

Answers to the Midterm 2 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. $f'(x) = \frac{x^2}{8}$

2. (a) $g^{(42)}(x) = -\sin(x)$

(b) $h^{(42)}(x) = 42f^{(41)}(x) + xf^{(42)}(x)$

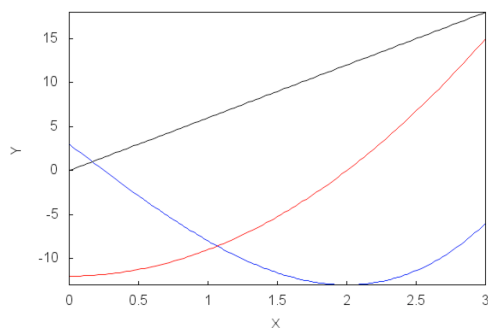
(c) $l^{(42)}(x) = 42\cos(x) + x(-\sin(x))$

3. $c = \frac{1}{2e}$ and also $c \leq 0$.

4. (a) $v(t) = 3t^2 - 12$ and $a(t) = 6t$

(b) Upward: the time interval $(2, \infty)$. Downward: $(0, 2)$.

(c) 9 units



(d)

(e) The graph is concave up on all of $(0, \infty)$. Speeding up: $(2, \infty)$.

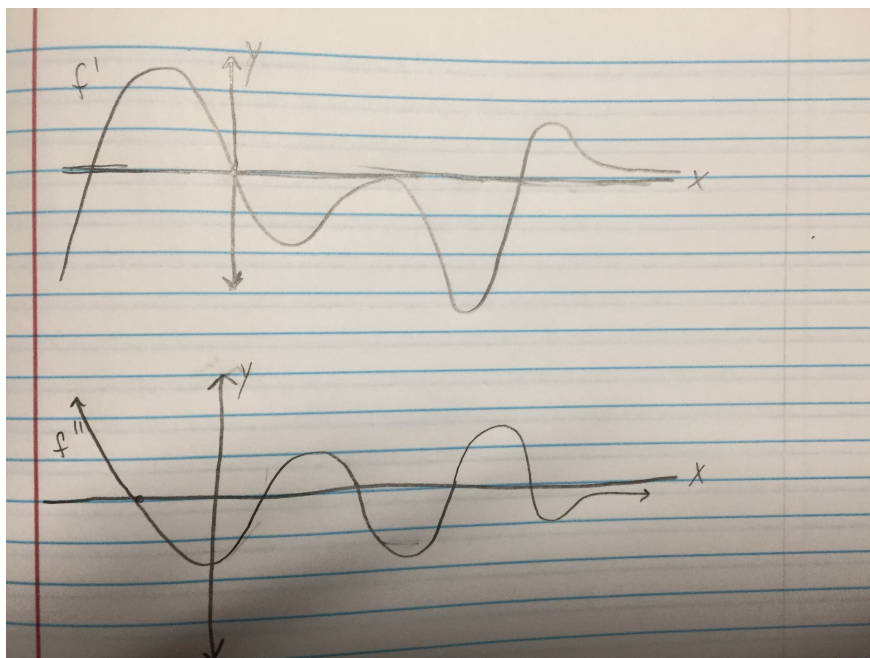
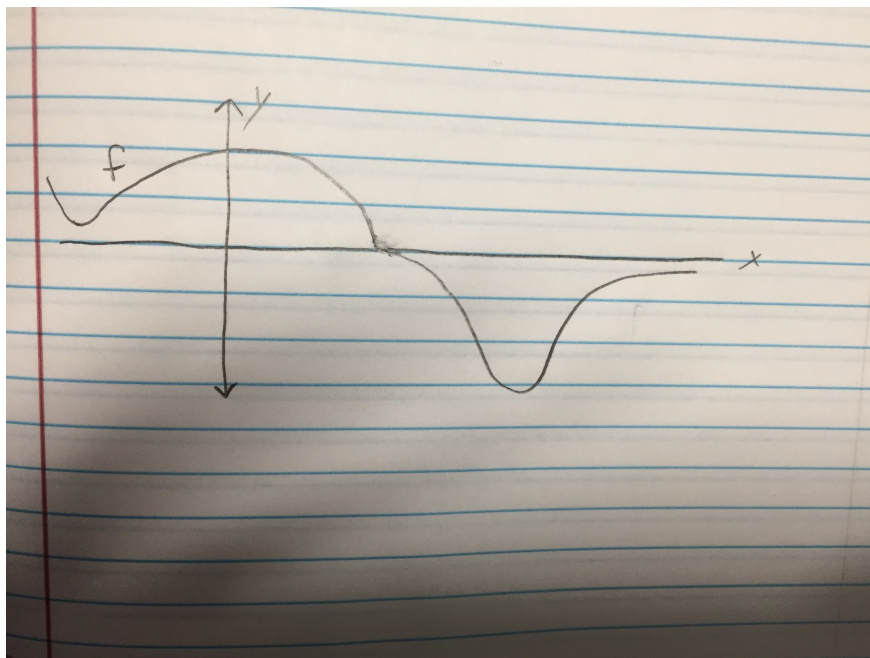
5. ...

6. (a) -2

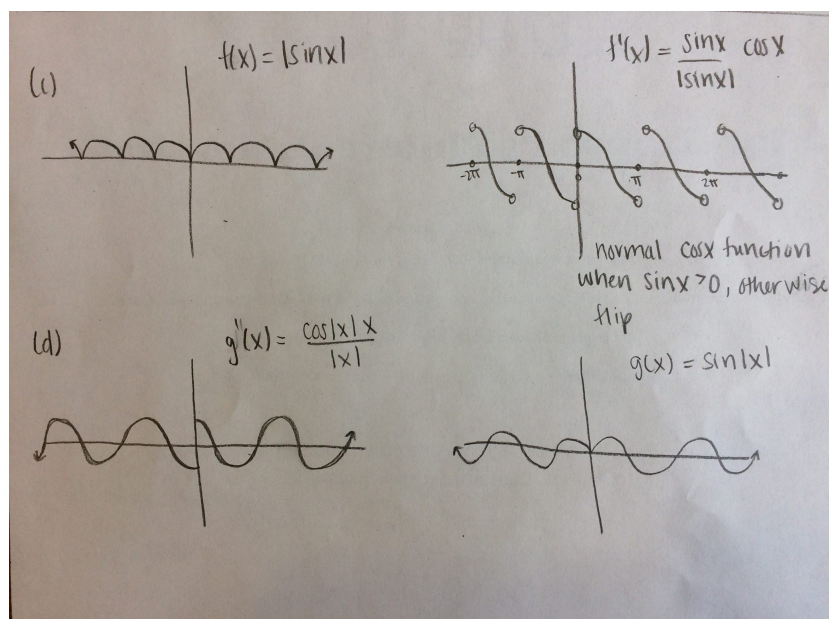
(b) $\frac{1}{2}$

(c) 2

7. $(\frac{16}{5}, -\frac{9}{5})$



- 8.
9. $P = \left(\frac{\sqrt{3}}{2}, \frac{1}{4}\right)$ and $Q = \left(-\frac{\sqrt{3}}{2}, \frac{1}{4}\right)$
10. (a) They are the rates of change of volume and height with respect to time.
They are both positive.
- (b) Zero.
- (c) $H''(t_1)$ is negative. $H''(t_2)$ is zero. $H''(t_3)$ is positive.
11. (a) ...
- (b) ...
- (c) $f'(x) = \frac{\sin(x)}{|\sin(x)|} \cos(x)$.
- (d) $g'(x) = \cos(|x|) \frac{x}{|x|}$.



(e)