

INEQUALITIES

Name: _____

KEY

• in-class assignment: PLEASE HAND IN FOR MARKS

/30

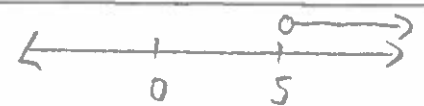

[20]

1. Show the following inequalities on a number line. Each inequality is to be shown on a separate number line.

| | | |
|----|---|--|
| 1 | $x < 10$ | |
| 2 | $b < -15$ | |
| 3 | $y \geq -3$ | |
| 4 | $a \geq 0$ | |
| 5 | $\frac{2x}{2} < \frac{9}{2} \times 2 \div 4.5$ | |
| 6 | $3x > 3x - 12$ $-3x \quad -3x$ $0 > -12$ \checkmark True | |
| 7 | $a < 2$ $a < -a + 4$ $+a \quad +a$ $2a < 4$ $\frac{2a}{2} < \frac{4}{2}$ | |
| 8 | $-25 \geq x$ $x \leq -25$ | |
| 9 | $x \leq 3$ $5x \leq -x + 18$ $+x \quad +x$ | |
| 10 | $\frac{6x}{6} \leq \frac{18}{6}$ $20 > -x + 5x$ $20 > 4x$ $4 \quad 4$ $5 > x$ | |

$5 > x$

- [10] 2. Clearly state, using a full sentence, whether a given inequality has infinitely many real solutions or no real solutions. Support your answer using algebra or otherwise justify your answer.

| | | |
|---|---|---|
| 1 | $x > 5$ |  <p>\therefore The inequality has infinitely many real solutions as there are infinitely many points/numbers greater than 5.</p> |
| 2 | $\begin{aligned} 2y &\leq 2y + 10 \\ -2y &\quad -2y \\ \hline 0 &\leq 10 \quad \checkmark \text{ True} \end{aligned}$ | <p>\therefore The inequality has infinitely many solutions as $y \in \mathbb{R}$ and there are infinitely many \mathbb{R} numbers.</p> |
| 3 | <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-bottom: 10px;">$a > 3$</div> $\begin{aligned} a &< 6a - 15 \\ -6a &\quad -6a \\ \hline -5a &< -15 \\ \frac{-5a}{-5} &\quad \frac{-15}{-5} \end{aligned}$ |  <p>\therefore There are infinitely many numbers greater than 3 so the inequality has infinitely many solutions.</p> |
| 4 | $\begin{aligned} 5b - 20 &> 5b - 13 \\ -5b + 20 &\quad -5b + 20 \\ \hline 0b &> 7 \\ 0 &> 7 \quad \times \text{ False} \end{aligned}$ | <p>\therefore There are no \mathbb{R} solutions to this inequality as $0 > 7$ is a false statement.</p> |
| 5 | $\begin{aligned} x + 45 &> -x - 45 \\ +x - 45 &\quad +x - 45 \\ \hline 2x &> -90 \\ \frac{2x}{2} &\quad \frac{-90}{2} \end{aligned}$ | <p>\therefore This inequality has infinitely many \mathbb{R} solutions as there are infinitely many \mathbb{R} numbers greater than -45.</p> |

$x > -45$