

Classroom Voting Questions: Precalculus

Introduction to Continuity

1. A drippy faucet adds one milliliter to the volume of water in a tub at precisely one-second intervals. Let f be the function that represents the volume of water in the tub at time t . Which of the following statements is correct?
 - (a) f is a continuous function at every time t
 - (b) f is continuous for all t other than the precise instants when the water drips into the tub.
 - (c) f is not continuous at any time t .
 - (d) There is not enough information to know where f is continuous.

2. A drippy faucet adds one milliliter to the volume of water in a tub at precisely one second intervals. Let g be the function that represents the volume of water in the tub as a function of the depth of the water, x , in the tub. Which of the following statements is correct?
 - (a) g is a continuous function at every depth x .
 - (b) there are some values of x at which g is not continuous.
 - (c) g is not continuous at any depth, x .
 - (d) not enough information is given to know where g is continuous.

3. You know the following statement is true:

If $f(x)$ is a polynomial, then $f(x)$ is continuous.

Which of the following is also true?
 - (a) If $f(x)$ is not continuous, then it is not a polynomial.
 - (b) If $f(x)$ is continuous, then it is a polynomial.
 - (c) If $f(x)$ is not a polynomial, then it is not continuous.

4. **True or False:** You were once exactly 3 feet tall.
 - (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:** At some time since you were born your weight in pounds equaled your height in inches.
- (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:** Along the Equator, there are two diametrically opposite sites that have exactly the same temperature at the same time.
- (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. Suppose that during half-time at a basketball game the score of the home team was 36 points. **True or False:** There had to be at least one moment in the first half when the home team had exactly 25 points.
- (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. At what point on the interval $[-7, 2]$ does the function $f(x) = \frac{3e^x}{4e^x - 4}$ have a discontinuity?
- (a) $x = 0$
 - (b) $x = 1$
 - (c) $x = 3$
 - (d) $x = 4$
 - (e) There is no discontinuity on this interval.

9. For what value of the constant c is the function $f(x)$ continuous, if

$$f(x) = \begin{cases} cx + 9 & \text{if } x \in (-\infty, 5] \\ cx^2 - 9 & \text{if } x \in (5, \infty) \end{cases}$$

- (a) $c = -\frac{9}{5}$
- (b) $c = \frac{9}{10}$
- (c) $c = \frac{9}{25}$
- (d) This is not possible.