HW 10 – MA 131

Section 6.1

2.) $x^9 + C$

4.) $\frac{e^{-3x}}{-3} + C$

5.) $3x + C$

13.) $2\ln x + \frac{x^2}{4} + C$

14.) $\frac{1}{7}\ln x + C$

18.) $\int \left(\frac{7}{2x^3} - \sqrt[3]{x}\right)dx = \frac{7}{2}\int \frac{1}{x^3}dx - \int \sqrt[3]{x}\,dx$

$= \frac{7}{2}\int x^{-3}dx - \int x^{1/3}dx$

$= \frac{7}{2}\frac{x^{-2}}{-2} - \frac{x^{4/3}}{4/3} + C$

$= \boxed{-\frac{7}{4x^2} - \frac{3}{4}x^{4/3} + C}$

23.) $\int -2(e^{2x}+1)dx = -2\int (e^{2x}+1)dx$

$= -2\int e^{2x}dx - 2\int 1\,dx$

$= -2\frac{e^{2x}}{2} - 2x + C$

$= \boxed{-e^{2x} - 2x + C}$

24.) $\int \left(-3e^{-x} + 2x - \frac{e^{.5x}}{2}\right) dx$

$= -3\int e^{-x}\,dx + 2\int x\,dx - \frac{1}{2}\int e^{.5x}\,dx$

$= -3\frac{e^{-x}}{-1} + 2\frac{x^2}{2} - \frac{1}{2}\frac{e^{.5x}}{.5} + C$

$= \boxed{3e^{-x} + x^2 - e^{.5x} + C}$

49.) $\frac{d}{dx}\left(\frac{1}{x} + C\right) = \frac{d}{dx}x^{-1} = -x^{-2}$ NOT (a)

$\frac{d}{dx}(x\ln x - x + C) = \frac{d}{dx}x\ln x - \frac{d}{dx}x$

$= x(1/x) + \ln x - 1$

$= 1 + \ln x - 1 = \ln x$ ✓

(b) $\boxed{\int \ln x\,dx = x\ln x - x + C}$

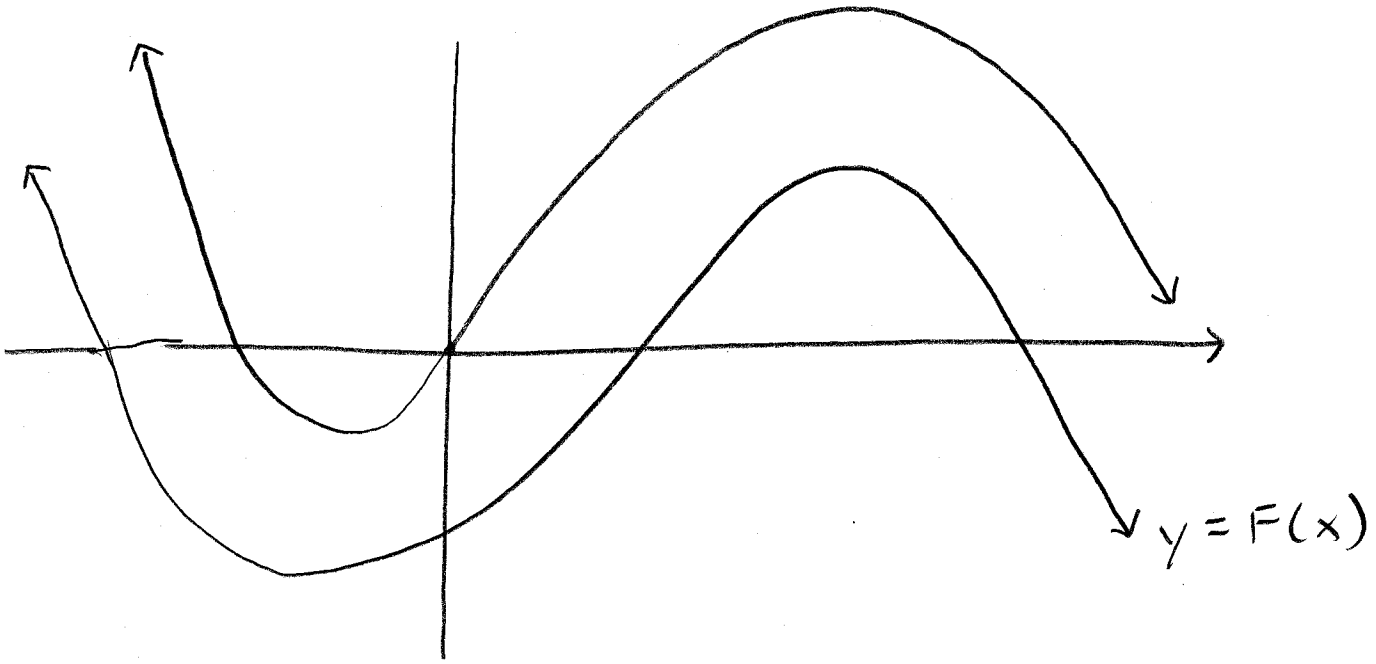
50.) $\frac{d}{dx}\left[\frac{2}{5}(x+1)^{5/2} - \frac{2}{3}(x+1)^{3/2} + C\right]$

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

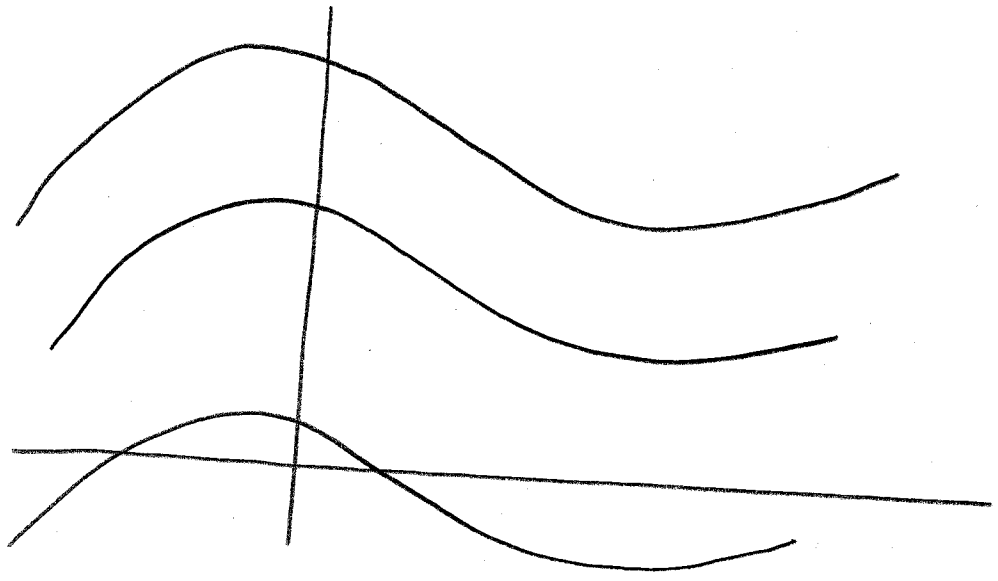
$= (x+1)^{1/2}\left[(x+1) - 1\right] = (x+1)^{1/2}x = x\sqrt{x+1}$ ✓

(a) $\boxed{\int x\sqrt{x+1}\,dx = \frac{2}{5}(x+1)^{5/2} - \frac{2}{3}(x+1)^{3/2} + C}$

51.) Since $G'(x) = F'(x)$, F and G have the same shape. G is just shifted up so $G(0) = 0$



52.)



53.) $f'(5) = 1/4$ (Same as $g'(5)$)