Calculus Practice: Use Derivatives to Analyze Functions 3a

For each problem, find all discontinuities.

1) $f(x) = -\dfrac{9x}{x^2 + 9}$

A) No discontinuities exist. B) Discontinuity at: $x = -1$
C) Discontinuity at: $x = 5$ D) Discontinuity at: $x = -5$

2) $y = \dfrac{1}{x + 2}$

A) Discontinuity at: $x = 0$ B) Discontinuity at: $x = 6$
C) Discontinuity at: $x = 1$ D) Discontinuity at: $x = -2$

3) $y = -\dfrac{x^2}{4x - 8}$

A) Discontinuity at: $x = 3$ B) Discontinuity at: $x = -7$
C) Discontinuity at: $x = 0$ D) Discontinuity at: $x = 2$

4) $y = -\dfrac{x^2}{2x - 4}$

A) Discontinuity at: $x = 6$ B) Discontinuity at: $x = -1$
C) Discontinuity at: $x = -5$ D) Discontinuity at: $x = 2$

5) $f(x) = -\dfrac{x^3}{x^2 - 4}$

A) Discontinuity at: $x = 7$ B) Discontinuity at: $x = 1$
C) Discontinuity at: $x = -3$ D) Discontinuities at: $x = -2, 2$

6) $y = \left(\dfrac{x}{x - 3}\right)^2$

A) Discontinuity at: $x = 0$ B) Discontinuity at: $x = -7$
C) Discontinuity at: $x = 3$ D) Discontinuity at: $x = 6$

7) $y = -\dfrac{x}{x^2 - 4}$

A) Discontinuity at: $x = 0$ B) Discontinuity at: $x = 3$
C) Discontinuity at: $x = 4$ D) Discontinuities at: $x = -2, 2$

8) $f(x) = -\dfrac{x}{x^2 - 1}$

A) Discontinuity at: $x = 6$ B) Discontinuity at: $x = 1$
C) Discontinuities at: $x = -1, 1$ D) Discontinuity at: $x = -5$

9) $f(x) = -\dfrac{2x}{x + 3}$

A) Discontinuity at: $x = -3$ B) Discontinuity at: $x = 6$
C) Discontinuity at: $x = -6$ D) Discontinuity at: $x = -5$

10) $y = \cot(2x)$; $[-\pi, \pi]$

A) No discontinuities exist.

B) Discontinuities at: $x = -\pi, 0, \pi$

C) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

D) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

11) $f(x) = 2\cos(2x)$; $[-\pi, \pi]$

A) No discontinuities exist.

B) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

12) $f(x) = \tan(x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi$

B) No discontinuities exist.

C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

13) $y = -\csc(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi$

B) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

C) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

D) No discontinuities exist.

14) $f(x) = \sin(2x)$; $[-\pi, \pi]$

A) No discontinuities exist.

B) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

C) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

15) $f(x) = -2\cos(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

B) No discontinuities exist.

C) Discontinuities at: $x = -\pi, 0, \pi$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

16) $f(x) = -2\sin(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

B) No discontinuities exist.

C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi$

17) $y = \tan(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

B) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

C) Discontinuities at: $x = -\pi, 0, \pi$

D) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

18) $y = -\cos(x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

B) No discontinuities exist.

C) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

D) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

Calculus Practice: Use Derivatives to Analyze Functions 3a

For each problem, find all discontinuities.

1) $f(x) = -\dfrac{9x}{x^2 + 9}$

*A) No discontinuities exist.
B) Discontinuity at: $x = -1$
C) Discontinuity at: $x = 5$
D) Discontinuity at: $x = -5$

2) $y = \dfrac{1}{x + 2}$

A) Discontinuity at: $x = 0$
B) Discontinuity at: $x = 6$
C) Discontinuity at: $x = 1$
*D) Discontinuity at: $x = -2$

3) $y = -\dfrac{x^2}{4x - 8}$

A) Discontinuity at: $x = 3$
B) Discontinuity at: $x = -7$
C) Discontinuity at: $x = 0$
*D) Discontinuity at: $x = 2$

4) $y = -\dfrac{x^2}{2x - 4}$

A) Discontinuity at: $x = 6$
B) Discontinuity at: $x = -1$
C) Discontinuity at: $x = -5$
*D) Discontinuity at: $x = 2$

5) $f(x) = -\dfrac{x^3}{x^2 - 4}$

A) Discontinuity at: $x = 7$
B) Discontinuity at: $x = 1$
C) Discontinuity at: $x = -3$
*D) Discontinuities at: $x = -2, 2$

6) $y = \left(\dfrac{x}{x - 3}\right)^2$

A) Discontinuity at: $x = 0$
B) Discontinuity at: $x = -7$
*C) Discontinuity at: $x = 3$
D) Discontinuity at: $x = 6$

7) $y = -\dfrac{x}{x^2 - 4}$

A) Discontinuity at: $x = 0$
B) Discontinuity at: $x = 3$
C) Discontinuity at: $x = 4$
*D) Discontinuities at: $x = -2, 2$

8) $f(x) = -\dfrac{x}{x^2 - 1}$

A) Discontinuity at: $x = 6$
B) Discontinuity at: $x = 1$
*C) Discontinuities at: $x = -1, 1$
D) Discontinuity at: $x = -5$

9) $f(x) = -\dfrac{2x}{x + 3}$

*A) Discontinuity at: $x = -3$
B) Discontinuity at: $x = 6$
C) Discontinuity at: $x = -6$
D) Discontinuity at: $x = -5$

10) $y = \cot(2x)$; $[-\pi, \pi]$

A) No discontinuities exist.

B) Discontinuities at: $x = -\pi, 0, \pi$

*C) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

D) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

11) $f(x) = 2\cos(2x)$; $[-\pi, \pi]$

*A) No discontinuities exist.

B) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

12) $f(x) = \tan(x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi$

B) No discontinuities exist.

*C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

13) $y = -\csc(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi$

B) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

*C) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

D) No discontinuities exist.

14) $f(x) = \sin(2x)$; $[-\pi, \pi]$

*A) No discontinuities exist.

B) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

C) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

15) $f(x) = -2\cos(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

*B) No discontinuities exist.

C) Discontinuities at: $x = -\pi, 0, \pi$

D) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

16) $f(x) = -2\sin(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

*B) No discontinuities exist.

C) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

D) Discontinuities at: $x = -\pi, 0, \pi$

17) $y = \tan(2x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$

B) Discontinuities at: $x = -\pi, -\frac{\pi}{2}, 0, \frac{\pi}{2}, \pi$

C) Discontinuities at: $x = -\pi, 0, \pi$

*D) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

18) $y = -\cos(x)$; $[-\pi, \pi]$

A) Discontinuities at: $x = -\pi, 0, \pi, -\frac{\pi}{2}, \frac{\pi}{2}$

*B) No discontinuities exist.

C) Discontinuities at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}$

D) Discontinuities at: $x = -\frac{\pi}{2}, \frac{\pi}{2}$