17 f is the function such that $f(x) = 4 - 3x$

(a) Work out f(5)

(1)

g is the function such that $g(x) = \dfrac{1}{1 - 2x}$

(b) Find the value of x that cannot be included in any domain of g

(1)

(c) Work out fg(−1.5)

(2)

(Total for Question 17 is 4 marks)

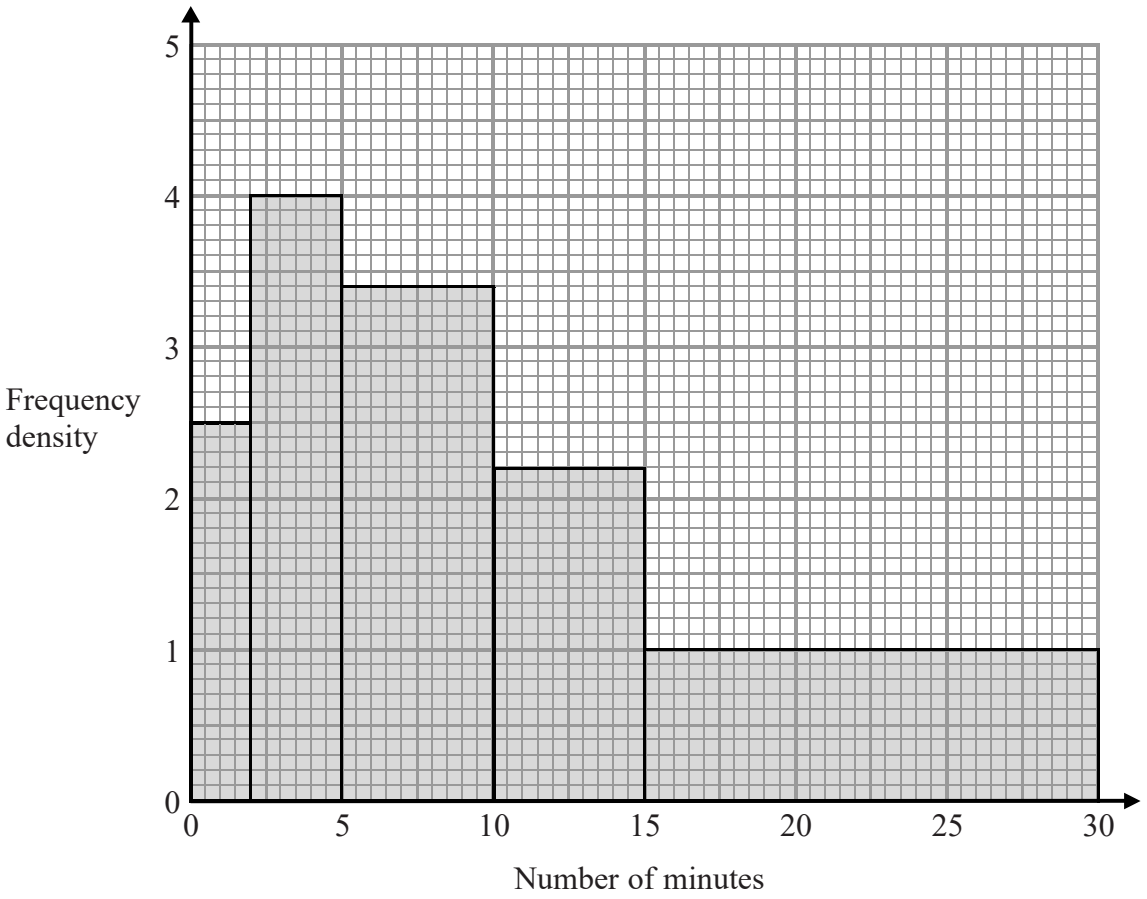
18 $P = \dfrac{a}{m - x}$

$x = 8$ correct to 1 significant figure
$a = 4.6$ correct to 2 significant figures
$m = 20$ correct to the nearest 10

Calculate the lower bound of P.
Show your working clearly.

(Total for Question 18 is 4 marks)

19 The histogram shows information about the numbers of minutes some people waited to be served at a Post Office.



Work out an estimate for the proportion of these people who waited longer than 20 minutes to be served.

(Total for Question 19 is 3 marks)

20

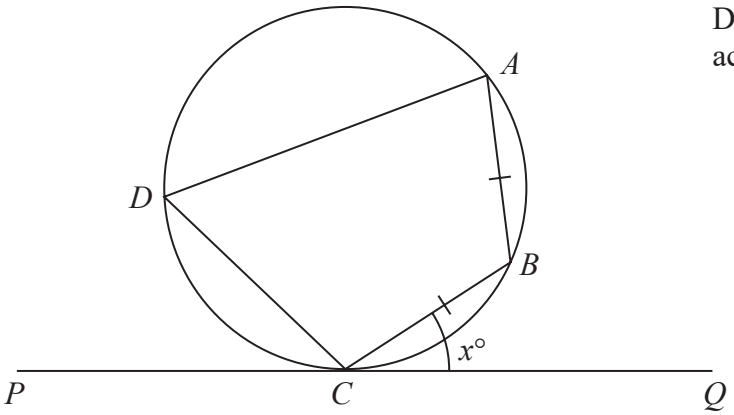


Diagram **NOT** accurately drawn

A, B, C and D are points on a circle.
PCQ is a tangent to the circle.
$AB = CB$.

Angle $BCQ = x°$

Prove that angle $CDA = 2x°$
Give reasons for each stage in your working.

(Total for Question 20 is 5 marks)

21 Line **L** has equation $4y - 6x = 33$
Line **M** goes through the point A (5, 6) and the point B (-4, k)

L is perpendicular to **M**.

Work out the value of k.

(Total for Question 21 is 4 marks)

22 The diagram shows a cone.

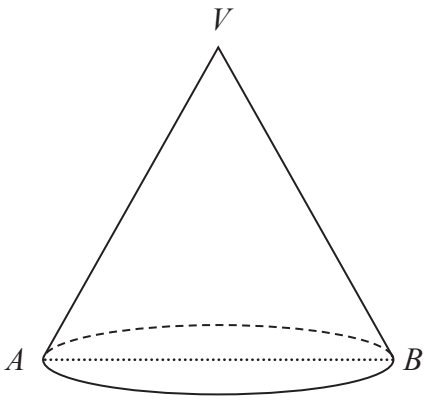


Diagram **NOT** accurately drawn

AB is a diameter of the cone.
V is the vertex of the cone.

Given that

the area of the base of the cone : the total surface area of the cone = 3 : 8

work out the size of angle *AVB*.
Give your answer correct to 1 decimal place.

°

(Total for Question 22 is 6 marks)

23 $ABCD$ is a trapezium.

$\overrightarrow{DC} = 3\overrightarrow{AB}$

$\overrightarrow{DA} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$ $\overrightarrow{DB} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$

Find the exact magnitude of $\overrightarrow{BC}$

(Total for Question 23 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS