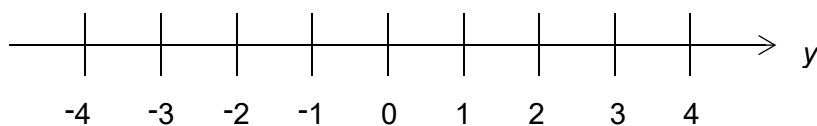## Foundation Check In – 6.04 Algebraic inequalities
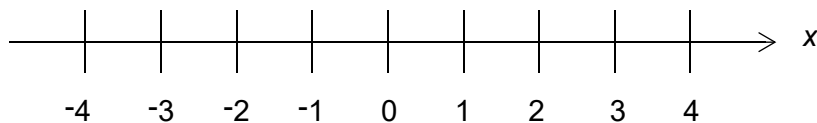
1. Put the correct sign $<$, $>$, $\leq$ or $\geq$ in the box to make the statement correct.

$$3 - 15 + 9 \qquad \boxed{} \qquad 11 - 2 \times 8$$

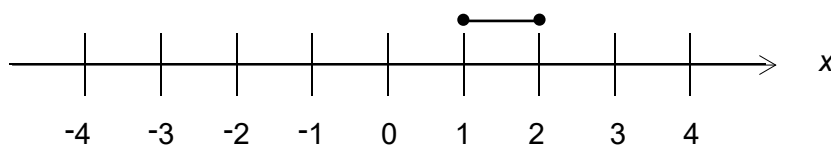2. Show the inequality $^{-}3 \leq y < 4$ on the number line below.

3. List the integers that satisfy both $^{-}6 \leq 2n < 3$ and $n < {-}1$.

4. Solve the inequality $4x - 1 > {^-}9$ and represent the solution set on the number line below.

5. The solution set to the inequality $p \leq 4x - 2 \leq 3p$ is given on the number line below. Work out the values of p and $3p$.

6. Kevin has made an error solving the inequality $2 - 5x < {-}3$. Explain what he has done wrong.

$$2 - 5x < {-}3$$
$$^{-}5x < {-}5$$
$$x < 1$$

7. A teacher decides to reward all those students that scored 75% and over in their mock exam and give extra revision classes to those students that scored under 25%. Using t to represent % test mark scored, write an inequality that represents the students that will **not** be rewarded or given extra revision classes.

8. Callum says that there are 7 integers that satisfy the inequality $^{-}2 < \dfrac{1}{2}x + 3 < 1$ but Nudrat says there are only 5. Who is right and why?

9. A number is multiplied by four and three is subtracted from it. This gives a number bigger than 5 and less than twenty-one. Find the range of values that this number could be.

10. Tina is planning a journey. A taxi costs £3 flat fee in addition to 55p per mile, whereas a private hire car charges 85p per mile plus a £1 booking fee. How many miles, to the nearest whole mile, does she need to travel for the taxi to be a better deal and by how much?

Extension

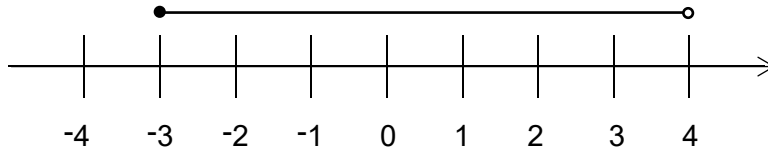The diagram below represents the floor plan for a room. The area of the floor needs to be at least 55m^2.
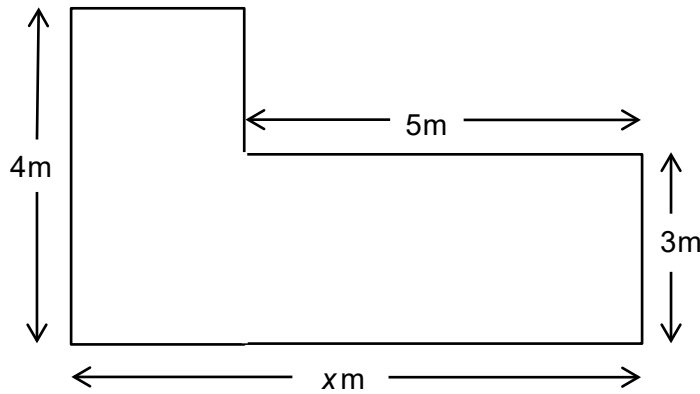
Form an inequality and solve it to show possible values for x.
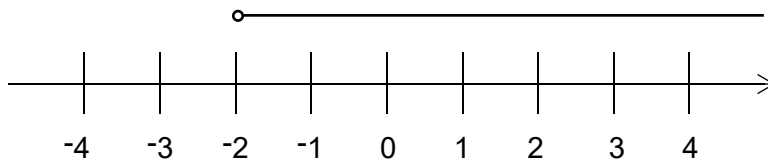
Answers

1. $>$

2.

3. The integers $^-2$ and $^-3$ satisfy both inequalities.

4.

5. $p = 2$ and $3p = 6$

6. The answer should be $x > 1$ because dividing by a negative inverts the inequality sign. Alternatively, Kevin could rearrange to make x positive and then solve $5 < 5x$.
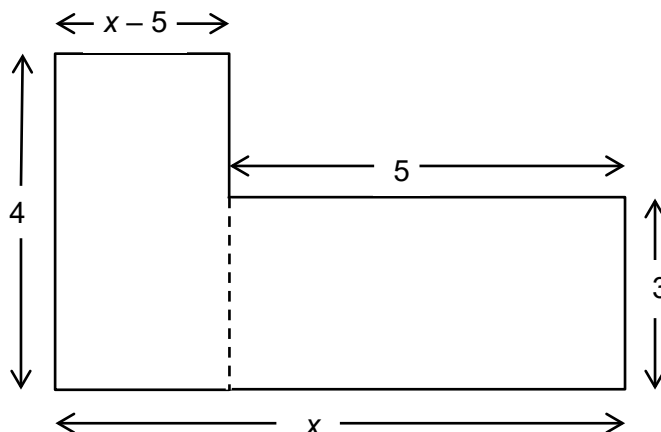
7. $25 \leq t < 75$

8. The integers that satisfy $^-2 < \frac{1}{2}x + 3 < 1$ are $^-9$, $^-8$, $^-7$, $^-6$ and $^-5$ (not $^-10$ and $^-4$), so Nudrat is correct.

9. Solving $5 < 4n - 3 < 21$ gives the range of values the number could be, $2 < n < 6$.

10. Solving $300 + 55m < 85m + 100$ gives $m > 6\frac{2}{3}$.

   The taxi is cheaper after 7 miles by 10p.

Extension

$4(x - 5) + 15 \geq 55$
$4x - 20 + 15 \geq 55$
$4x - 20 \geq 40$
$4x \geq 60$
$x \geq 15$

GCSE (9–1)
MATHEMATICS

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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Use the correct inequality sign (<, ≤, > or ≥)			
AO1	2	Show an inequality on a number line			
AO1	3	Find integer solutions to a linear inequality			
AO1	4	Solve a linear inequality in one variable and express the solution on a number line			
AO1	5	Use solutions on a number line to define a linear inequality in one variable			
AO2	6	Solve a linear inequality in one variable involving division by a negative			
AO2	7	Write a linear inequality from a context			
AO2	8	Find integer solutions to a linear inequality			
AO3	9	Write and solve a linear inequality in one variable			
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