

# Classroom Voting Questions: Calculus II

## Section 6.3 Differential Equations

1. Find the solution to the differential equation  $\frac{dy}{dx} = 6x^2$  if  $y(0) = 5$ .
  - (a)  $y(x) = 12x + 5$
  - (b)  $y(x) = 6x^2 + 5$
  - (c)  $y(x) = 2x^3 + 5$
  - (d) None of the above
  
2. Suppose you are told that the acceleration function of an object is a continuous function  $a(t)$ . Let's say you are given that  $v(0) = 1$ . **True or False:** You can find the position of the object at any time  $t$ .
  - (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
  
3. We know that  $\frac{d^2f}{dx^2} = 8e^x + 12$ , that  $f'(0) = 4$ , and  $f(0) = 10$ . What is  $f(x)$ ?
  - (a)  $f(x) = 8e^x + 6x^2 + 4x + 10$
  - (b)  $f(x) = 8e^x + 6x^2 - 4x + 2$
  - (c)  $f(x) = 8e^x + 12x^2 + 4x + 10$
  - (d)  $f(x) = 8e^x + 12x^2 - 4x + 2$
  
4. **True or False:** If  $F(x)$  is an antiderivative of  $f(x)$ , then  $y = F(x)$  is a solution to the differential equation  $\frac{dy}{dx} = f(x)$ .
  - (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident

5. **True or False:** If  $y = F(x)$  is a solution to the differential equation  $\frac{dy}{dx} = f(x)$ , then  $F(x)$  is an antiderivative of  $f(x)$ .
- (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
6. **True or False:** If an object has constant nonzero acceleration, then the position of the object as a function of time is a quadratic polynomial.
- (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
7. **True or False:** If an object's position as a function of time is a quadratic polynomial, then its acceleration is constant.
- (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
8. **True or False:** If  $F(x)$  and  $G(x)$  are two antiderivatives of  $f(x)$  for  $-\infty < x < \infty$  and  $F(5) > G(5)$ , then  $F(10) > G(10)$ .
- (a) True, and I am very confident
  - (b) True, but I am not very confident
  - (c) False, but I am not very confident
  - (d) False, and I am very confident
9. **True or False:** If two solutions of a differential equation  $\frac{dy}{dx} = f(x)$  have different values at  $x = 3$  then they have different values at every  $x$ .
- (a) True, and I am very confident
  - (b) True, but I am not very confident

- (c) False, but I am not very confident
- (d) False, and I am very confident

10. **True or False:** If the function  $y = f(x)$  is a solution of the differential equation  $\frac{dy}{dx} = \frac{\sin x}{x}$ , then the function  $y = f(x) + 5$  is also a solution.

- (a) True, and I am very confident
- (b) True, but I am not very confident
- (c) False, but I am not very confident
- (d) False, and I am very confident

11. A car is traveling at a speed of 40 mph. How fast is this speed in feet per second?

- (a) 211,200 ft/s
- (b) 58.67 ft/s
- (c) 3,520 ft/s
- (d) 586.7 ft/s

12. A car goes from zero to 80 ft/s in 4 seconds. What is its acceleration?

- (a) 10 ft/s<sup>2</sup>
- (b) 20 ft/s<sup>2</sup>
- (c) 30 ft/s<sup>2</sup>
- (d) 40 ft/s<sup>2</sup>

13. An acrobat is tossed into the air at an upward speed of 40 ft/s. What is the acrobat's velocity after 2 seconds?

- (a) 40 ft/s
- (b) -24 ft/s
- (c) -32 ft/s
- (d) -64 ft/s

14. An acrobat is tossed into the air at an upward speed of 40 ft/s. How high is the acrobat after 2 seconds?

- (a) 80 ft

- (b) 64 ft
  - (c) 16 ft
  - (d)  $-48$  ft
15. A car is traveling at a speed of  $72$  ft/s when the driver slams on the brakes, giving it a deceleration of  $12$  ft/s<sup>2</sup>. How long does it take for the car to reach a stop?
- (a) 2 s
  - (b) 4 s
  - (c) 6 s
  - (d) 8 s
  - (e) 12 s
16. A ball is thrown up into the air at a speed of  $64$  ft/s. How high will the ball get?
- (a) 2 ft
  - (b) 32 ft
  - (c) 64 ft
  - (d) 128 ft
17. A plane can accelerate from zero to  $200$  ft/s in 10 seconds. What distance will it cover before it reaches a speed of  $200$  ft/s?
- (a) 10 ft
  - (b) 100 ft
  - (c) 1,000 ft
  - (d) 10,000 ft
18. Looking over the edge of a canyon, we throw down a stone at a speed of  $12$  ft/s. When it hits the floor of the canyon, it is going at a speed of  $140$  ft/s. How deep is the canyon?
- (a) 304 ft
  - (b) 259 ft
  - (c) 122 ft
  - (d) 76 ft

19. A car goes from zero to 80 ft/s at a constant acceleration. When the car reaches 80 ft/s, it has traveled a distance of 200 ft. What was its acceleration?
- (a) 4 ft/s<sup>2</sup>
  - (b) 8 ft/s<sup>2</sup>
  - (c) 16 ft/s<sup>2</sup>
  - (d) 32 ft/s<sup>2</sup>
  - (e) 200 ft/s<sup>2</sup>
20. A car is driving at 100 ft/s when the driver suddenly slams on the brakes, slowing down at a constant deceleration to 20 ft/s, when the driver takes his foot off the brakes. The distance the car traveled while the brakes were on is 240 ft. What was the cars rate of deceleration?
- (a) 6.7 ft/s<sup>2</sup>
  - (b) 13.3 ft/s<sup>2</sup>
  - (c) 20 ft/s<sup>2</sup>
  - (d) 40 ft/s<sup>2</sup>