 + \sqrt{10})$  s
- (d) 4 s