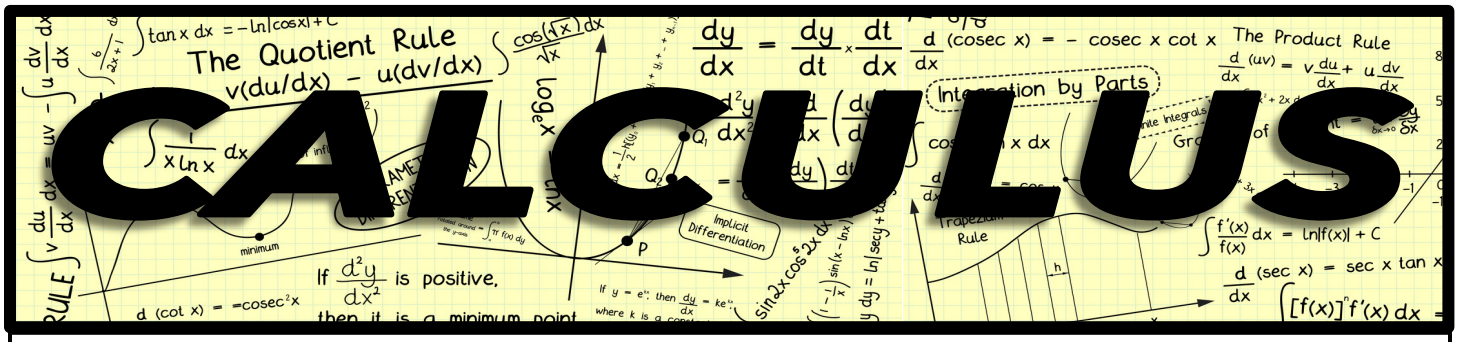

Wed., Sept. 18

Sec. 3.1 p 133 (Do parts a & b of each problem.)
- 1st Definition: 10, 30, 31
- 2nd Definition: 16, 20, a, b on back

Handout: Match the graphs with the graph of their derivatives *(Hint: Think about the slope of the original graph.)*

Sec. 3.3 p 151
- Power Rule: 19, 23, 24, 45, c, d, e
- Trig functions: f, g, h

Fri., Sept. 20

Product, Quotient, Chain Rule (problems on back)

Wednesday, Sept. 25

More Chain Rule (problems on back)

Differentials (problems on back)

Friday, Sept. 27

Differentiability Handout *(Optional Homework, but will be tested)*

Review Derivatives

Journal Due

Tuesday, Oct. 1

Derivatives Test

Day 1 Assignment

(a) $f(x)=4\cos x$

(b) $f(x)=2\sin x$

(c) $f(x)=\dfrac{2}{x^2}+3\sqrt{x}$

(d) $f(x)=\left(2x^2+3\right)\left(x^3-5\right)$

(e) $f(x)=\dfrac{4}{3x^5}-6\sqrt[3]{x^2}$

(f) $f(x)=\tan x+\csc x$

(g) $f(x)=4\sin x-3\cot x+2$

(h) $f(x)=\sin x\left(2\csc x-\cot x\right)$

Hint: Trig identities might be useful.

Day 2 Assignment (Product, Quotient & Chain Rules)

Find *f'(x)* using the product, quotient or chain rules.

1. $f(x)=\left(x^3+7x^2-8\right)\left(2x^{-3}+x^{-4}\right)$
2. $f(x)=\left(\dfrac{1}{x}+\dfrac{1}{x^2}\right)\left(3x^3+27\right)$
3. $f(x)=\dfrac{4x+1}{x^2-5}$
4. $f(x)=\left(\dfrac{3x+2}{x}\right)\left(x^{-5}+1\right)$
5. $f(x)=\dfrac{\sin x}{x^2+\sin x}$
6. $f(x)=\left(x^2+1\right)\sec x$
7. $f(x)=\dfrac{\cot x}{1+\csc x}$
8. $f(x)=\sec x\tan x$
9. $f(x)=\dfrac{\sin x\sec x}{1+x\tan x}$
10. $f(x)=\dfrac{\left(x^2+1\right)\cot x}{3-\cos x\csc x}$
11. $f(x)=\left(x^3+2x\right)^{37}$.
12. $f(x)=\dfrac{4}{\left(3x^2-2x+1\right)^3}$

(Quotient rule is not the easiest way.)

13. $f(x)=\sqrt{4+\sqrt{3x}}$
14. Find $f''(x)$.

$f(x)=x^2\cos x+4\sin x$

Find $\frac{dy}{dx}$.

15. $y=(5x+8)^7\left(1-\sqrt{x}\right)^6$
16. $y=\left(\dfrac{x-5}{2x+1}\right)^3$
17. $y=\dfrac{(2x+3)^3}{\left(4x^2-1\right)^8}$

Write the equation of the line tangent to the given function at the given value of *x*.

18. $y=\left(x-\dfrac{1}{x}\right)^3,\ x=2$
19. $y=x^2\sqrt{5-x^2},\ x=1$

Day 3 Assignment (More Chain Rule)

Find $f'(x)$

1. $f(x)=\sin\left(\dfrac{1}{x^2}\right)$
2. $f(x)=\tan^4\left(x^3\right)$
3. $f(x)=\sqrt{3x-\sin^2(4x)}$
4. $f(x)=\left[x+\csc\left(x^3+3\right)\right]^{-3}$

Find $\frac{dy}{dx}$.

5. $y=x^5\sec\left(\frac{1}{x}\right)$
6. $y=\dfrac{\sin\left(x^6\right)}{\sec\left(3x^2+5x^4\right)^8}$
7. $y=\sin(\tan 3x)^7$
8. $y=\cos^3(\sin 2x)$
9. $y=\left[x+\sin^3\left(x^5\right)\right]^{12}$
10. $y=\left[\dfrac{x\sin 2x}{\tan^4\left(x^7\right)}\right]^5$
11. Solve with CAS:

$$y=\tan^4\left[2+\frac{(7-x)\sqrt{3x^2+5}}{x^3+\sin x}\right]$$

Write the equation of the line tangent to the given function at the given value of *x*.

12. $y=x\cos 3x,\ x=\pi$
13. $y=\tan\left(4x^2\right),\ x=\sqrt{\pi}$

Differentials

1. Find *dy* if $y=\sqrt{3x-2}$ and *x* changes from 2 to 2.03.
2. Find *dA* if $A=3x^2-x$ and x changes from 4 to 4.1.
3. The radius of a round manhole cover is estimated to be 16 in., with a maximum error of ± 0.06 in. (a) Use differentials to estimate the maximum error in the area to the nearest hundredth. (b) Approximate the percentage error in the radius and the area to the nearest thousandth of a percent.
4. A spherical balloon is being inflated with gas. (a) Use differentials to approximate the increase in the volume if the diameter changes from 2 ft. to 2.02 ft. to the nearest hundredth. (b) Approximate the percentage error in the radius and the volume to the nearest percent.
5. A metal cube with sides of 15 in. is coated with a sealant 0.01 in thick. Approximate the change in the surface area to the nearest tenth.
6. A metal rod 18 cm long and 5 cm in diameter lies at the bottom of the ocean. It gradually develops a layer of corrosion 0.1 cm thick along its surface. Approximate the change in the volume to the nearest hundredth.