Review / Warm-up

Directions: Complete the worksheet. The only resources allowed are your peers, so work together and see how far you get!

1) a) Explain why $\sin^2\theta + \cos^2\theta = 1$. (Hint: Recall the connection of sine and cosine to the unit circle.)

b) Use the identity $\sin^2\theta + \cos^2\theta = 1$ to show that $\tan^2\theta + 1 = \sec^2\theta$.

2) Fill in the following derivatives:

a) $\frac{d}{dx} \sin x =$

b) $\frac{d}{dx} \cos x =$

c) $\frac{d}{dx} \tan x =$

d) $\frac{d}{dx} e^x$

e) $\frac{d}{dx} \ln x =$

f) $\frac{d}{dx} \arctan x =$

(Note: $\arctan x$ is another way of writing $\tan^{-1} x$)

3) Fill in the following derivative rules (for example, for linearity, you would write $\frac{d}{dx}(f+g) = \frac{df}{dx} + \frac{dg}{dx}$ or $(f+g)' = f' + g'$).

Power rule:

Product rule:

Chain rule:

4) When computing antiderivatives, why do we put "+ C"? (For example, $\int x\,dx = x^2 + C$.)

5) Find and correct the error in the following statement:

"For every real number n, $\int x^n dx = \frac{x^{n+1}}{n+1} + C$."

6) Compute the following integrals:

a) $\int_0^1 (x^2 + 7x - \frac{1}{x^2})\, dx$

b) $\int x \sin(3x^2)\, dx$

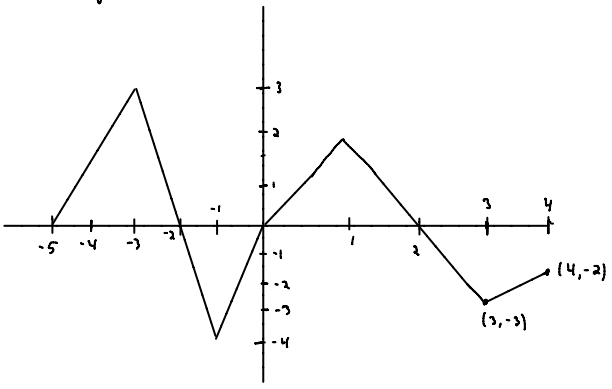
c) $\int_0^4 |\sqrt{x} - 1|\, dx$

d) $\int_{-1}^{1} \sin x\, dx$

e) $\int \tan(9x)\,dx$

f) $\int \sin(\pi x)\, e^{\cos(\pi x)}\,dx$

7) Shown here is the graph of a function f, which consists of line segments.



a) Calculate $\int_{-5}^{4} f(x)\,dx$.

b) Calculate $\int_{-5}^{4} |f(x)|\,dx$.