# Homework 3 feedback

16/20

1. Small arithmetic error; for part (a), the final answer should be computed as $\frac{1}{\arctan(1)} \cdot \frac{1}{1+(1)^2} = \frac{1}{\pi/4} \cdot \frac{1}{2} = \frac{2}{\pi}$.

2. Good!

3. (0/2) The first line is correct, but I don't really understand what's written on the second line.

4. Good!

5. (1/2) For part (a), the equation of the tangent line at $x = 1$ should pass through the point $(1, 0)$ and have slope 1, so the equation would be $y = x - 1$. (The derivative $\frac{1}{x}$ needs to be evaluated at $x = 1$ to give the slope at $x = 1$.) Then plugging in $x = 1.1$ gives the approximation 0.1, whereas the actual answer is 0.095, so it's pretty close.

   For part (b), again the derivative should be evaluated at the "reference point" $x = 2025$, so that the slope of the tangent line is $\frac{1}{2\sqrt{2025}} = \frac{1}{2 \cdot 45}$, since $\sqrt{2025} = 45$. Then, the final answer is $45 - \frac{1}{45} = \frac{2024}{45}$.

6. Good!

7. Good!

8. (1/2) Denominator was changed from $(x+1)^2$ to $x^2+1$, which changes everything. . . after the error everything was done correctly though. When the derivative is computed as

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

   then the critical points in the domain are just $x = 1$. The endpoints evaluate to $f(0) = 0$, $f(3) = 0$, so we see that $f(1) = -1$ is the minimum.

9. Good!