# Foundation Check In - 3.01 Powers and roots

**Do not use a calculator.**

1. Write the reciprocal of  in index notation.
2. Using the laws of indices, simplify and write your answer in index notation.
3. Using the laws of indices, simplify and write your answer in index notation.
4. Calculate , giving your answer as a fraction.
5. Calculate .
6. Explain which is greater,  or .
7. Matthew is asked to simplify, giving his answer in index notation. His answer is . Is he right? Give a reason for your answer.
8. Explain why is not equal to .
9. When you add the cube of Alfie’s age to Hannah’s age, the total is 79. When you add the ages of Alfie and Hannah together, the total is 19. How old are Alfie and Hannah?
10. Jenny wants to tile the wall above her bath which measures 2 m high by 2 m wide. The square tiles that she has chosen will each cover an area of 400 cm2. How many tiles will she need to complete one row of the wall?

**Extension**

**You may use a calculator for the extension task.**

Find different pairs of values for *x* and *y* which will satisfy the equation .

Answers

1. 
2. 
3. 
4. 
5. 1 or -1
6.  as  is bigger than .
7. Yes he is correct using the laws of indices, -2 + 3 + 5 = 6 and then 6 × 2 = 12.
8. The answer is not calculated by multiplying the bases and adding the indices or different bases so cannot apply the laws of indices.

The answer is .

1. Alfie is 4 and Hannah is 15.
2. Dimension of one tile = = 20 cm

200 cm ÷ 20 cm = 10 tiles per row

**Extension**

Possible answers include:

*x* = 2 and *y* = 6 *x* = 4 and *y* = 3

*x* = 8 and *y* = 2 *x* = 64 and *y* = 1

*x* = 16 and *y* = *x* = 4096 and *y* = 

*x* = 262 144 and *y* = *x* = 16 777 216 and *y* = 

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| AO1 | 1 | Use negative integer indices to represent reciprocals |  |  |  |  | AO1 | 1 | Use negative integer indices to represent reciprocals |  |  |  |
| AO1 | 2 | Using the laws of indices, know and apply |  |  |  |  | AO1 | 2 | Using the laws of indices, know and apply |  |  |  |
| AO1 | 3 | Using the laws of indices, know and apply |  |  |  |  | AO1 | 3 | Using the laws of indices, know and apply |  |  |  |
| AO1 | 4 | Calculate with negative integer powers |  |  |  |  | AO1 | 4 | Calculate with negative integer powers |  |  |  |
| AO1 | 5 | Calculate with negative integer powers and roots |  |  |  |  | AO1 | 5 | Calculate with negative integer powers and roots |  |  |  |
| AO2 | 6 | Understand the values of negative integer indices |  |  |  |  | AO2 | 6 | Understand the values of negative integer indices |  |  |  |
| AO2 | 7 | Explain how the laws of indices can be applied to simplify expressions with negative integer indices and brackets |  |  |  |  | AO2 | 7 | Explain how the laws of indices can be applied to simplify expressions with negative integer indices and brackets |  |  |  |
| AO2 | 8 | Understand when the laws of indices cannot be applied to simplify expressions with integer indices |  |  |  |  | AO2 | 8 | Understand when the laws of indices cannot be applied to simplify expressions with integer indices |  |  |  |
| AO3 | 9 | Solve a worded problem using calculations of integer indices |  |  |  |  | AO3 | 9 | Solve a worded problem using calculations of integer indices |  |  |  |
| AO3 | 10 | Solve a worded problem using calculations with roots |  |  |  |  | AO3 | 10 | Solve a worded problem using calculations with roots |  |  |  |
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