

1) a. $F'(-1) = -8$

b. $F'(-1) = 21$

c. $G'(2) = 11$

d. $G'(-1) = 4$

e. $H'(-1) = 2$

f. $H(2) = \frac{-53}{9}$

2) a. $y' = 5 \sin^4(\sin(3x)) \cos(\sin(3x)) \cos(3x) \cdot 3$

b. $y' = -\csc(3x^2+4x) \cot(3x^2+4x) (6x+4)$

c. $y' = \sec^2(3x^2+4x) (6x+4)$

d. $y' = (3x+1)^3 \cdot 4(2x-5)^2 + (2x-5)^4 \cdot (3(3x+1)^2(3))$
 $f(x) = x^3 - 4x^{\frac{3}{2}} + x^{-5}$

$f'(x) = 3x^2 + 6x^{\frac{3}{2}} - 5x^{-6}$

3) a. $x \frac{dy}{dx} + y + 2y \frac{dy}{dx} = 0$

$\frac{dy}{dx} = \frac{-y}{(x+2y)}$

$\frac{d^2y}{dx^2} = \frac{y + y(1 - \frac{2y}{x+2y})}{(x+2y)^2}$

b. $3x^2 + 3y^2 \frac{dy}{dx} = 0$

$\frac{dy}{dx} = \frac{-x^2}{y^2}$

$\frac{d^2y}{dx^2} = \frac{-2xy^2 + 2x^2y(\frac{-x^2}{y^2})}{y^4}$

4) a. $y = 0$

b. $x = 0$

c. $y = 7x^{-1}$

$y' = -7x^{-2}$

$y'' = 14x^{-3}$

$y''|_{x=2} = \frac{7}{4}$

rate of change in slope
 ↓
 (plug in to 2nd deriv)

5) a. $y = 0$

b. $x = 2, x = -2$

c. $g' = \frac{-16x}{(x^2-4)^2}$

d. $y'(1) = \frac{-16}{9}$

$y(1) = \frac{8}{3}$

$y + \frac{8}{3} = \frac{-16}{9}(x-1)$

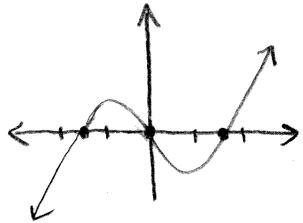
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e. $y + \frac{8}{3} = \frac{9}{16}(x-1)$

f. $\frac{-16x}{(x^2-4)^2} = 0$

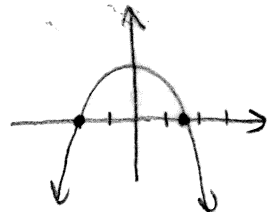
$x = 0$

6) a.



b. $x = -1.75, x = 0, x = 1.75$

c.

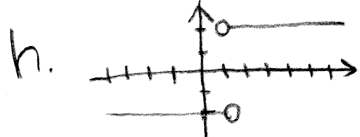


d. $\frac{f(1.5) - f(-2)}{1.5 - (-2)} = \frac{9}{7}$

e. $(-2, 1.5)$

f. $(-\infty, -2) \cup (1.5, \infty)$

g. $\frac{f(3) - f(1.5)}{3 - 1.5} = -3$, avg speed: 3



k. 2 ft/min

l. $x=1$, corner sharp turn

i. 2

j. -2 ft/min

m. neg. $(-4, 1)$
 $\cos(1.6)$