# OCR 01 Number Operations and Integers (Higher)

1. Find the cube root of 729.
2. List the prime numbers that are also factors of 28.
3. Calculate the product of 6, 8 and -10.
4. Calculate .
5. Calculate .
6. Calculate .
7. What number can be expressed as ?
8. Express 1352 as a product of its prime factors.
9. Find the Highest Common Factor and the Lowest Common Multiple of 324 and 729.
10. Put one or more pairs of brackets in the following statement to make it true.



1. Explain why it is impossible for a prime number to be a square number.
2. Shamina tries to find the Lowest Common Multiple (LCM) of 36, 80 and 150 and writes down the following.







LCM .

Explain what she has done wrong and find the correct LCM.

1. Alex says that the cube of any integer is always bigger than the square of the same integer.

Is he correct? Explain your answer.

1. Eamonn thinks of an integer. He squares it and then subtracts the starting integer and he gets an answer of 12. John says the original number can only be 4. Is he correct? Explain your answer.
2. Show that the difference between any two consecutive square numbers is always an odd number.
3. Alexander writes 355 765 500 as the product of its prime factors, as shown below.



State, with a reason, whether he is correct or not.

1. Teams in a competition are awarded 6 points for each game they win, 3 points for a draw and

-2 points for a loss. One team has played seven games and has 17 points. They have won two games. How many games has this team drawn and lost?

1. Lucia wants to fill party bags each with 1 balloon and 1 pen. She has £12.50 to spend on balloons and pens. Balloons are sold in packs of 15 that cost £1.25. Pens are sold in packs of 6 that cost £1.75. She does not want any balloons or pens left over. How many packs of balloons and how many packs of pens should she buy?
2. A carpenter has two pieces of wood, one is 144 cm long and the other is 252 cm long. He wants to cut each piece into shelves, using all of the wood. All shelves must be the same length and made from a single piece of wood. What is the maximum shelf length, and how many shelves will this give?
3. Two consecutive square numbers have a product of 900. Which two square numbers are they?

### Answers

1. 9
2. 2 and 7
3. -480
4. 2
5. 32
6. 
7. 
8. 
9.  and 

Highest Common Factor 

Lowest Common Multiple 

1. 
2. The definition of a prime number is that it only has one and itself as factors. A square number is an integer squared, so it has the integer as an additional factor and therefore cannot be a prime number.
3. The prime factors of 36 should be . She has not selected the highest power of each factor when calculating the LCM. She should have written LCM  as her answer.
4. No, Alex is not correct as  and  which are equal or  which is smaller than.
5. Using inverse operations the original value could be 4 or -3, so John is not correct.
6. Two consecutive square numbers are  and . The difference between them would be . This gives . The value of  is always even and so  is always odd.
7. No, he is not right, as 57 is not a prime number. It should be .
8. 

|  |  |
| --- | --- |
| **Possible scores in remaining five games** | **Total** |
| 3 | 3 | 3 | 3 | 3 | 15 |
| 3 | 3 | 3 | 3 | -2 | 10 |
| 3 | 3 | 3 | -2 | -2 | 5 |
| 3 | 3 | -2 | -2 | -2 | 0 |
| 3 | -2 | -2 | -2 | -2 | -5 |
| -2 | -2 | -2 | -2 | -2 | -10 |

They have drawn 3 games and lost 2.

1. To ensure no balloons or pens are left over, find the LCM of 6 and 15:
* Prime factors of 6 are 2 and 3. Prime factors of 15 are 3 and 5.
* LCM is .
* Number of packs of balloons .
* Number of packs of pens .

Check Lucia can afford these:

* Cost of balloons .
* Cost of pens .
* Total cost .
1.  and 

HCF is cm which is maximum shelf length.

4 shelves can be made from the first piece and 7 from the second to give 11 shelves in total.

1.  and the nearest square numbers to 30 are 25 and 36.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Find the cube root |  |  |  |  | AO1 | 1 | Find the cube root |  |  |  |
| AO1 | 2 | Identify prime numbers and factors |  |  |  |  | AO1 | 2 | Identify prime numbers and factors |  |  |  |
| AO1 | 3 | Calculate the product of three numbers |  |  |  |  | AO1 | 3 | Calculate the product of three numbers |  |  |  |
| AO1 | 4 | Perform calculations using priority of operations |  |  |  |  | AO1 | 4 | Perform calculations using priority of operations |  |  |  |
| AO1 | 5 | Perform calculations with roots |  |  |  |  | AO1 | 5 | Perform calculations with roots |  |  |  |
| AO1 | 6 | Perform calculations using priority of operations |  |  |  |  | AO1 | 6 | Perform calculations using priority of operations |  |  |  |
| AO1 | 7 | Use power notation in expressing a whole number as a product of its prime factors |  |  |  |  | AO1 | 7 | Use power notation in expressing a whole number as a product of its prime factors |  |  |  |
| AO1 | 8 | Use power notation in expressing a whole number as a product of its prime factors |  |  |  |  | AO1 | 8 | Use power notation in expressing a whole number as a product of its prime factors |  |  |  |
| AO1 | 9 | Find the HCF and LCM of two whole numbers |  |  |  |  | AO1 | 9 | Find the HCF and LCM of two whole numbers |  |  |  |
| AO1 | 10 | Perform calculations using priority of operations |  |  |  |  | AO1 | 10 | Perform calculations using priority of operations |  |  |  |
| AO2 | 11 | Understand and explain prime numbers and square numbers |  |  |  |  | AO2 | 11 | Understand and explain prime numbers and square numbers |  |  |  |
| AO2 | 12 | Interpret calculations |  |  |  |  | AO2 | 12 | Interpret calculations |  |  |  |
| AO2 | 13 | Understand and explain square numbers and cube numbers |  |  |  |  | AO2 | 13 | Understand and explain square numbers and cube numbers |  |  |  |
| AO2 | 14 | Use and explain inverse operations |  |  |  |  | AO2 | 14 | Use and explain inverse operations |  |  |  |
| AO2 | 15 | Present a proof with square numbers |  |  |  |  | AO2 | 15 | Present a proof with square numbers |  |  |  |
| AO3 | 16 | Evaluate an answer involving prime factors |  |  |  |  | AO3 | 16 | Evaluate an answer involving prime factors |  |  |  |
| AO3 | 17 | Solve a number problem in context |  |  |  |  | AO3 | 17 | Solve a number problem in context |  |  |  |
| AO3 | 18 | Solve a problem using LCM |  |  |  |  | AO3 | 18 | Solve a problem using LCM |  |  |  |
| AO3 | 19 | Solve a problem involving HCF |  |  |  |  | AO3 | 19 | Solve a problem involving HCF |  |  |  |
| AO3 | 20 | Solve a problem involving square numbers |  |  |  |  | AO3 | 20 | Solve a problem involving square numbers |  |  |  |