1 (b) Solve the inequality $3x + 15 < 8x + 3$

Show clear algebraic working.

....

(3)

(Total for Question 1 is 3 marks)

2 (d) Solve the inequality $4x + 7 > 2$

....

(2)

(Total for Question 2 is 2 marks)

3 The function f is such that $f(x) = 5 + 6x - x^2$ for $x \leqslant 3$

(a) Express $5 + 6x - x^2$ in the form $p - (x - q)^2$ where p and q are constants.

....

(2)

(b) Using your answer to part (a), find the range of values of x for which $f^{-1}(x)$ is positive.

....

(5)

(Total for Question 3 is 7 marks)

4 (a) Write down the integer values of x that satisfy the inequality $-2 < x \leqslant 4$

....
(2)
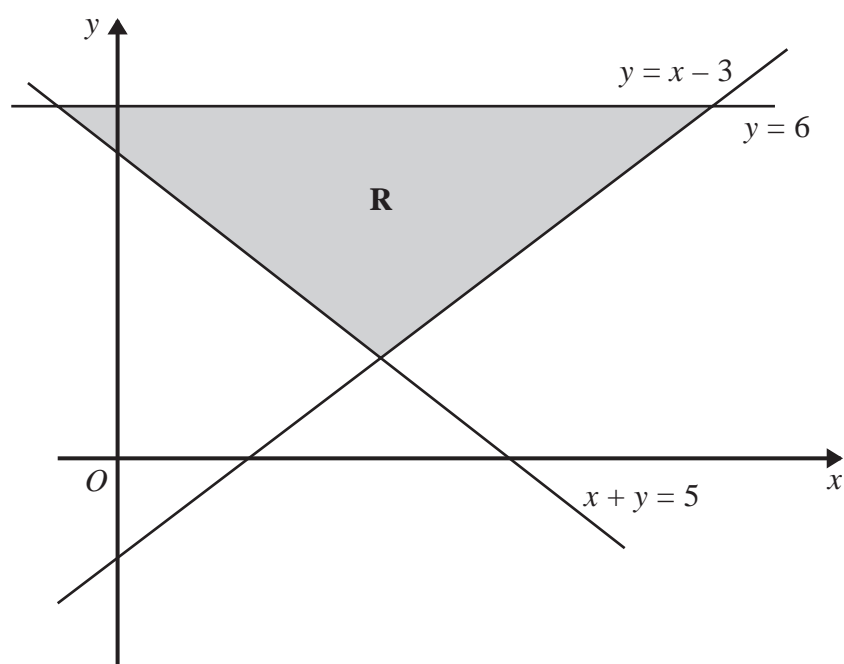
The region **R**, shown shaded in the diagram, is bounded by three straight lines.

Diagram **NOT** accurately drawn

(b) Write down the three inequalities that define the region **R**.

....

....

....
(2)

(Total for Question 4 is 4 marks)

5 (a) Solve the inequality $2x + 7 > 4$

....
(2)

(Total for Question 5 is 2 marks)

6 $-4 \leqslant 2y < 6$

y is an integer.
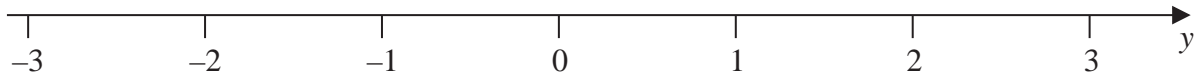
(a) Write down all the possible values of y.

....

(2)

(b) Solve the inequality $7t - 3 \leqslant 2t + 31$

Show your working clearly.

....

(2)

(Total for Question 6 is 4 marks)

7 (a) On the number line, show the inequality $-2 \leqslant y < 1$

(2)

n is an integer.

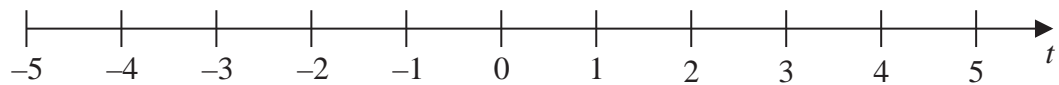(b) Write down all the values of *n* that satisfy $-3.4 < n \leqslant 2$

....

(2)

(Total for Question 7 is 4 marks)

8 (c) (i) Solve the inequality $7t - 8 < 2t + 7$

....
(2)

(ii) On the number line below, represent the solution set of the inequality solved in
part (c)(i)

(1)

(Total for Question 8 is 3 marks)

9   Solve the inequality $3 - 4x \leqslant 11$

....

(Total for Question 9 is 2 marks)

10 $f(x) = x^2 - 4$

$g(x) = 2x + 1$

Solve $fg(x) > 0$
Show clear algebraic working.

....

(Total for Question 10 is 4 marks)

11 (b) Solve the inequality $2y^2 - 7y - 30 \leqslant 0$

Show your working clearly.

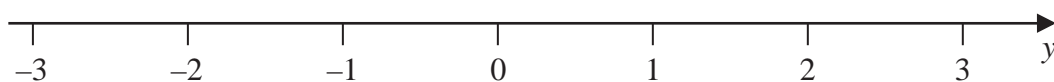...

(3)

(Total for Question 11 is 3 marks)

12 n is an integer.

(a) Write down all the values of n such that $-2 \leqslant n < 3$

....

(2)

(b) On the number line, represent the inequality $y \leqslant 1$

$$\text{−3} \quad \text{−2} \quad \text{−1} \quad \text{0} \quad \text{1} \quad \text{2} \quad \text{3} \quad y$$

(1)

(Total for Question 12 is 3 marks)

13 Two particles, P and Q, move along a straight line.
The fixed point O lies on this line.

The displacement of P from O at time t seconds is s metres, where

$$s = t^3 - 4t^2 + 5t \quad \text{for } t > 1$$

The displacement of Q from O at time t seconds is x metres, where

$$x = t^2 - 4t + 4 \quad \text{for } t > 1$$

Find the range of values of t where $t > 1$ for which both particles are moving in the
same direction along the straight line.

....

(Total for Question 13 is 6 marks)

14 (a) Solve $4y + 5 > 12$

....

(2)

(Total for Question 14 is 2 marks)

15 (a) Solve the inequality $\quad 5x - 7 \leqslant 2$

....

(2)

(Total for Question 15 is 2 marks)

16 Here is a rectangle.

$(2x + 3)\,\text{cm}$

Diagram **NOT** accurately drawn

$(x - 1)\,\text{cm}$
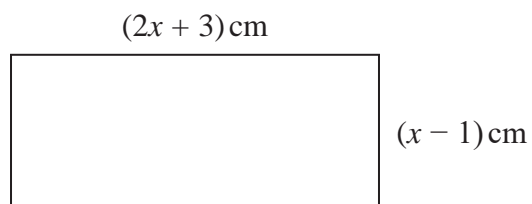
Given that the area of the rectangle is less than $75\,\text{cm}^2$

find the range of possible values of x

....

(Total for Question 16 is 5 marks)

17 $-8 < 2y \leqslant 2$

y is an integer.

(a) Find all the possible values of *y*

....
(2)

(b) Write down the inequality shown on the number line.

....
(1)
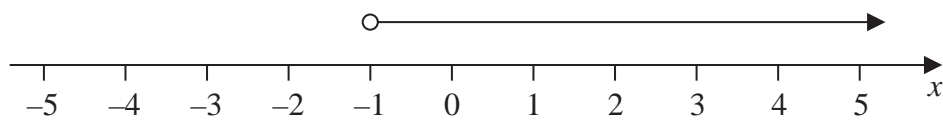
(Total for Question 17 is 3 marks)

18 (b) Write down the inequality shown on the number line
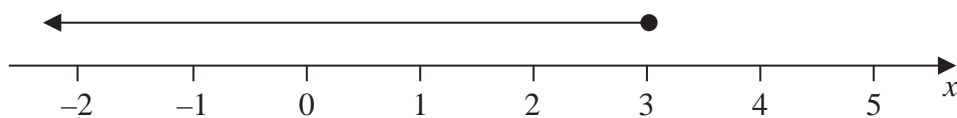
....
(1)

(c) Solve the inequality $7w + 6 > 12w + 14$

....
(3)

(Total for Question 18 is 4 marks)

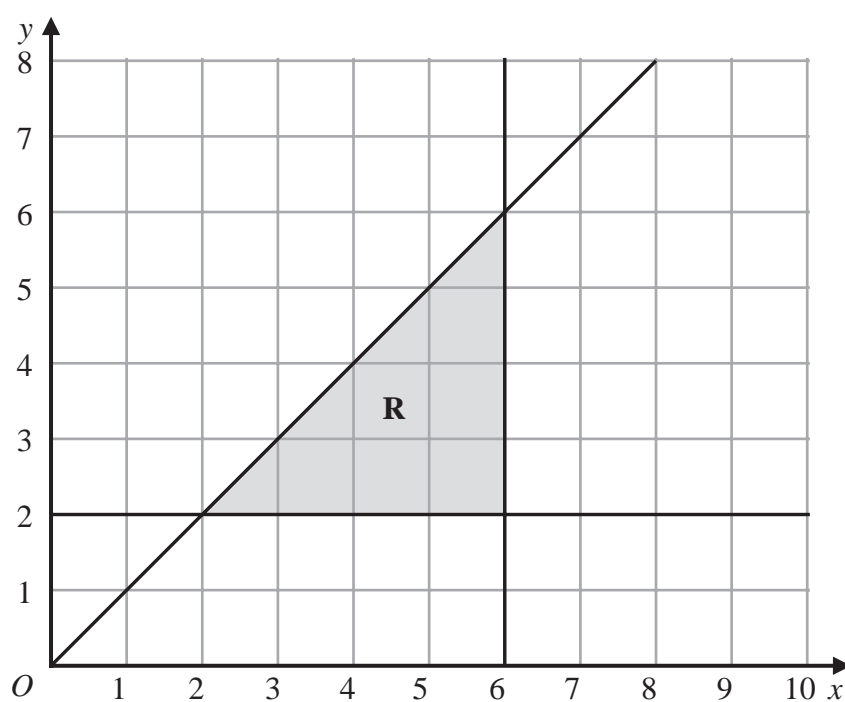**19** The curve **T** has equation $y = x^3 - 2x^2 - 9x + 15$

(b) Find the range of values of x for which **T** has a positive gradient.
Give your values correct to 3 significant figures.
Show your working clearly.

....

(4)

(Total for Question 19 is 4 marks)

20   (a) Solve $9 - 4x > 17$

....
(2)

(b) Write down the three inequalities that represent the shaded region **R**

....

....

....
(3)

(Total for Question 20 is 5 marks)