

**Question 6** (10 marks)

(a) Use integration by parts to show that  $\int \arccos x \, dx = x \arccos x - \sqrt{1-x^2} + c$ .



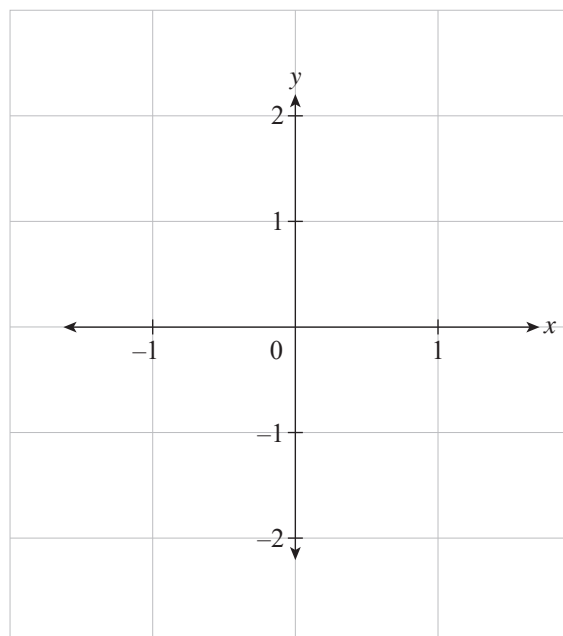
(2 marks)

(b) (i) On the axes in Figure 5, draw and label the graph of  $f(x) = \arccos x - \frac{\pi}{2}$  for  $-1 \leq x \leq 1$ .

(2 marks)

(ii) On the axes in Figure 5, draw and label the graph of  $y = |f(x)|$  for  $-1 \leq x \leq 1$ .

(1 mark)



**Figure 5**

(iii) On the axes in Figure 6, draw the graph of  $y = f(|x|)$  for  $-1 \leq x \leq 1$ .

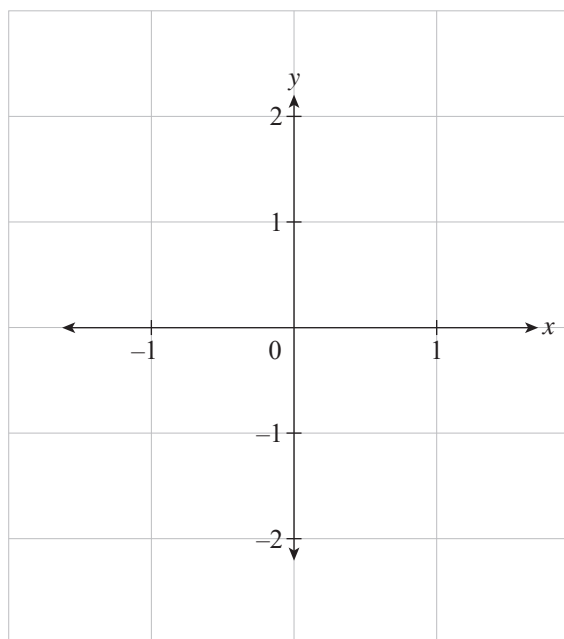


Figure 6

(1 mark)

(c) Using part (a) and part (b)(iii), show that the area between the graph of  $y = f(|x|)$  and the  $y$ -axis for  $0 \leq x \leq 1$  is 1 square unit.



(4 marks)