

A Inequalities (Non-Calc)

7 Solve.

$$4x - 3 \geq 9$$

$$+3 \quad +3$$

$$4x \geq 12$$

$$\div 4 \quad \div 4$$

$$x \geq 3$$

$$x \geq 3$$

[2]

6 Solve the inequality.

$$7 \leq 11x$$

$$\div 11 \quad \div 11$$

$$\frac{7}{11} \leq x \quad \text{or} \quad x \geq \frac{7}{11}$$

$$x \geq \frac{7}{11}$$

[1]

15 Solve.

$$12x - 3 \geq 4x + 13$$

$$-4x \quad -4x$$

$$8x - 3 \geq 13$$

$$+3 \quad +3$$

$$8x \geq 16$$

$$\div 8 \quad \div 8$$

$$x \geq 2$$

$$x \geq 2$$

[2]

7 Solve $2x + 3 < 5x - 12$.

$$-2x \quad -2x$$

$$3 < 3x - 12$$

$$+12 \quad +12$$

$$15 < 3x$$

$$\div 3 \quad \div 3$$

$$5 < x$$

$$x > 5$$

[2]

8 Solve.

(b) $11x - 3 \geq 2(2x + 9)$

$$11x - 3 \geq 4x + 18$$

$$\begin{array}{r} -4x \end{array}$$

$$7x - 3 \geq 18$$

$$\begin{array}{r} +3 \end{array}$$

$$7x \geq 21$$

$$\begin{array}{r} \div 7 \end{array}$$

$$\underline{x \geq 3}$$

$$x \geq 3$$

[3]

5 Solve.

$9 - 2x \leq 5(x + 6)$

$$9 - 2x \leq 5x + 30$$

$$\begin{array}{r} +2x \end{array}$$

$$9 \leq 7x + 30$$

$$\begin{array}{r} -30 \end{array}$$

$$-21 \leq 7x$$

$$\begin{array}{r} \div 7 \end{array}$$

$$\underline{-3 \leq x}$$

$$x \geq -3$$

[3]

6 Solve $2x + 6 > 5x - 10$.

$$2x + 6 > 5x - 10$$

$$\begin{array}{r} -2x \end{array}$$

$$6 > 3x - 10$$

$$\begin{array}{r} +10 \end{array}$$

$$16 > 3x$$

$$\begin{array}{r} \div 3 \end{array}$$

$$\underline{\frac{16}{3} > x}$$

$$x < \frac{16}{3}$$

[2]

4 (a) Solve the inequality.

$$\begin{array}{r} 3m + 12 \leq 8m - 5 \\ -3m \quad -3m \end{array}$$

$$\begin{array}{r} 12 \leq 5m - 5 \\ +5 \quad +5 \end{array}$$

$$\begin{array}{r} 17 \leq 5m \\ \div 5 \quad \div 5 \end{array}$$

$$\underline{\frac{17}{5} \leq m}$$

$$\dots\dots\dots m \geq \frac{17}{5} \dots\dots\dots [2]$$

11 Solve.

$$4(2x - 3) \geq 43 + 3x$$

$$\begin{array}{r} 8x - 12 \geq 43 + 3x \\ -3x \quad -3x \end{array}$$

$$\begin{array}{r} 5x - 12 \geq 43 \\ +12 \quad +12 \end{array}$$

$$\begin{array}{r} 5x \geq 55 \\ \div 5 \quad \div 5 \end{array}$$

$$\underline{x \geq 11}$$

$$\dots\dots\dots x \geq 11 \dots\dots\dots [3]$$

13 Solve.

$$4 - 3x \geq \frac{6 - x}{5}$$

$$\begin{array}{r} 4 - 3x \geq \frac{6 - x}{5} \\ \times 5 \quad \times 5 \end{array}$$

$$5(4 - 3x) \geq 6 - x$$

$$\begin{array}{r} 20 - 15x \geq 6 - x \\ +15x \quad +15x \end{array}$$

$$\begin{array}{r} 20 \geq 6 + 14x \\ -6 \quad -6 \end{array}$$

$$\begin{array}{r} 14 \geq 14x \\ \div 14 \quad \div 14 \end{array}$$

$$\underline{1 \geq x}$$

$$\dots\dots\dots x \leq 1 \dots\dots\dots [3]$$

- 7 (a) Naga has n marbles.
 Panav has three times as many marbles as Naga.
 Naga loses 5 marbles and Panav buys 10 marbles.
 Together they now have more than 105 marbles.

Write down and solve an inequality in n .

Before:

Naga: n

Panav: $3n$

After:

Naga: $n - 5$

Panav: $3n + 10$

$$n - 5 + 3n + 10 > 105$$

$$4n + 5 > 105$$

$$\begin{array}{r} -5 \quad -5 \\ 4n > 100 \end{array}$$

$$\begin{array}{r} \div 4 \quad \div 4 \\ n > 25 \end{array}$$

$$n > 25 \quad [3]$$

- 4 Find the integer values of x when $-1 \leq x < 3$.

$$-1, 0, 1, 2 \quad [2]$$

- 1 Write down the integer values of x that satisfy the inequality $-2 \leq x < 2$.

$$-2, -1, 0, 1 \quad [2]$$

(c) $-8 < 3x - 2 \leq 7$

(i) Solve the inequality.

$$\begin{aligned} -8 &< 3x - 2 \leq 7 \\ +2 & \quad +2 \quad +2 \\ -6 &< 3x \leq 9 \\ \div 3 & \quad \div 3 \quad \div 3 \\ -2 &< x \leq 3 \end{aligned}$$

$-2 < x \leq 3$ [3]

(ii) Find the integer values of x that satisfy the inequality.

$-1, 0, 1, 2, 3$ [1]

12 x is an integer and $-3 \leq 2x - 1 < 3$.

Find the values of x .

$$\begin{aligned} -3 &\leq 2x - 1 < 3 \\ +1 & \quad +1 \quad +1 \\ -2 &\leq 2x < 4 \\ \div 2 & \quad \div 2 \quad \div 2 \\ -1 &\leq x < 2 \end{aligned}$$

$-1, 0, 1$... [2]

10 (a) Find all the positive integers which satisfy the inequality.

$$\begin{aligned} 3n - 8 &> 5n - 15 \\ -3n & \quad -3n \\ -8 &> 2n - 15 \\ +15 & \quad +15 \\ 7 &> 2n \\ \div 2 & \quad \div 2 \\ 3.5 &> n \\ \text{or} \\ 1 &< 3.5 \end{aligned}$$

$1, 2, 3$ [2]

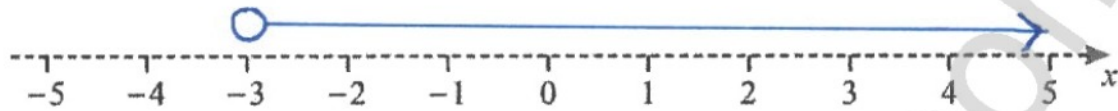
(0 is neither positive or negative)

- 3 (a) Solve $x+9 > 6$.

$$\begin{array}{r} x+9 > 6 \\ -9 \quad -9 \\ \hline x > -3 \end{array}$$

$$x > -3 \quad [1]$$

- (b) Show your answer to part (a) on this number line.



[1]

- 4 (a) Solve $11+2x \geq 5$.

$$\begin{array}{r} 11+2x \geq 5 \\ -11 \quad -11 \\ \hline 2x \geq -6 \\ \div 2 \quad \div 2 \\ \hline x \geq -3 \end{array}$$

$$x \geq -3 \quad [2]$$

- (b) Show your solution to part (a) on this number line.



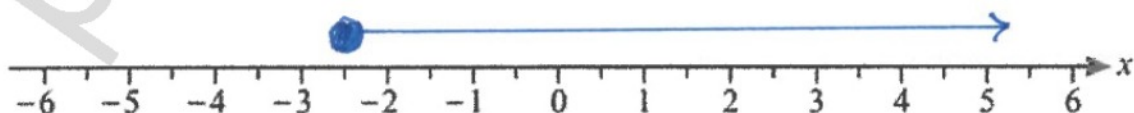
[1]

- (b) (i) Solve.

$$\begin{array}{r} x-3 \leq 5x+7 \\ -x \quad -x \\ \hline -3 \leq 4x+7 \\ -7 \quad -7 \\ \hline -10 \leq 4x \\ \div 4 \quad \div 4 \\ \hline -2.5 \leq x \end{array}$$

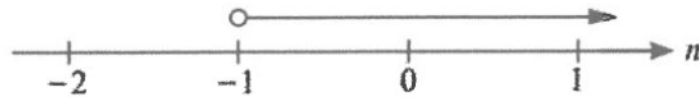
$$x \geq -2.5 \quad [2]$$

- (ii) Show your answer to part (b)(i) on the number line.



[1]

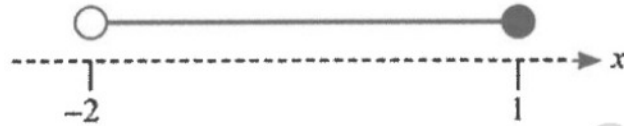
7



Write down the inequality, in terms of n , shown by the number line.

$n > -1$ [1]

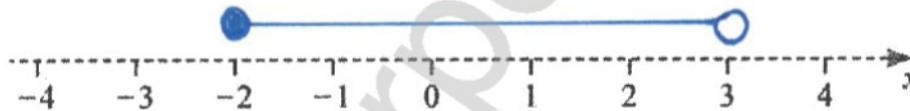
7 (a)



Write down the inequality in x shown by the number line.

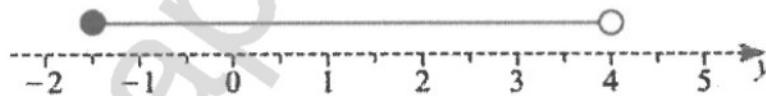
$-2 < x \leq 1$ [2]

1 On the number line, show the inequality $-2 \leq x < 3$.



[2]

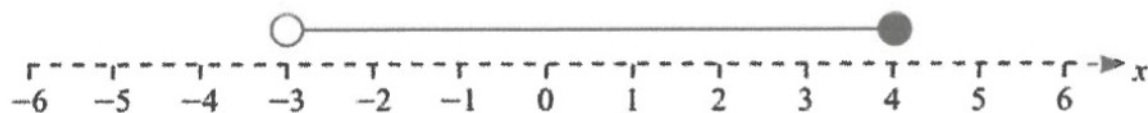
7



Write down the inequality in y shown by the number line.

$-1.5 \leq y < 4$ [2]

7



Write down the inequality for x represented on the number line.

$$\underline{-3 < x \leq 4} \quad [2]$$

3 Show this inequality on the number line.

$$-3 < x \leq 4$$



[2]

3 (a)



Write down the inequality shown by the number line.

$$\underline{-2 < x \leq 4} \quad [1]$$

(b) $-3 \leq 2x + 3 < 9$

(i) Solve the inequality.

$$-3 \leq 2x + 3 < 9$$

$$\begin{array}{ccc} -3 & +3 & -3 \\ -6 & \leq 2x < 6 \end{array}$$

$$\begin{array}{ccc} \div 2 & \div 2 & \div 2 \\ -3 & \leq x < 3 \end{array}$$

$$\underline{-3 \leq x < 3} \quad [3]$$

(ii) Write down all the integer values of x that satisfy the inequality.

$$\underline{-3, -2, -1, 0, 1, 2} \quad [2]$$