Sample Exam #2 Solutions
MAT 1475 Fall 2019

1. $y = -\frac{2}{9}x + \frac{1}{9}$

2. $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} = \lim_{h\to 0} \frac{h(2x+h-3)}{h} = 2x-3$

3. $\frac{dV}{dr} = 4\pi r^2$

4. (a) $f'(t) = 12t^3 - \frac{25}{2}t^4 + 6$

   (b) $h'(x) = \frac{1}{1+\cos(x)}$

   (c) $f'(x) = \sec(x)\tan(x) - \sqrt{2}\sec^2(x)$

   (d) $g'(s) = 10s^9 + 24s^5 + 8s$

   (e) $y' = 24x^{-9} + \frac{1}{\sqrt{x}}$

   (f) $h''(t) = -\frac{4}{5}t^{-3}$

5. $(2, 9\ \ 2/3)$ and $(-2, 20\ \ 1/3)$

6. $y' = -\frac{63}{10}$ and the equation of the tangent line is $y = -\frac{63}{10}x + \frac{136}{5}$

7. $y' = \left(\frac{x(x+1)^3}{(3x-1)^2}\right)\left(\frac{1}{x} + \frac{3}{x+1} - \frac{6}{3x-1}\right)$

8. $y' = x^{\cos(x)}\left(\frac{\cos(x)}{x} - \sin(x)\ln(x)\right)$

9. (a) $y' = \frac{-8x}{(x^2+1)^5}$

(b) $y' = -\dfrac{2}{x}$

(c) $y' = 3^x \sec(x)[\ln(3) + \tan(x)]$

(d) $y' = \ln(16)(\cos(x))16^{\sin(x)}$

(e) $y' = -\dfrac{1}{\sin(x)\cos(x)}$

(f) $y' = 6\cos(2x)\cos(6x) - 2\sin(2x)\sin(6x)$

(g) $y' = \dfrac{3x(x^3 - 5x + 4)}{(2 - x^3)^2}$

(h) $y' = \dfrac{3}{\sqrt{1 - 9x^2}}$