

Quiz 2pm

Key

This is a two-stage quiz. During the first stage, use your knowledge & calculator to take this quiz. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have 15 min. to write one solution (with everyone's name on it!!!) to be turned in for the group.

Show *all* your work. Reasonable supporting work must be shown for any partial credit.

1. [3] Use the graph of f below *estimate* the following:

$f'(1.5) = \text{slope of line tangent to } f \text{ @ } x = 1.5$

$\frac{x-1.5}{3} = -\frac{1}{2}$ (1.5)

derivative (1.5)
read slope (1.5)

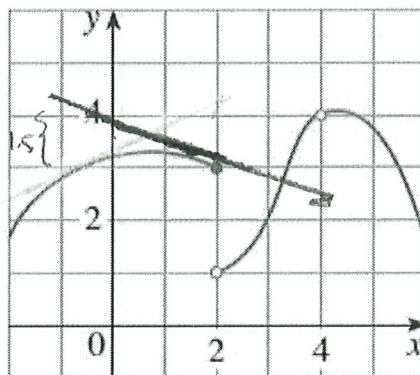
the equation of the line, tangent to f when $x = 1.5$.

looking for $y = mx + b$ (1.5)

$m = -\frac{1}{2}$ from above

$b = \text{y-intercept} \approx 4$ (1.5)

So
 $y = -\frac{1}{2}x + 4$
ply in (1.5)



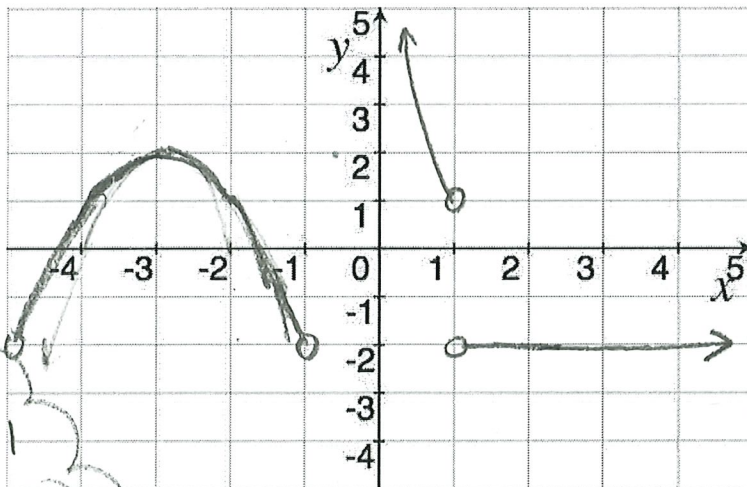
2. [4] Sketch the graph of a function α that satisfies *all* of the following.

(a) $\lim_{x \rightarrow \infty} \alpha(x) = -2$ (1) (1)

(b) $\lim_{x \rightarrow 0^+} \alpha(x) = \infty$ (1)

(c) $\frac{d}{dx} \alpha|_{x=-3} = 0$ (1)

note, there are lots of other correct answers



3. [3] Given that f and g are continuous, that $g(5) = 4$, and $\lim_{x \rightarrow 5} \left(f(x) + \frac{g(x)}{f(x)} \right) = -2$, find $f(5)$.

$\lim_{x \rightarrow 5} \left(f(x) + \frac{g(x)}{f(x)} \right) = -2$
 (1.5) b/c nice properties of limits
 $= \lim_{x \rightarrow 5} f(x) + \frac{\lim_{x \rightarrow 5} g(x)}{\lim_{x \rightarrow 5} f(x)} = -2$

(1.5) b/c $f+g$ are continuous

$f(5) + \frac{g(5)}{f(5)} = -2$
 mult by $f(5)$
 $(f(5))^2 + g(5) = -2f(5)$
 $(f(5))^2 + 2f(5) + 4 = 0$ (1.5)

No solution? $f(5)$ DNE

$-2 \pm \sqrt{4 - 4(1)(4)}$
 2.1
 complex solutions (1.5)

signed good (1)

Derivative
Tangent
1.5

With limits
1.5

limit