

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) 2π
 - (b) π^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