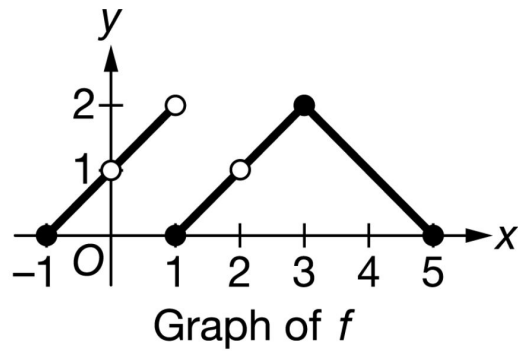# 2.3 AP Style Questions

1. The graph of the function f is shown below. What are all the values of x for which f has a removable discontinuity?

   a. 0 only

   b. 1 only

   c. 0 and 2 only

   d. 0, 1, and 2 only

   Graph of f

2.

   Let f be the function defined by $f(x) = \frac{3x^3+2x^2}{x^2-x}$. Which of the following statements is true?

   (A) f has a discontinuity due to a vertical asymptote at $x = 0$ and at $x = 1$.

   (B) f has a removable discontinuity at $x = 0$ and a jump discontinuity at $x = 1$.

   (C) f has a removable discontinuity at $x = 0$ and a discontinuity due to a vertical asymptote at $x = 1$.

   (D) f is continuous at $x = 0$, and f has a discontinuity due to a vertical asymptote at $x = 1$.

3. Let f be the piecewise function below. Which of the following statements is false?

a. f is continuous at $x = 1$

b. f is continuous at $x = 2$

c. f is continuous at $x = 3$

d. f is continuous at $x = 4$

$$f(x) = \begin{cases} x^2 + 2x & \text{for } x < 1 \\ 3 & \text{for } x = 1 \\ x^3 + x^2 + x & \text{for } 1 < x < 3 \\ 0 & \text{for } x = 3 \\ 2x + 1 & \text{for } x > 3 \end{cases}$$

4. What is the domain of the function given by $f(x) = \frac{\sqrt{x^2-4}}{x-3}$?

a. $\{x \ : \ x \neq 3\}$

b. $\{x \ : \ |x| \leq 2\}$

c. $\{x \ : \ |x| \geq 2\}$

d. $\{x \ : \ |x| \geq 2 \text{ and } x \neq 3\}$

e. $\{x \ : \ x \geq 2 \text{ and } x \neq 3\}$

5.

Let f be the function defined by $f(x) = \begin{cases} x^2 + 2 & \text{for } x \leq 3, \\ 6x + k & \text{for } x > 3. \end{cases}$

If f is continuous at $x = 3$, what is the value of k?

a. -7

b. 2

c. 3

d. 7

6. Let f be the function given by $f(x) = \frac{2x^2+14x-16}{x^2-9x+8}$. For what values of x does f have a removable discontinuity?

(A) 1 only

(B) 8 only

(C) -8 and 1

(D) 1 and 8

$$f(x) = \begin{cases} a^2 + x^2 & \text{for } x < 3 \\ a(x+3) & \text{for } x \geq 3 \end{cases}$$

7. Let f be the function defined above, where a is a constant. For what values of a, if any, is f continuous at $x = 3$?

(A) 0 only

(B) 3 only

(C) 0 and 3

(D) There is no such a.