Calculus Practice: Use Derivatives to Analyze Functions 2b

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

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

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

3) $y = \dfrac{16}{x^2 + 4}$

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

5) $f(x) = -\dfrac{x^2}{4x + 8}$

6) $y = \dfrac{x}{x^2 - 16}$

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

8) $y = -\dfrac{1}{6}(x - 2)^{\frac{7}{3}} + \dfrac{14}{3}(x - 2)^{\frac{1}{3}}$

9) $y = (5x + 5)^{\frac{1}{2}}$

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

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

12) $f(x) = \frac{1}{6}(x - 2)^{\frac{7}{3}} - \frac{14}{3}(x - 2)^{\frac{1}{3}}$

13) $y = \frac{3}{16}(x + 1)^{\frac{4}{3}} - \frac{3}{2}(x + 1)^{\frac{1}{3}} + 1$

14) $f(x) = -\frac{1}{4}x^{\frac{8}{3}} + 4x^{\frac{2}{3}} - 2$

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

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

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

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

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

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

Calculus Practice: Use Derivatives to Analyze Functions 2b

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

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

Critical points at: $x = -2, 0$

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

No critical points exist.

3) $y = \dfrac{16}{x^2 + 4}$

Critical point at: $x = 0$

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

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

5) $f(x) = -\dfrac{x^2}{4x + 8}$

Critical points at: $x = -4, 0$

6) $y = \dfrac{x}{x^2 - 16}$

No critical points exist.

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

Critical point at: $x = 4$

8) $y = -\dfrac{1}{6}(x - 2)^{\frac{7}{3}} + \dfrac{14}{3}(x - 2)^{\frac{1}{3}}$

Critical points at: $x = 0, 2, 4$

9) $y = (5x + 5)^{\frac{1}{2}}$

Critical point at: $x = -1$

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

Critical points at: $x = -2, 0, 2$

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

Critical point at: $x = 1$

12) $f(x) = \frac{1}{6}(x - 2)^{\frac{7}{3}} - \frac{14}{3}(x - 2)^{\frac{1}{3}}$

Critical points at: $x = 0, 2, 4$

13) $y = \frac{3}{16}(x + 1)^{\frac{4}{3}} - \frac{3}{2}(x + 1)^{\frac{1}{3}} + 1$

Critical points at: $x = -1, 1$

14) $f(x) = -\frac{1}{4}x^{\frac{8}{3}} + 4x^{\frac{2}{3}} - 2$

Critical points at: $x = -2, 0, 2$

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

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

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

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

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

No critical points exist.

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

No critical points exist.

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

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

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

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