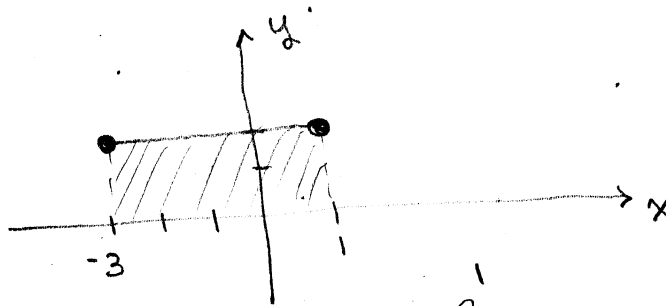# Math 131 - Quiz 7

December 6, 2021

Name __key__

Score _____

Show all work to receive full credit. Supply explanations when necessary. This quiz is due December 15.
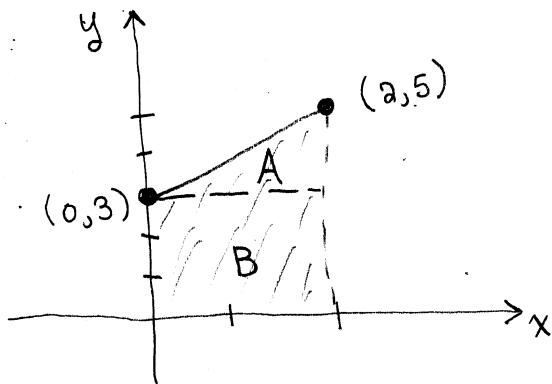
1. (4 points) Sketch the graph of the integrand over the corresponding interval and then use area to evaluate the integral.

   (a) $\displaystyle\int_{-3}^{1} 2\,dx$

   $$\int_{-3}^{1} 2\,dx = (4)(2) = \boxed{8}$$

   BASE   HEIGHT

   (b) $\displaystyle\int_{0}^{2} (x+3)\,dx$

   $$\int_{0}^{2} (x+3)\,dx$$
   $$= \text{AREA } A + \text{AREA } B$$
   $$= \frac{1}{2}(2)(2) + (2)(3)$$
   $$= \boxed{8}$$

   Turn over.

2. (3 points) Use an antiderivative to evaluate the definite integral: $\int_1^3 \dfrac{2x^4 - 7x + 3}{x^2}\, dx$

$$\int_1^3 \left(2x^2 - \frac{7}{x} + 3x^{-2}\right) dx$$

$$= \left. \frac{2}{3}x^3 - 7\ln|x| - 3x^{-1} \right|_1^3$$

$$= \left(18 - 7\ln 3 - 1\right) - \left(\frac{2}{3} - 0 - 3\right)$$

$$\approx \boxed{11.643}$$

3. (3 points) Use a definite integral to find the area of the region under the graph of $y = \dfrac{2}{1+x^2}$ over the interval $[0, 1]$.

$$\int_0^1 \frac{2}{1+x^2}\, dx = \left. 2\,\mathrm{TAN}^{-1} x \right|_0^1$$

$$= 2\,\mathrm{TAN}^{-1}(1) - 2\,\mathrm{TAN}^{-1}(0)$$

$$= 2\left(\frac{\pi}{4}\right) - 2(0) = \boxed{\frac{\pi}{2}}$$