My Chapter Two Practice Problems – Part I

$$\lim_{h \to 0} \frac{\sin(\frac{\pi}{2}+h)-\sin(\frac{\pi}{2})}{h}$$

(A) -1
(B) 0
(C) 1
(D) π/2
(E) None of the above

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$$\lim_{x \to 1} \frac{x^{53}-1}{x-1}$$

If $f(x) = \sqrt[3]{x} + 3x - x^3$, then what is the value of $f\,'(1)$?

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Find the equation of the tangent line to the graph of $y = 12x - \cos x$ at $x = 0$

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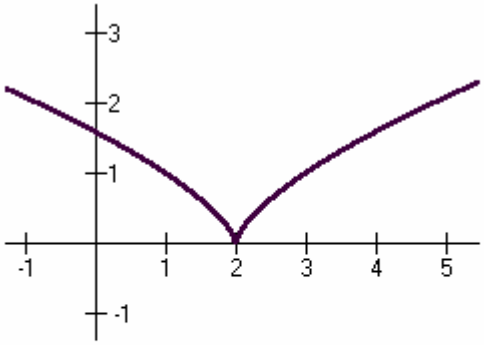
If $f(x) = 4x^{\frac{2}{3}}$, then $f'(8) =$

A) $\frac{32}{3}$ B) 2 C) $\frac{1}{2}$ D) $\frac{4}{3}$ E) 48

Determine where the function is not differentiable.



- A. (-8, 2) ((2, 8)
- B. $x = 2$
- C. The function is differentiable everywhere.
- D. $y = \sqrt[3]{4}$

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Find the equation of the tangent line to the graph of $f(x) = x^2 - 5x + 2$ at the point (2, -4).

- A. $y = -x - 4$
- B. $y = 2x^2 - 9x + 6$
- C. $x + y + 6 = 0$
- D. $x + y + 2 = 0$

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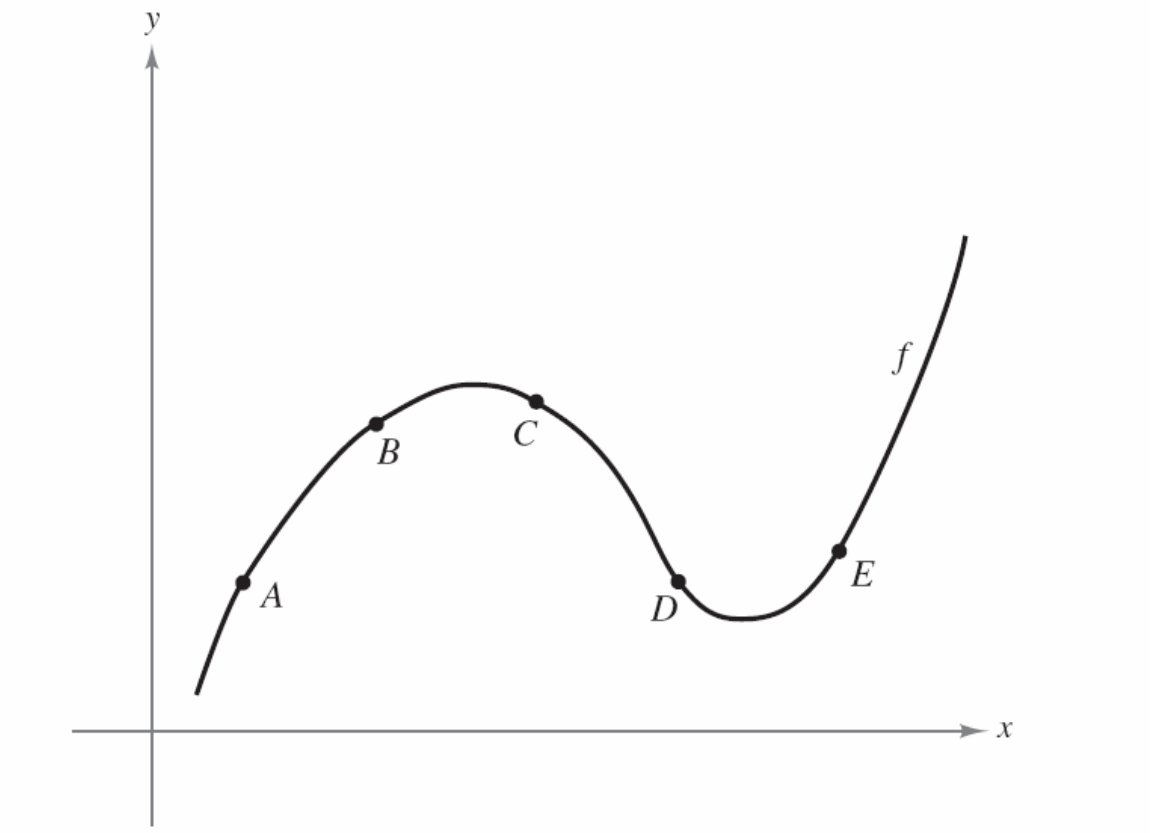
If $f(x)=\frac{x+1}{\sqrt{x}}$, find $f'(x)$.

- A. $f'(x)=\frac{3x+1}{2\sqrt{x^3}}$
- B. $f'(x)=\frac{x-1}{2\sqrt{x^3}}$
- C. $f'(x)=\frac{x-1}{2\sqrt{x^5}}$
- D. $f'(x)=\frac{3x+1}{2\sqrt{x^5}}$
- E. $f'(x)=\frac{x+1}{\sqrt{x^3}}$



Where will this graph have horizontal tangents?

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A particle moves along the x-axis so that its position at time t is given as $s(t) = 2t^2 - 6t + 13$. For value of t is the velocity of the particle zero?

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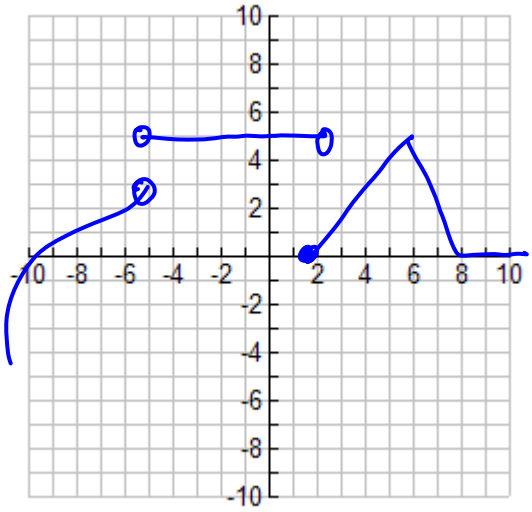

This is the graph of f:
At what values of x is the graph of f continuous but NOT differentiable?

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$$\lim_{x\to\frac{\pi}{2}} \frac{\cos x - \cos\frac{\pi}{2}}{x-\frac{\pi}{2}}$$

Suppose that the function g is defined by

$$g(x)=\begin{cases} k\sqrt{x}, & 0\le x\le 4 \\ mx+1, & 4<x\le 8 \end{cases}$$

where k and m are constants

If g is differentiable at $x=4$, then what are the values of k and m?

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$$\lim_{h \to 0} \frac{(x+h)^{100} - x^{100}}{h}$$