

16

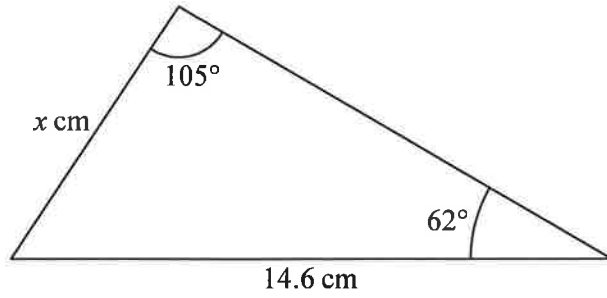


Diagram NOT accurately drawn

Work out the value of  $x$ .  
Give your answer correct to 1 decimal place.

$x = \dots\dots\dots$

(Total for Question 16 is 3 marks)

17  $ABCD$  is a parallelogram.

$$\vec{BC} = \begin{pmatrix} 5 \\ -1 \end{pmatrix} \quad \vec{DC} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$$

Find  $\vec{BD}$  as a column vector.

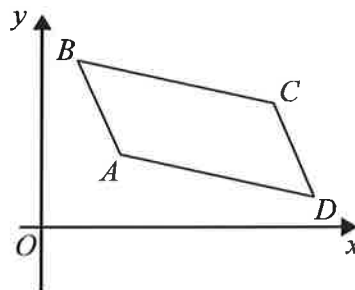


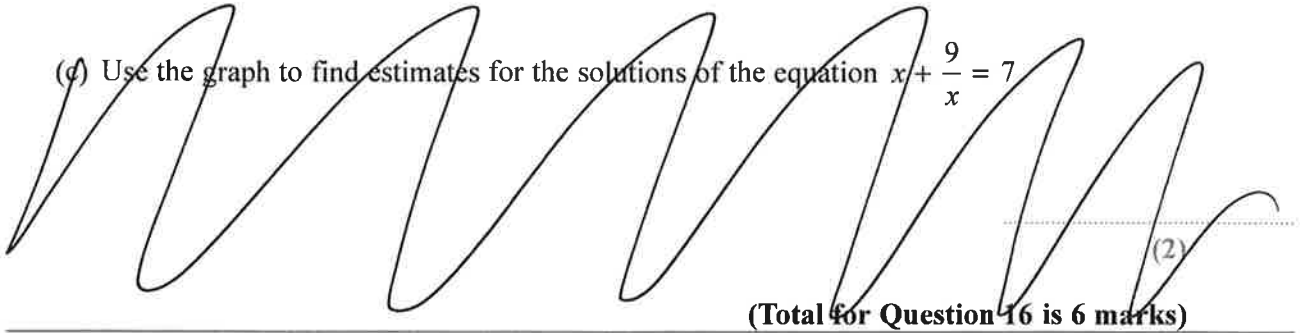
Diagram NOT accurately drawn

( )

(Total for Question 17 is 2 marks)



(c) Use the graph to find estimates for the solutions of the equation  $x + \frac{9}{x} = 7$



(Total for Question 16 is 6 marks)

B

17  $f(x) = \frac{3}{x+1} + \frac{1}{x-2}$

(a) State one value of  $x$  which cannot be included in any domain of  $f$ .

.....  
(1)

(b) Find the value of  $f(0)$

.....  
(1)

(c) Find the value of  $x$  for which  $f(x) = 0$   
Show clear algebraic working.

$x =$  .....  
(3)

(Total for Question 17 is 5 marks)



B

- 19 (a) Show that  $(5 - \sqrt{8})(7 + \sqrt{2}) = 31 - 9\sqrt{2}$   
Show each stage of your working.

(3)

Given that  $c$  is a prime number,

- (b) rationalise the denominator of  $\frac{3c - \sqrt{c}}{\sqrt{c}}$

Simplify your answer.

(2)

(Total for Question 19 is 5 marks)



B

21  $y = x^3 + 6x^2 + 5$

(a) Find  $\frac{dy}{dx}$

$$\frac{dy}{dx} = \dots\dots\dots (2)$$

The curve with equation  $y = x^3 + 6x^2 + 5$  has two turning points.

(b) Work out the coordinates of these two turning points.  
Show your working clearly.

..... (4)

(Total for Question 21 is 6 marks)



B

22  $A$ ,  $r$  and  $T$  are three variables.

$A$  is proportional to  $T^2$

$A$  is also proportional to  $r^3$

$T = 47$  when  $r = 0.25$

Find  $r$  when  $T = 365$

Give your answer correct to 3 significant figures.

(Total for Question 22 is 4 marks)

