# Foundation Check In – 6.04 Algebraic inequalities

1. Put the correct sign ˂, ˃, ≤ or ≥ in the box to make the statement correct.

3 – 15 + 9 11 – 2 × 8

1. Show the inequality -3 ≤ *y* ˂ 4 on the number line below.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  | *y* |
|   |  |  |  |  |  |  |  |  |  |

-4 -3 -2 -1 0 1 2 3 4

1. List the integers that satisfy both -6 ≤ 2*n* ˂ 3 and *n* < -1.
2. Solve the inequality 4*x* – 1 ˃ -9 and represent the solution set on the number line below.

*x*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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-4 -3 -2 -1 0 1 2 3 4

1. The solution set to the inequality *p* ≤ 4*x* – 2 ≤ 3*p* is given on the number line below. Work out the values of *p* and 3*p*.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  | *x* |
|   |  |  |  |  |  |  |  |  |  |

-4 -3 -2 -1 0 1 2 3 4

1. Kevin has made an error solving the inequality 2 – 5*x* ˂ -3. Explain what he has done wrong.

 2 – 5*x* ˂ -3

 -5x ˂ -5

 *x* < 1

1. 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.
2. Callum says that there are 7 integers that satisfy the inequality -2 ˂  ˂ 1 but Nudrat says there are only 5. Who is right and why?
3. 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.
4. 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 55 m2.

5 m

4 m

3 m

*x* m

Form an inequality and solve it to show possible values for *x*.

## Answers

1. ˃

|  |  |  |  |  |  |  |  |  |  |
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-4 -3 -2 -1 0 1 2 3 4

1. The integers -2 and -3 satisfy both inequalities.

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|   |  |  |  |  |  |  |  |  |  |

-4 -3 -2 -1 0 1 2 3 4

1. ** and 
2. 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˂ 5*x*.
3. 25 ≤ *t* < 75
4. The integers that satisfy -2 ˂  ˂ 1 are -9, -8, -7, -6 and -5 (not -10 and -4), so Nudrat is correct.
5. Solving 5 ˂ 4*n* – 3 ˂ 21 gives the range of values the number could be, 2 ˂ *n* ˂ 6.
6. Solving 300 + 55*m* ˂ 85*m* + 100 gives *m* > .

The taxi is cheaper after 7 miles by 10p.

**Extension**

*x* – 5

5

4(*x* – 5) + 15 ≥ 55

4*x* – 20 + 15 ≥ 55

 4*x* – 20 ≥ 40

 4*x* ≥ 60

 *x* ≥ 15

4

3

*x*

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Use the correct inequality sign ( ˂, ≤, ˃ or ≥ ) |  |  |  |  | AO1 | 1 | Use the correct inequality sign ( ˂, ≤, ˃ or ≥ ) |  |  |  |
| AO1 | 2 | Show an inequality on a number line |  |  |  |  | AO1 | 2 | Show an inequality on a number line |  |  |  |
| AO1 | 3 | Find integer solutions to a linear inequality |  |  |  |  | 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 | 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 |  |  |  |  | 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 | 6 | Solve a linear inequality in one variable involving division by a negative |  |  |  |
| AO2 | 7 | Write a linear inequality from a context |  |  |  |  | AO2 | 7 | Write a linear inequality from a context |  |  |  |
| AO2 | 8 | Find integer solutions to a linear inequality |  |  |  |  | AO2 | 8 | Find integer solutions to a linear inequality |  |  |  |
| AO3 | 9 | Write and solve a linear inequality in one variable |  |  |  |  | AO3 | 9 | Write and solve a linear inequality in one variable |  |  |  |
| AO3 | 10 | Write and solve a linear inequality in one variable |  |  |  |  | AO3 | 10 | Write and solve a linear inequality in one variable |  |  |  |
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