

## Finding Critical Points Practice Quiz

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Date \_\_\_\_\_ Period \_\_\_\_\_

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

5 pts each

1)  $y = 2x^2 - 12x + 20$

$$y' = 4x - 12$$

$$0 = 4x - 12$$

$$12 = 4x$$

$$3 = x$$

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

$$y' = -\csc x \cot x$$

$$\text{or } y' = -\frac{\cos x}{\sin^2 x}$$

$$\boxed{\text{C.N. } x = -\pi/2, \pi/2} \quad (x=0 \text{ not in domain of function})$$

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

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

$$y' = 0 \text{ when } \boxed{x = -\sqrt{3}, 0, \sqrt{3} \text{ C.N.}}$$

 $(y' \text{ undefined at } x = \pm 1 \text{ but not in domain})$ 

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

$$y' = -\frac{7}{18}(x-1)^{\frac{4}{3}} + \frac{14}{9}(x-1)^{-\frac{2}{3}} \rightarrow y' = -\frac{7\sqrt[3]{(x-1)^4}}{18} + \frac{14}{9\sqrt[3]{(x-1)^2}}$$

~~$$y' = -\frac{7}{18}(x-1)^{\frac{4}{3}} + \frac{14}{9}(x-1)^{-\frac{2}{3}}$$~~

 $y' \text{ undefined at } x=1$  $y' = 0 \text{ at } x = -1, 3$ 

$$\boxed{\text{C.N. } x = -1, 1, 3}$$