# OCR 06 Algebra (Foundation)

1. Simplify .
2. Simplify .
3. Simplify fully .
4. Which of these is an identity?

 

1. Write down the next two terms in this sequence.

2, 5, 9, 14, 20, ….., …..

1. Find the value of *x* in the following.

.

1. Simplify .
2. Rearrange  to make *u* the subject.
3. Solve these simultaneous equations.



1. Factorise .
2. The formula for calculating the final velocity of an object moving with constant acceleration is  where *u* is the initial velocity, *v* is the final velocity, *a* is the acceleration and *t* is the time. Yinka uses this formula to calculate the final velocity when the initial velocity is 5 m/s, the acceleration is 2 m/s2 and the time taken is 8 seconds. His working is shown below.







m/s

Identify the error in Yinka’s working and calculate the correct answer.

1. A sequence is given by the formula . Show that 140 is a term in this sequence.
2. The values *x*, 6, 8, 14, 22, 36, 58, *y* form part of a sequence. Show that .
3. Represent the solutions to the inequality  on the number line below.
4. A rectangle has width cm and length cm. A square has sides of length cm. Show that the perimeter of the rectangle is twice the perimeter of the square.
5. The area of a circle is 40.7 cm2. Find the radius of the circle and give your answer to 3 significant figures.
6. Francesca is double Kieron’s age and Chun is 7 years younger than Kieron. The sum of the three individuals’ ages is 109. How old is each individual?
7. A triangle has angles °, ° and °.

Work out the size of the largest angle.

1. Give an expression in terms of *a* for the length of the hypotenuse of the right-angled triangle shown below.

3*a*

4*a*

1. A rectangle has width cm and length cm. The area of the rectangle is 60 cm2.

Work out the perimeter of the rectangle in cm.

### Answers

1. 
2. 
3. 
4.  because it is true for all values of *x*.
5. 27 and 35
6. 







1. 



1. 





1.  multiplied by 5 gives 

 multiplied by 2 gives 

Subtracting gives 



Substituting in  gives 







1. 
2. Yinka has not used BIDMAS. He has added 5 + 2 to get 7 and then multiplied 7 by 8 to get 56. He should have worked out 2 × 8 first to get 16 and then added this to 5. The correct answer is 21 m/s.
3. 





As *n* is an integer, 140 is a term in the sequence.

1. The numbers are part of a Fibonacci type sequence so (from ) and(from ). .
2. 







1. Perimeter of rectangle is 

Perimeter of square is 

 so the perimeter of the rectangle is twice that of the square.

1. cm
2. 





Kieron is 29, Francesca is 58 and Chun is 22.

1. 







The largest angle is given by .

1. Using Pythagoras’ theorem:









1. 







 and  so  and 

*x* cannot be negative so  and the perimeter is cm.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Simplify an algebraic expression by collecting like terms |  |  |  |  | AO1 | 1 | Simplify an algebraic expression by collecting like terms |  |  |  |
| AO1 | 2 | Simplify algebraic products |  |  |  |  | AO1 | 2 | Simplify algebraic products |  |  |  |
| AO1 | 3 | Simplify algebraic quotients |  |  |  |  | AO1 | 3 | Simplify algebraic quotients |  |  |  |
| AO1 | 4 | Recognise the difference between an equation and an identity |  |  |  |  | AO1 | 4 | Recognise the difference between an equation and an identity |  |  |  |
| AO1 | 5 | Generate terms by spotting a pattern |  |  |  |  | AO1 | 5 | Generate terms by spotting a pattern |  |  |  |
| AO1 | 6 | Solve a linear equation with an unknown on both sides of the equation |  |  |  |  | AO1 | 6 | Solve a linear equation with an unknown on both sides of the equation |  |  |  |
| AO1 | 7 | Simplify an algebraic expression by multiplying a single term over a bracket |  |  |  |  | AO1 | 7 | Simplify an algebraic expression by multiplying a single term over a bracket |  |  |  |
| AO1 | 8 | Change the subject of a formula |  |  |  |  | AO1 | 8 | Change the subject of a formula |  |  |  |
| AO1 | 9 | Solve simultaneous equations |  |  |  |  | AO1 | 9 | Solve simultaneous equations |  |  |  |
| AO1 | 10 | Factorise a quadratic expression |  |  |  |  | AO1 | 10 | Factorise a quadratic expression |  |  |  |
| AO2 | 11 | Use a kinematics formula |  |  |  |  | AO2 | 11 | Use a kinematics formula |  |  |  |
| AO2 | 12 | Use the formula for the *n*th term of a sequence |  |  |  |  | AO2 | 12 | Use the formula for the *n*th term of a sequence |  |  |  |
| AO2 | 13 | Recognise a special sequence |  |  |  |  | AO2 | 13 | Recognise a special sequence |  |  |  |
| AO2 | 14 | Represent an inequality on a number line |  |  |  |  | AO2 | 14 | Represent an inequality on a number line |  |  |  |
| AO2 | 15 | Form an algebraic expression in context |  |  |  |  | AO2 | 15 | Form an algebraic expression in context |  |  |  |
| AO3 | 16 | Find the radius of a circle |  |  |  |  | AO3 | 16 | Find the radius of a circle |  |  |  |
| AO3 | 17 | Solve a problem by setting up and solving an equation |  |  |  |  | AO3 | 17 | Solve a problem by setting up and solving an equation |  |  |  |
| AO3 | 18 | Form and solve an equation to solve a problem in context |  |  |  |  | AO3 | 18 | Form and solve an equation to solve a problem in context |  |  |  |
| AO3 | 19 | Form and simplify an expression using Pythagoras’ theorem |  |  |  |  | AO3 | 19 | Form and simplify an expression using Pythagoras’ theorem |  |  |  |
| AO3 | 20 | Form and solve a quadratic equation |  |  |  |  | AO3 | 20 | Form and solve a quadratic equation |  |  |  |