Calculus Practice: Use Derivatives to Analyze Functions 1a

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

1) $y = -x^5 + 2x^3 - 1$

A) Critical points at: $x = -\frac{\sqrt{30}}{15}, \frac{1}{3}, \frac{\sqrt{30}}{15}$

B) Critical points at: $x = -\frac{4\sqrt{30}}{5}, 4, \frac{4\sqrt{30}}{5}$

C) Critical points at: $x = -\frac{\sqrt{30}}{5}, 0, \frac{\sqrt{30}}{5}$

D) No critical points exist.

2) $y = x^3 - 3x + 1$

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

B) Critical points at: $x = -4, 4$

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

D) No critical points exist.

3) $y = -x^4 + x^2 + 1$

A) Critical points at: $x = -\frac{\sqrt{2}}{6}, \frac{1}{3}, \frac{\sqrt{2}}{6}$

B) No critical points exist.

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

D) Critical points at: $x = -2\sqrt{2}, 4, 2\sqrt{2}$

4) $f(x) = -x^4 - 2x^3 + 2x^2 - 6$

A) Critical points at: $x = -\frac{2}{3}, \frac{1}{3}, \frac{1}{6}$

B) Critical points at: $x = -8, 4, 2$

C) Critical points at: $x = -2, 0, \frac{1}{2}$

D) No critical points exist.

5) $y = x^3 - 3x^2 + 6$

A) Critical points at: $x = \frac{1}{3}, \frac{2}{3}$

B) No critical points exist.

C) Critical points at: $x = 4, 8$

D) Critical points at: $x = 0, 2$

6) $f(x) = x^4 - 2x^2 + 3$

A) Critical points at: $x = -1, 0, 1$

B) No critical points exist.

C) Critical points at: $x = -\frac{1}{3}, \frac{1}{3}$

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

7) $y = x^5 - 2x^3 - 4$

A) No critical points exist.

B) Critical points at: $x = -\frac{\sqrt{30}}{5}, 0, \frac{\sqrt{30}}{5}$

C) Critical points at: $x = -\frac{4\sqrt{30}}{5}, 4, \frac{4\sqrt{30}}{5}$

D) Critical points at: $x = -\frac{\sqrt{30}}{15}, \frac{1}{3}, \frac{\sqrt{30}}{15}$

8) $y = -x^4 + 3x^2 - 3$

A) Critical points at: $x = -\frac{\sqrt{6}}{6}, \frac{1}{3}, \frac{\sqrt{6}}{6}$

B) Critical points at: $x = -\frac{\sqrt{6}}{2}, 0, \frac{\sqrt{6}}{2}$

C) Critical points at: $x = -2\sqrt{6}, 4, 2\sqrt{6}$

D) No critical points exist.

9) $y = x^4 - 2x^2 - 4$

A) Critical points at: $x = -1, 0, 1$

B) No critical points exist.

C) Critical points at: $x = -4, 4$

D) Critical points at: $x = -\frac{1}{3}, \frac{1}{3}$

10) $f(x) = -x^5 + 2x^3 + 2$

A) Critical points at: $x = -\frac{4\sqrt{30}}{5}, 4, \frac{4\sqrt{30}}{5}$

B) No critical points exist.

C) Critical points at: $x = -\frac{\sqrt{30}}{5}, 0, \frac{\sqrt{30}}{5}$

D) Critical points at: $x = -\frac{\sqrt{30}}{15}, \frac{1}{3}, \frac{\sqrt{30}}{15}$

11) $f(x) = x^3 - 2x^2 + 1$

A) No critical points exist.

B) Critical points at: $x = 4, \frac{16}{3}$

C) Critical points at: $x = \frac{1}{3}, \frac{4}{9}$

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

12) $y = -x^3 - 11x^2 - 35x - 28$

A) Critical points at: $x = -5, -\frac{7}{3}$

B) Critical points at: $x = -\frac{5}{3}, -\frac{7}{9}$

C) No critical points exist.

D) Critical points at: $x = -20, -\frac{28}{3}$

13) $f(x) = x^4 - 3x^2 + 2$

A) Critical points at: $x = -2\sqrt{6}, 4, 2\sqrt{6}$

B) Critical points at: $x = -\frac{\sqrt{6}}{2}, 0, \frac{\sqrt{6}}{2}$

C) No critical points exist.

D) Critical points at: $x = -\frac{\sqrt{6}}{6}, \frac{1}{3}, \frac{\sqrt{6}}{6}$

14) $f(x) = -x^4 + 3x^2 + 2$

A) Critical points at: $x = -\frac{\sqrt{6}}{2}, 0, \frac{\sqrt{6}}{2}$

B) No critical points exist.

C) Critical points at: $x = -\frac{\sqrt{6}}{6}, \frac{1}{3}, \frac{\sqrt{6}}{6}$

D) Critical points at: $x = -2\sqrt{6}, 4, 2\sqrt{6}$

15) $y = x^3 - 3x - 1$

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

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

C) No critical points exist.

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

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

A) Critical point at: $x = 3$

B) No critical points exist.

C) Critical point at: $x = 1$

D) Critical point at: $x = 12$

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