Bonus Quiz - Calculus

If this quiz's grade is better than your worst weekly test that still counts, this quiz will replace it (so this can only *improve* your grade). It is open book / open note, but you may not talk about it with with your classmates. Don't use a symbolic calculator (non-symbolic okay). **SHOW YOUR WORK.**

1. Find the most likely value of $\lim_{x \to 0} \frac{\sin x}{x}$ using successive approximation (it's an integer).
   Reminder: Use radians!
2. Given $f(x)=3x^2 + 4x - 1$, find the instantaneous slope at x=2
3. Given $f(x) = \sin x$, find the instantaneous slope at $x = \pi/2$ (x is in radians)
4. If $f(x) = 4x^5 - 3x^4 + 2x^2 + 5$, what is $f'(x)$?
5. Find $\frac{d}{dx}(5x^3+2x^2+12x+7)$
6. Find $\frac{d}{dx}(2x^{80}+2x^3)$
7. Find $\frac{d}{dx}\frac{3x^3+x^2+5}{x-2}$
8. Find $\frac{d}{dx}\frac{x^2+3}{x^2+3x+4}$
9. Find the derivative (with respect to x) of $x \sin x$
10. Find $\frac{d}{dx}\left(\frac{\cos x}{x}\right)$
11. Find $\frac{d}{dx}(\cos^2 x)$
12. Find $\frac{d}{dx}\left(3x^4+\sin x\right)$
13. Find $\int \left(16x^3+9x^2-4\right)dx$; remember the "+ C"!!
14. Find $\int 12x^2-x+8\,dx$
15. Find $\int x^{99}-6x^5+24x^4+3x+6\,dx$
16. Find $\int 3x^{11}-5$
17. Find $\int_1^4 x^3+2\,dx$
18. Find $\int_2^5 x^2+3x-2\,dx$
19. Find $\int_0^{\pi} x^2-1\,dx$
20. Find $\int_{-2}^{2} x^2+x+1\,dx$