Quiz 14 Solutions

1. a. $A(x) = \int_{-3}^{x} f(t)\,dt$

b. $A(0) = \int_{-3}^{0} f(t)\,dt = 5$

c. $A(5) - A(2) = \int_{-3}^{5} f(t)\,dt - \int_{-3}^{2} f(t)\,dt = 5 - 7 = -2$

This represents the negative of the area between the graph and the x-axis on the interval $[2, 5]$.

2. a. $F(2) = \int_{2}^{2} \sqrt{3t^2+1}\,dt = 0$

b. $F'(x) = \sqrt{3x^2+1}$, so $F'(2) = \sqrt{13}$

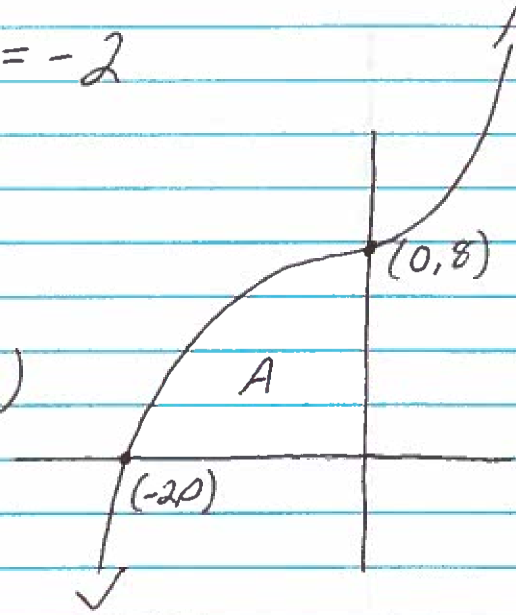
3. $\int_0^{\pi/2} [(t+1)^{-1} - \cos t]\,dt =$

$[\ln(t+1) - \sin t]\Big|_0^{\pi/2} =$

$(\ln(\pi/2+1) - \sin \pi/2) - (\ln(0+1) - \sin 0)$

$= \ln(\pi/2+1) - 1$

4. $x^3+8=0 \Rightarrow x=-2$



$A=\int_{-2}^{0} x^3+8\,dx =$

$\frac{x^4}{4}+8x\Big|_{-2}^{0} =$

$\left(\frac{0^4}{4}+8\cdot 0\right)-\left(\frac{(-2)^4}{4}+8(-2)\right)$

$=-(4-16)=12$

5. $\bar{h} = \frac{1}{\ln 2}\int_0^{\ln 2} e^{2x}\,dx$

$=\frac{1}{\ln 2}\left(\frac{1}{2} e^{2x}\right)\Big|_0^{\ln 2} = \frac{1}{\ln 2}\left(\frac{1}{2} e^{2\ln 2}-\frac{1}{2} e^0\right)$

$=\frac{1}{\ln 2}\left(\frac{1}{2} e^{\ln 4}-\frac{1}{2} e^0\right) = \frac{1}{\ln 2}\cdot\frac{1}{2}(4-1)$

$=\frac{3}{2\cdot \ln 2}$