

Answers to the Final Review Problems

NOTE: These are provided so you can check if your answers are correct BUT on the exam I expect you to show ALL of your work, not just answers.

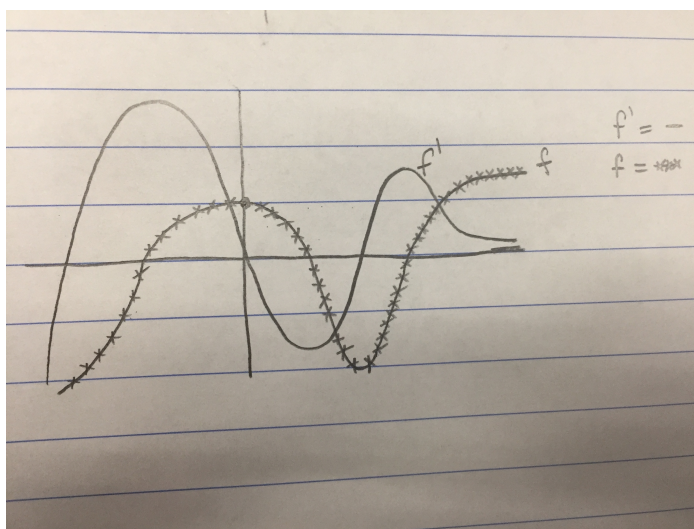
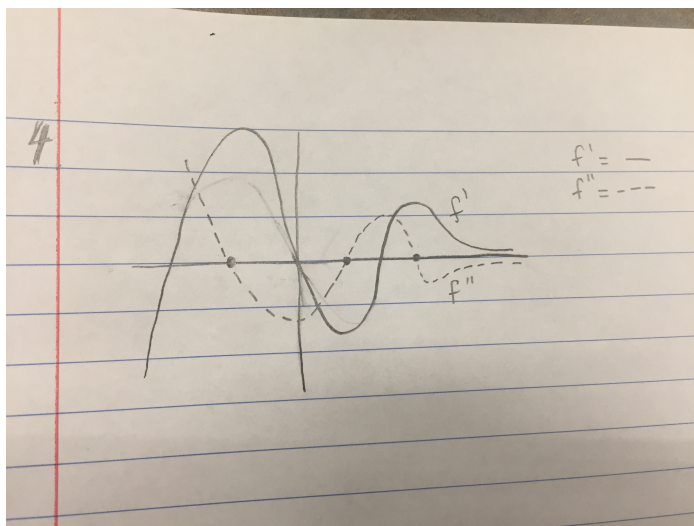
If you want to know whether your solution methods are correct and complete visit office hours or the MPC.

1. ...
2. The negative solution of $\frac{1}{2}x^2 - 2x - 1 = 0$ gives is the x-coordinate of the point on the graph whose tangent line also passes through $(2, 2)$. We get $x \approx -0.4495$. The corresponding y-value is $y \approx 0.899$ and the tangent line at that point is

$$y = 0.4995x + 1.101.$$

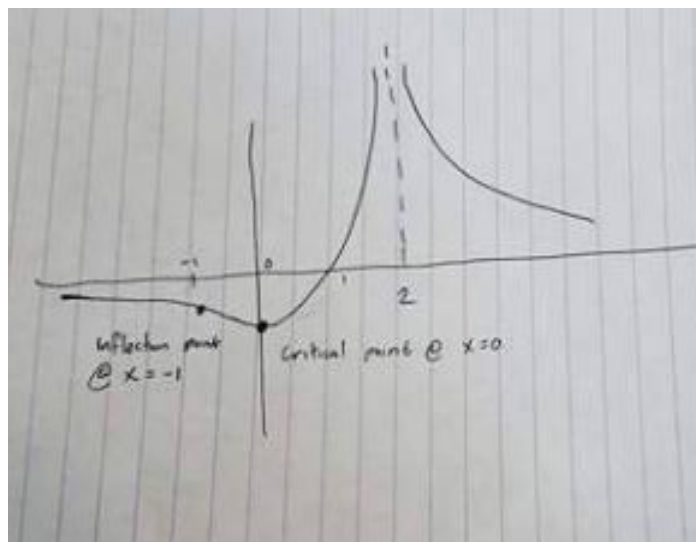
The x-intercept of this line is $x \approx -2.449$.

3. (a) 0
- (b) $-\frac{9}{5}$
- (c) 0
- (d) 1
- (e) 0



- 4.
5. 48
6. $0.33 \text{ m}^3/\text{min}$

7. $f'(x) \frac{\ln(x)}{x}$
8. 1.886 ft/sec
9. $x = \frac{1}{3}$ and $y = \frac{2}{3}$
10. $L(x) = 1 + (-1)(x - 0)$. Near $a = 0$ the values $L(x)$ give a good approximation of $f(x)$.
11. (a) Only vertical asymptote is $x = 2$. Only horizontal asymptote is $y = 0$.
 (b) Increasing: $(0, 2)$ and $(2, \infty)$. Decreasing: $(-\infty, 0)$.
 (c) There is a local min at $x = 0$.
 (d) Concave up: $(-\infty, -1)$. Concave down: $(-1, 2)$ and $(2, \infty)$. Inflection point: $(-1, -\frac{2}{9})$.



- (e)
12. ...
13. (a) True.
(b) True.
14. $a = -3$ and $b = 7$.
15. Extreme Value Theorem
16. Radius = $\frac{500}{\pi}$ and length of rectangle = 500.
17. Domain is all of $\mathbb{R}$. The only place it is discontinuous is $x = 1$. It is not differentiable at $x = 1$ and $x = -1$.
18. Highest point $(-2, 4)$ Lowest point: $(2, -4)$.
19. $r = \sqrt{2}$.