hw set 28
sect 4.7

For 1-14, find the general antiderivative

5. $f(x) = 3\sqrt{x} - 2\sqrt[3]{x}$

$f(x) = 3x^{1/2} - 2x^{1/3}$

$F(x) = 2x^{3/2} - \frac{3}{2}x^{4/3} + C$

6. $f(t) = \dfrac{3t^4 - t^3 + 6t^2}{t^4}$

$f(t) = 3 - t^{-1} + 6t^{-2}$

$F(t) = 3t - \ln t - 3t^{-1} + C$

16. Find the antiderivative
check your answer by graphing f and F

$f(x) = 4 - 3(1+x^2)^{-1}, \quad F(1) = 0$

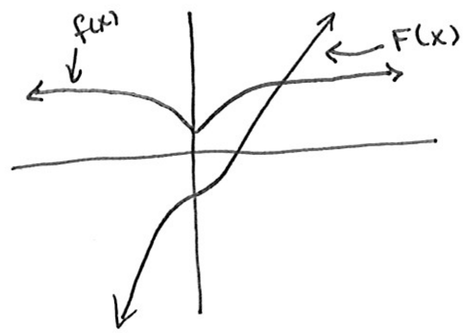
$f(x) = 4 - 3 \cdot \frac{1}{1+x^2}$

$F(x) = 4x - 3\arctan(x) + C$

$0 = 4 - 3\arctan(1) + C$

So, $C = -4 + 3(\pi/4) = \frac{3\pi - 16}{4} = -1.6438$

$F(x) = 4x - 3\arctan x + \frac{3\pi}{4} - 4$



For 17-34, find f

21. $f'''(t) = \cos t$

$f''(t) = \sin t + C$

$f'(t) = -\cos t + Cx + D$

$f(t) = -\sin t + \frac{1}{2}Cx^2 + Dx + E$

26. $f'(t) = t + 1/t^3, \; t > 0, \; f(1) = 6$

$f(t) = \frac{1}{2}t^2 - \frac{1}{2} \cdot \frac{1}{t^2} + C$

$f(1) = 6 = 1/2 - 1/2 + C \Rightarrow C = 6$

$f(t) = \frac{1}{2}t^2 - \frac{1}{2t^2} + 6$

28. $f'(x) = \dfrac{4}{\sqrt{1-x^2}}, \quad f(\frac{1}{2}) = 1$

$f(x) = 4\arcsin x + C$

$1 = 4\arcsin(\frac{1}{2}) + C$

$1 = 4(\pi/6) + C$

$C = 1 - \frac{2\pi}{3} = -1.094395$

$f(x) = 4\arcsin x + 1 - \frac{2\pi}{3}$

30. $f''(x) = 8x^3 + 5, \; f(1) = 0, \; f'(1) = 8$

$f'(x) = 2x^4 + 5x + C, \quad f'(1) = 8$

$8 = 2 + 5 + C, \quad C = 1$

$f'(x) = 2x^4 + 5x + 1$

$f(x) = \frac{2}{5}x^5 + \frac{5}{2}x^2 + x + D, \quad f(1) = 0$

$0 = \frac{2}{5} + \frac{5}{2} + 1 + D, \quad D = -3.9$

$f(x) = \frac{2}{5}x^5 + \frac{5}{2}x^2 + x - 3.9$

31. $f''(\theta) = \sin\theta + \cos\theta, \; f(0) = 3, \; f'(0) = 4$

$f'(\theta) = -\cos\theta + \sin\theta + C$

$4 = -1 + C, \quad C = 5$

$f(\theta) = -\sin\theta - \cos\theta + 5\theta + D$

$3 = -1 + D, \; D = 4$

$f(\theta) = -\sin\theta - \cos\theta + 5\theta + 4$

34. $f''(t) = 2e^t + 3\sin t, \; f(0) = 0, \; f(\pi) = 0$

$f'(t) = 2e^t - 3\cos t + C$

$f(t) = 2e^t - 3\sin t + Ct + D$

$t = 0: \quad 0 = 2 + D, \quad D = -2$

$t = \pi: \quad 0 = 2e^\pi + C\pi - 2, \quad C = \frac{2 - 2e^\pi}{\pi}$

$f(t) = 2e^t - 3\sin t - 2 + \left(\frac{2 - 2e^\pi}{\pi}\right)t$

37. which graph is an antiderivative of f? why?

b is the antiderivative b/c when $f < 0$, b is decreasing
& when $f > 0$, b is increasing