

Quiz 4

Key

Show *all* your work. Reasonable supporting work must be shown to earn credit. There are *two* sides to this quiz.

1. [3] (WebHW11 #1) Write the form of the partial fractions of the rational expression. Do not solve for the constants.

$$\frac{3x-1}{x^2+8x+16}$$

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

factoring (+1) (+1) (+1)

2. [3] (PartialFractionsActivity #5) Find $\int \frac{3}{5t^2+1} dt$

Recall $\int \frac{1}{u^2+n} du = \arctan(u) + c$ (+.5)

So let $u = \sqrt{5}t$
 $du = \sqrt{5}dt \Rightarrow \frac{1}{\sqrt{5}} du = dt$ substitution (+1)

start technique (+.5)
do the work (+.5)
plus c (+.5)
algebra (+.5)

$$\int \frac{3}{5t^2+1} dt = 3 \int \frac{1}{(\sqrt{5}t)^2+1} dt = 3 \int \frac{1}{u^2+1} \left(\frac{1}{\sqrt{5}}\right) du$$

$$= \frac{3}{\sqrt{5}} \int \frac{1}{u^2+1} du = \frac{3}{\sqrt{5}} \arctan(u) + c$$

algebra (+.5)

$$= \frac{3}{\sqrt{5}} \arctan(\sqrt{5}t) + c$$

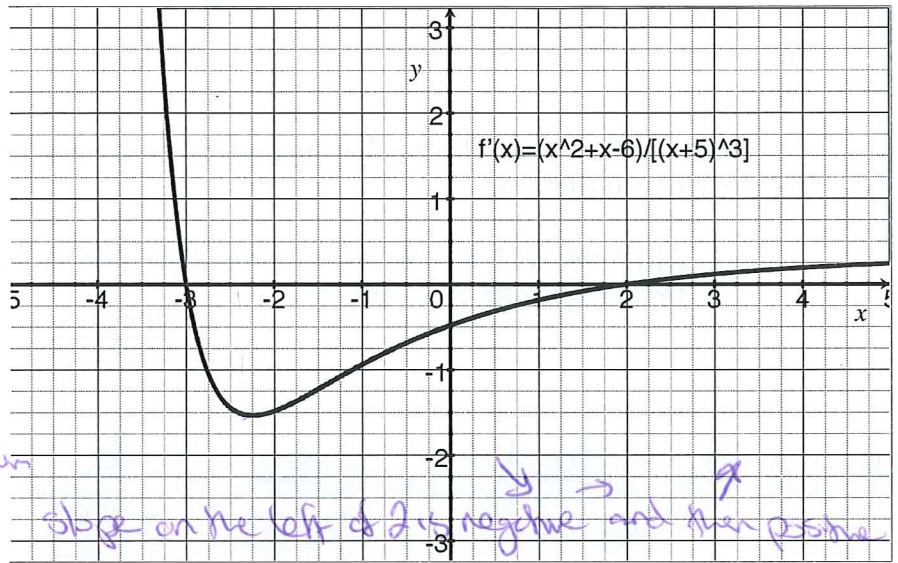
Check: $\frac{d}{dt} \left(\frac{3}{\sqrt{5}} \arctan(\sqrt{5}t) \right) = \frac{3}{\sqrt{5}} \cdot \frac{1}{(\sqrt{5}t)^2+1} \cdot \sqrt{5} = \frac{3}{5t^2+1} \checkmark$

3. (§8.5 #42) Use the graph of $f'(x)$ graphed below to answer the following:

- (a) [1] Approximate an x which is a minimum for $f'(x)$.

if mind of in peak of x ≈ -3

$x \approx -2.25$



- (b) [1] Approximate an x which is a minimum for $f(x)$.

if a zero of x = 2

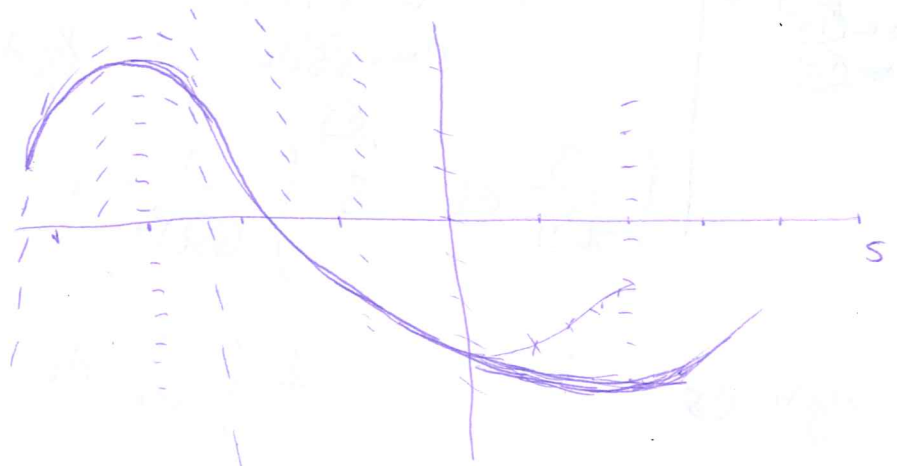
~~$x = 2$~~ $x = 2$ slope on the left of 2 is negative and then positive
 slope is positive on the left of -3 + then negative on the right

- (c) [2] Which is greater, $f(0)$ or $f(1)$? Explain your answer.

Note $f'(0)$ and $f'(1)$ are both negative (and between $x=0$ and $x=1$)

(h) $\Rightarrow f$ is decreasing between $x=0$ and $x=1$

(i) so $f(0)$ will be larger.



for fun ... a possible graph of f . ☺