# Section Check In – AL: Algebra

## Questions

1. Express as a single fraction .

[AL2]

|  |  |
| --- | --- |
| **1** |  |
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|  |
|  |
|  |

2. A sequence of numbers  is given by , .

Find  and 

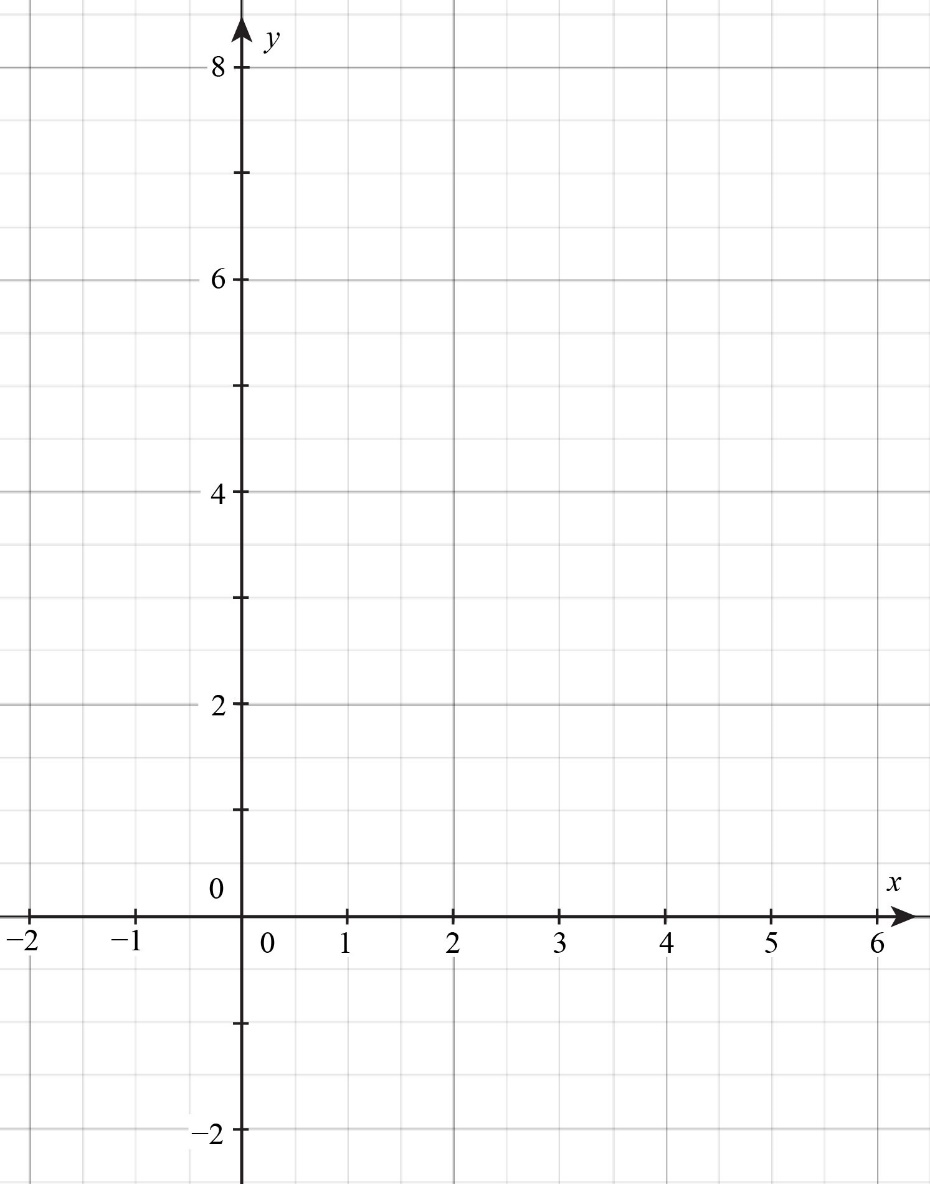
[AL10]

|  |  |
| --- | --- |
| **2** |  |
|  |
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|  |
|  |

3. On the grid below indicate the region for which the following inequalities hold. You should  
shade the regions which are NOT satisfied.



[AL9]



4. Simplify .

[AL2]

|  |  |
| --- | --- |
| **4** |  |
|  |
|  |

5. Find the coefficient of *x* when multiplying out the expression .

[AL1,3]

|  |  |
| --- | --- |
| **5** |  |
|  |
|  |
|  |

6. Solve the inequality , giving your answer in terms of  and .

[AL7,8]

|  |  |
| --- | --- |
| **6** |  |
|  |
|  |

7. Express  in the form .

[AL5]

|  |  |
| --- | --- |
| **7** |  |
|  |
|  |
|  |

8. Use the factor theorem to show that  is a factor of .

[AL4]

|  |  |
| --- | --- |
| **8** |  |
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|  |
|  |

9. Solve the inequality 

[AL8]

|  |  |
| --- | --- |
| **12** |  |
|  |
|  |
|  |

10. Factorise fully 

[AL4]

|  |  |
| --- | --- |
| **10** |  |
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|  |

11. An athlete is training for the London marathon. He runs 7 miles on day 1 and then increases his run by 0.8 miles each day until he can run a complete marathon of 26.2 miles.

On which day of his training does he run the full 26.2 miles?

[AL11]

|  |  |
| --- | --- |
| **11** |  |
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12. Taxi firm A charges £5 for the first mile and £1.25 for each extra mile. Firm B charges £10 for the first two miles and £1 per mile for each extra mile after the first two. Form and solve an inequality for the distance m for which company B is cheaper.

[AL8]

|  |  |
| --- | --- |
| **12** |  |
|  |
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|  |
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13. An object is projected vertically upwards from ground level and its height, metres, after  seconds is given by the formula . Show that the object is above a height of metres for approximately  seconds.

[AL6]

|  |  |
| --- | --- |
| **13** |  |
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|  |

14. A sequence is given by the rule  . Given that  and , find;

(a) 

(b) 

(c) 

[AL10]

|  |  |
| --- | --- |
| **14(a)** |  |
|  |
| **14(b)** |  |
|  |
| **14(c)** |  |
|  |
|  |
|  |
|  |

15. Simplify fully  giving your answer in the form 

[AL3]

|  |  |
| --- | --- |
| **15** |  |
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### Extension

The first 7 terms of a sequence are *a*, *b*, *c*, 12, *e*, *f*, 50. The sequence follows the same rules as the Fibonacci sequence (i.e. the 3rd term is the sum of the 1st & 2nd, the 4th term is the sum of the 2nd & 3rd, etc.). What are the values of *a*, *b*, *c*, *e* & *f* ?

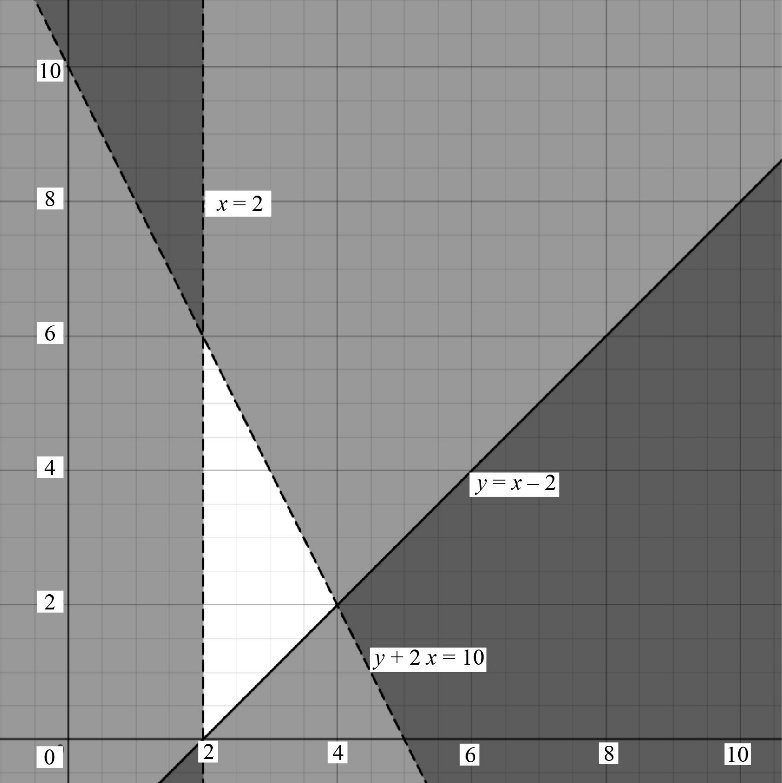
|  |  |
| --- | --- |
| **Ext** |  |
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|  |

## Worked solutions

1. 

 oe

2. , , , 



1. Simplifying, 
2. 

Coefficient of is .

1. 

7. 



  ,  and 

8. Let 



Since , by factor theorem, using  shows that  is a factor.

9. 





10. Possible integer roots  {"mathml":"<math xmlns=\"http://www.w3.org/1998/Math/MathML\" style=\"font-family:Arial;font-size:11px;\"/>","origin":"MathType for Microsoft Add-in"}{"mathml":"<math xmlns=\"http://www.w3.org/1998/Math/MathML\" style=\"font-family:Arial;font-size:11px;\"/>","origin":"MathType for Microsoft Add-in"}

 No

  is a factor







11.  , , …



12. 











 {"mathml":"<math xmlns=\"http://www.w3.org/1998/Math/MathML\" style=\"font-family:Arial;font-size:11px;\"/>","origin":"MathType for Microsoft Add-in"}

13. Times when object is at a height of metres found by substituting 

Equation is  which rearranges to 

Using quadratic formula,  or 

Time above is 

14. (a) 

(b) 



(c) Let  and 

, , ,





Solving simultaneously gives 

15. 

|  |  |  |  |
| --- | --- | --- | --- |
|  | *x*2 | - 4*x* | +17 |
| *x* | *x*3 | - 4*x*2 | + 17*x* |
| +3 | 3x2 | -12*x* | + 51 |



### Extension











Simultaneous Equations





 ,  ,  ,  and 

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