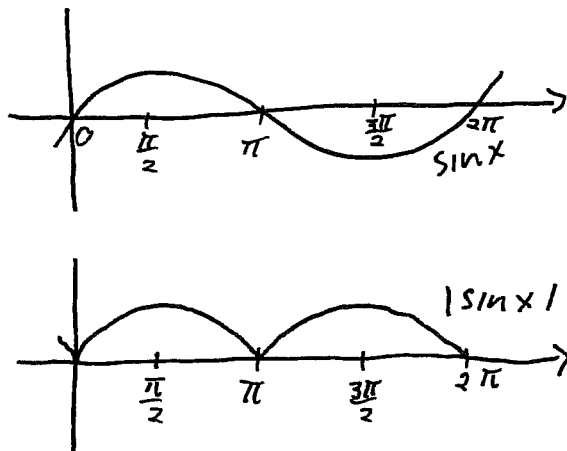


## Quiz 4

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

**Question 1.** (5 marks) §5.3 #28 Evaluate the integral.

$$\begin{aligned} & \int_0^{3\pi/2} |\sin x| dx \\ &= \int_0^{\pi} \sin x dx + \int_{\pi}^{3\pi/2} -\sin x dx \\ &= \left[ -\cos x \right]_0^{\pi} + \left[ \cos x \right]_{\pi}^{3\pi/2} \\ &= -\cos \pi + \cos 0 + \cos \frac{3\pi}{2} - \cos \pi \\ &= -(-1) + 1 + 0 - (-1) \\ &= 3 \end{aligned}$$



**Question 2.** (5 marks) §5.4 #19 Let  $f(x) = (x-3)^2$ ,  $[2, 5]$

a. Find the average value of  $f$  on the given interval.

b. Find  $c$  such that  $f_{ave} = f(c)$ .

c. Sketch the graph of  $f$  and a rectangle whose area is the same as the area under the graph of  $f$ .

a) avg. val. of func =  $\frac{1}{b-a} \int_a^b f(x) dx = \frac{1}{5-2} \int_2^5 (x-3)^2 dx = \frac{1}{3} \int_2^5 x^2 - 6x + 9 dx$

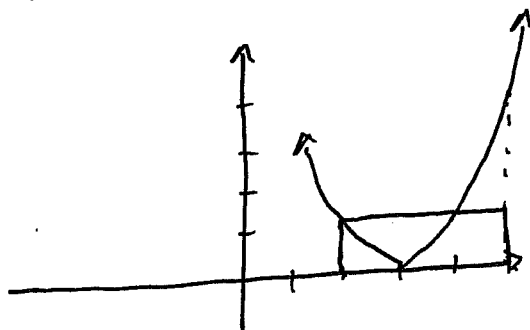
b)  $1 = f(c)$   
 $1 = (x-3)^2$

$\pm \sqrt{1} = x-3$

$\pm 1 = x-3$

$x = 3 \pm 1 = 2 \text{ or } 4$

c)



$$\begin{aligned} &= \frac{1}{3} \left[ \frac{x^3}{3} - 3x^2 + 9x \right]_2^5 \\ &= \frac{1}{3} \left[ \left[ \frac{5^3}{3} - 3(5)^2 + 9(5) \right] - \left[ \frac{2^3}{3} - 3(2)^2 + 9(2) \right] \right] \\ &= \frac{1}{3} \left[ \left[ \frac{125}{3} - 75 + 45 \right] - \left[ \frac{8}{3} - 12 + 18 \right] \right] \\ &= \frac{1}{3} \left[ \frac{125}{3} - 30 - \frac{8}{3} - 6 \right] \\ &= \frac{1}{3} \left[ \frac{117}{3} - 36 \right] = 1 \end{aligned}$$