Calculus Practice: Use Derivatives to Analyze Functions 2a

For each problem, find the x-coordinates of all critical points.

1) $f(x) = \dfrac{x^3}{x^2 - 1}$

A) Critical points at: $x = -\sqrt{3}, 0, \sqrt{3}$

B) Critical points at: $x = -\dfrac{\sqrt{3}}{3}, \dfrac{1}{3}, \dfrac{\sqrt{3}}{3}$

C) Critical points at: $x = -4\sqrt{3}, 4, 4\sqrt{3}$

D) No critical points exist.

2) $y = -\dfrac{2x}{x + 3}$

A) Critical point at: $x = 3$

B) Critical point at: $x = 4$

C) Critical point at: $x = 2$

D) No critical points exist.

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

A) No critical points exist.

B) Critical points at: $x = -\dfrac{\sqrt{3}}{3}, \dfrac{\sqrt{3}}{3}$

C) Critical points at: $x = -\sqrt{3}, \sqrt{3}$

D) Critical points at: $x = -4\sqrt{3}, 4\sqrt{3}$

4) $y = \dfrac{1}{x^2 - 9}$

A) Critical point at: $x = \dfrac{1}{3}$

B) No critical points exist.

C) Critical point at: $x = 0$

D) Critical point at: $x = 4$

5) $y = -(x + 4)^{\frac{1}{3}}$

A) Critical point at: $x = -\dfrac{4}{3}$

B) Critical point at: $x = -16$

C) Critical point at: $x = -4$

D) No critical points exist.

6) $f(x) = -(5x + 15)^{\frac{1}{2}}$

A) Critical point at: $x = -3$

B) Critical point at: $x = -1$

C) Critical point at: $x = -12$

D) No critical points exist.

7) $y = -\dfrac{1}{4}(x + 3)^{\frac{8}{3}} + 4(x + 3)^{\frac{2}{3}} - 2$

A) Critical points at: $x = -\dfrac{5}{3}, -1, -\dfrac{1}{3}$

B) No critical points exist.

C) Critical points at: $x = -5, -3, -1$

D) Critical points at: $x = -20, -12, -4$

8) $f(x) = -(7x + 28)^{\frac{1}{2}}$

A) Critical point at: $x = -16$

B) Critical point at: $x = -4$

C) Critical point at: $x = -\dfrac{4}{3}$

D) No critical points exist.

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

A) No critical points exist.

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

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

D) Critical points at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}, -\pi, 0, \pi$

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

A) Critical points at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}, -\pi, 0, \pi$

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

C) No critical points exist.

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

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

A) Critical points at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}, -\pi, 0, \pi$

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

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

D) No critical points exist.

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

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

B) Critical points at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}, -\pi, 0, \pi$

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

D) No critical points exist.

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

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

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

C) Critical points at: $x = -\frac{3\pi}{4}, -\frac{\pi}{4}, \frac{\pi}{4}, \frac{3\pi}{4}, -\pi, 0, \pi$

D) No critical points exist.

14) $y = -\sec(2x)$; $[-\pi, \pi]$

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

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

C) No critical points exist.

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

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D) No critical points exist.

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