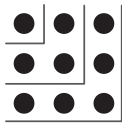


MATHLETICS

Inspiring Better Results

Special Numbers, Factors and Multiples

Student Book - Series H-2



$$1 + 3 + 5 = 9 = 3^2$$



Mathletics
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Special numbers, factors and multiples

Student Book - Series H 2

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Author of The Topics and Topic Tests: AS Kalra

Special numbers, factors and multiples

Topic 1: Odd, even, prime and composite numbers

QUESTION 1 Complete the following sentences with 'even' or 'odd'.

- a The product of an odd number and 2 is always _____.
- b The product of an even number and 2 is always _____.
- c An odd number multiplied by 1 is always _____.
- d An even number multiplied by 1 is always _____.
- e Adding 1 to an even number always gives an _____ number.
- f The sum of two odd numbers gives an _____ number.
- g Adding zero to an even number always gives an _____ number.
- h Between 4 and 6 there is only an _____ number.

QUESTION 2

- a Which is the only even prime number? _____
- b Write the even numbers between 2 and 12. _____
- c Write all the prime numbers less than 15. _____
- d All even numbers end in one of five digits. List them. _____
- e All odd numbers end in one of five digits. List them. _____

QUESTION 3 Complete the following.

- a The product of two odd numbers is an _____ number.
- b The product of two even numbers is an _____ number.
- c The square of an odd number is an _____ number.
- d The square of an even number is an _____ number.
- e The difference between two odd numbers is an _____ number.
- f The difference between two even numbers is an _____ number.

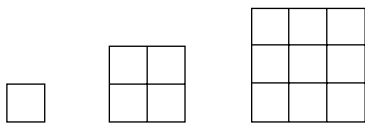
QUESTION 4 Answer the following.

- a What is the next odd number after 9999? _____
- b What is the next even number after 99 999? _____
- c The product of an odd number and an even number is an _____ number.

Special numbers, factors and multiples

Topic 2: Square numbers

QUESTION 1



- a Extend this pattern by two more terms.
b What is the 7th square number? _____
c Write the numbers shown by the above squares. _____
d Why are these called square numbers? _____

QUESTION 2

Extend the following patterns by three more lines.

a

$$1 = 1$$
$$1 + 3 = 4$$
$$1 + 3 + 5 = 9$$

b

$$1 = 1$$
$$1 + 2 + 1 = 4$$
$$1 + 2 + 3 + 2 + 1 = 9$$

QUESTION 3

Write each of the following in index form.

- a $2 \times 2 =$ _____ b $85 \times 85 =$ _____ c $16 \times 16 =$ _____
d $12 \times 12 =$ _____ e $59 \times 59 =$ _____ f $5 \times 5 =$ _____
g $48 \times 48 =$ _____ h $3 \times 3 =$ _____ i $68 \times 68 =$ _____
j $31 \times 31 =$ _____ k $14 \times 14 =$ _____ l $103 \times 103 =$ _____

QUESTION 4

Write each of the following in expanded form.

- a $4^2 =$ _____ b $20^2 =$ _____ c $92^2 =$ _____
d $82^2 =$ _____ e $8^2 =$ _____ f $7^2 =$ _____
g $9^2 =$ _____ h $5^2 =$ _____ i $50^2 =$ _____
j $11^2 =$ _____ k $48^2 =$ _____ l $31^2 =$ _____

QUESTION 5

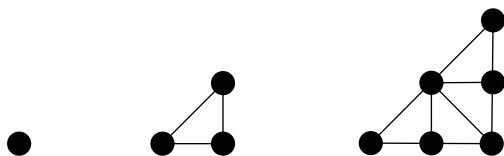
- a Write the square number that we get when the first 8 odd numbers are added.

- b Square numbers can be written as the sum of _____ numbers.

Special numbers, factors and multiples

Topic 3: Triangular numbers

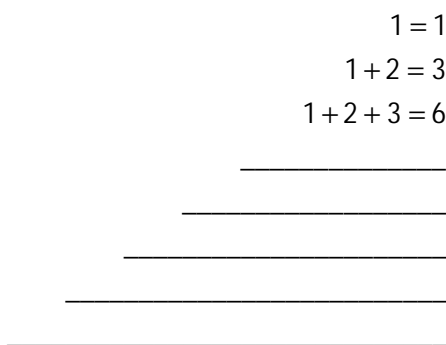
QUESTION 1



- a Extend the pattern by two more terms.
- b What is the 7th triangular number? _____
- c Write the numbers shown by the above triangles. _____
- d Why are these called triangular numbers? _____

QUESTION 2

Extend the following pattern by 5 more lines.



QUESTION 3

- a List the first ten triangular numbers.

- b Add the first two triangular numbers. What kind of number do you get?

- c Add any two consecutive triangular numbers. What kind of number do you get?

- d Find a number that is both a triangular number and a square number.

QUESTION 4

- a Which numbers are triangular between 10 and 40? _____
- b A dot diagram for the 3rd triangular number is drawn for you in Question 1. Draw a similar dot diagram for another triangular number.

Special numbers, factors and multiples

Topic 4: Factors

QUESTION 1

- a Is 1 a factor of 10? _____
- b Is 2 a factor of 10? _____
- c Is 5 a factor of 10? _____
- d Is 10 a factor of 10? _____
- e How many factors of 10 are there? List them. _____

QUESTION 2 Find the factors of the following numbers.

- a 16 _____
- b 108 _____
- c 200 _____
- d 24 _____
- e 72 _____
- f 256 _____
- g 225 _____
- h 500 _____

QUESTION 3 Find the value of the missing factor.

- a $5 \times \underline{\hspace{2cm}} = 75$
- b $\underline{\hspace{2cm}} \times 5 = 85$
- c $3 \times \underline{\hspace{2cm}} = 57$
- d $3 \times \underline{\hspace{2cm}} = 84$
- e $\underline{\hspace{2cm}} \times 2 = 52$
- f $\underline{\hspace{2cm}} \times 6 = 54$
- g $13 \times \underline{\hspace{2cm}} = 65$
- h $\underline{\hspace{2cm}} \times 15 = 60$
- i $9 \times \underline{\hspace{2cm}} = 108$
- j $4 \times \underline{\hspace{2cm}} = 36$
- k $\underline{\hspace{2cm}} \times 3 = 39$
- l $\underline{\hspace{2cm}} \times 7 = 133$

QUESTION 4

- a What is a prime number? _____
- b How many factors does a prime number have? _____
- c What number is a factor of every number? _____
- d Write all the prime numbers between 10 and 30. _____

QUESTION 5 Use a factor tree to factorise each of the following.

- a 27
- b 63
- c 108

Special numbers, factors and multiples

Topic 5: The highest common factor (HCF)

QUESTION 1 Find the factors for each pair of numbers and circle the common factors.

- a 8 _____ b 12 _____
12 _____ 16 _____

QUESTION 2 Find the factors for each set of numbers and circle the common factors.

- a 8 _____ b 12 _____
10 _____ 16 _____
12 _____ 18 _____

QUESTION 3

- a List all the factors of 12.

- b List all the factors of 18.

- c List the common factors of 12 and 18.

- d What is the highest common factor (HCF) of 12 and 18? _____

QUESTION 4 Find the highest common factor (HCF) of the following.

- a 12 and 30

- b 21 and 84

- c 4, 8 and 16

- d 14, 21 and 28

Special numbers, factors and multiples

Topic 6: Multiples

QUESTION 1 Give the first three multiples of each of the following numbers.

- a 4 _____ b 5 _____ c 10 _____
d 13 _____ e 11 _____ f 14 _____
g 15 _____ h 25 _____ i 20 _____

QUESTION 2

- a List the first seven multiples of 6. _____
b List the first seven multiples of 4. _____
c What are the common multiples of 4 and 6? _____
d What is the lowest common multiple (LCM)? _____

QUESTION 3

- a Write any six multiples of 5. _____
b List all the multiples of 7 between 10 and 60. _____
c List all the multiples of 5 up to and including 80.

QUESTION 4 List the first five multiples of the following numbers.

- a 2 _____ b 3 _____
c 4 _____ d 8 _____
e 6 _____ f 9 _____
g 10 _____ h 12 _____

QUESTION 5

- a Are all whole numbers multiples of 1? _____
b Are all even whole numbers multiples of 2? _____
c Write the smallest multiple of any whole number. _____

Special numbers, factors and multiples

Topic 7: Lowest common multiple (LCM)

QUESTION 1

- a List the first seven multiples of 6. _____
- b List the first seven multiples of 9. _____
- c List the common multiples of 6 and 9. _____
- d What is the lowest common multiple (LCM) of 6 and 9? _____

QUESTION 2 List the first eight multiples for each set of numbers and circle the common multiples.

a 6 and 8

b 2 and 12

c 3, 4 and 6

d 6, 8 and 12

QUESTION 3 List the first five multiples for each set of numbers, circle the common multiples and find the LCM.

a 12 and 16

LCM = _____

b 15 and 20

LCM = _____

c 4, 6 and 12

LCM = _____

d 6, 12 and 24

LCM = _____

Special numbers, factors and multiples

Topic 8: Index notation, square roots and cube roots

QUESTION 1 Write each of the following in expanded form.

- a 8^2 _____ b 9^3 _____
c 5^3 _____ d 2^6 _____
e 4^5 _____ f 7^3 _____

QUESTION 2 Write each of the following in index form.

- a 3 3 3 3 3 3 _____ b 7 7 7 7 7 7 7 7 _____
c 15 15 15 15 _____ d 21 21 21 21 21 _____
e 81 81 81 _____ f 36 36 36 36 _____

QUESTION 3 Complete the following table.

| | Index form | Base | Index | Basic numeral |
|---|------------|------|-------|---------------|
| a | 12^2 | | | |
| b | 9^3 | | | |
| c | 3^5 | | | |
| d | 16^2 | | | |
| e | 2^7 | | | |

QUESTION 4 Complete the following.

- a If $3^2 = 9$ then $\sqrt{9} =$ _____ b If $5^2 = 25$ then $\sqrt{25} =$ _____
c If $7^2 = 49$ then $\sqrt{49} =$ _____ d If $15^2 = 225$ then $\sqrt{225} =$ _____
e If $4^3 = 64$ then $\sqrt[3]{64} =$ _____ f If $6^3 = 216$ then $\sqrt[3]{216} =$ _____

QUESTION 5 Evaluate the following.

- a $\sqrt{9} =$ _____ b $\sqrt{144} =$ _____ c $\sqrt[3]{8} =$ _____ d $\sqrt{196} =$ _____
e $\sqrt{121} =$ _____ f $\sqrt{256} =$ _____ g $\sqrt{169} =$ _____ h $\sqrt[3]{1000} =$ _____
i $\sqrt{400} =$ _____ j $\sqrt{225} =$ _____ k $\sqrt[3]{343} =$ _____ l $\sqrt[3]{729} =$ _____
m $(\sqrt{8})^2 =$ _____ n $(\sqrt{16})^2 =$ _____ o $(\sqrt[3]{27})^3 =$ _____ p $(\sqrt[3]{64})^3 =$ _____

Special numbers, factors and multiples

Topic 9: Problem solving with special numbers, factors and multiples

- 1** Is 14 a factor of 56? _____
- 2** 9 is one factor of 72. What is the other factor? _____
- 3** Write all the factors of 24. _____
- 4** Are there any even prime numbers? If so, list them.

- 5** List all one-digit prime numbers.

- 6** What are the common factors of 24 and 32?

- 7** Find the highest common factor (HCF) of 18 and 42.

- 8** Write the first three common multiples of 8 and 12.

- 9** Find the lowest common multiple (LCM) of 8 and 12.

- 10** Find the first five square numbers.

- 11** Find the first five triangular numbers.

- 12** Find the first two numbers which are both triangular and square.

- 13** Find all the multiples of 2 between 15 and 35.

- 14** Find the lowest common multiple (LCM) of 6, 9 and 12.

- 15** Find all the composite numbers between 10 and 40.

Special numbers, factors and multiples

Topic Test

PART A

Instructions This part consists of 12 multiple-choice questions
Each question is worth 1 mark
Fill in only ONE CIRCLE for each question
Calculators are NOT allowed

Time allowed: 15 minutes

Total marks = 12

| | | | | Marks | | |
|-----------|---|----------------------------|----------------------------|----------------------------|----------------------------|--------------------------------|
| 1 | The square root of 6^2 is | <input type="radio"/> A 3 | <input type="radio"/> B 4 | <input type="radio"/> C 5 | <input type="radio"/> D 6 | <input type="text" value="1"/> |
| 2 | The sum of the first three triangular numbers is | <input type="radio"/> A 10 | <input type="radio"/> B 18 | <input type="radio"/> C 24 | <input type="radio"/> D 30 | <input type="text" value="1"/> |
| 3 | The sum of the first three square numbers is | <input type="radio"/> A 14 | <input type="radio"/> B 18 | <input type="radio"/> C 24 | <input type="radio"/> D 30 | <input type="text" value="1"/> |
| 4 | The sum of the first five prime numbers is | <input type="radio"/> A 14 | <input type="radio"/> B 18 | <input type="radio"/> C 28 | <input type="radio"/> D 30 | <input type="text" value="1"/> |
| 5 | The sum of the first five prime numbers greater than 3 is | <input type="radio"/> A 26 | <input type="radio"/> B 36 | <input type="radio"/> C 46 | <input type="radio"/> D 53 | <input type="text" value="1"/> |
| 6 | The next prime number greater than 13 is | <input type="radio"/> A 16 | <input type="radio"/> B 17 | <input type="radio"/> C 18 | <input type="radio"/> D 19 | <input type="text" value="1"/> |
| 7 | The number of factors a prime number has is | <input type="radio"/> A 1 | <input type="radio"/> B 2 | <input type="radio"/> C 3 | <input type="radio"/> D 4 | <input type="text" value="1"/> |
| 8 | The lowest common multiple of 6 and 8 is | <input type="radio"/> A 12 | <input type="radio"/> B 24 | <input type="radio"/> C 36 | <input type="radio"/> D 48 | <input type="text" value="1"/> |
| 9 | If 7 is one factor of 84, the other factor is | <input type="radio"/> A 6 | <input type="radio"/> B 12 | <input type="radio"/> C 24 | <input type="radio"/> D 42 | <input type="text" value="1"/> |
| 10 | The sum of two consecutive odd numbers is 24. The smaller number is | <input type="radio"/> A 5 | <input type="radio"/> B 7 | <input type="radio"/> C 9 | <input type="radio"/> D 11 | <input type="text" value="1"/> |

Special numbers, factors and multiples

Topic Test

PART A continued

| | | Marks |
|--|---|-------|
| 11 | The sum of three consecutive even numbers is 30. The smaller number is Ⓐ 4 Ⓑ 6 Ⓒ 8 Ⓓ 10 | 1 |
| 12 | The sum of two consecutive triangular numbers is Ⓐ a prime number Ⓑ an odd number Ⓒ an even number Ⓓ a square number | 1 |
| 13 | The only even prime number is Ⓐ 2 Ⓑ 4 Ⓒ 6 Ⓓ 8 | 1 |
| 14 | The first two numbers that are both triangular and square are Ⓐ 1 and 4 Ⓑ 1 and 9 Ⓒ 1 and 16 Ⓓ 1 and 36 | 1 |
| 15 | The sum of all one-digit odd numbers is Ⓐ a triangular number Ⓑ a square number Ⓒ a prime number Ⓓ an even number | 1 |
| Total marks achieved for PART A | | 15 |

Special numbers, factors and multiples

Topic Test

PART B

Instructions This part consists of 15 questions
Each question is worth 1 mark
Write answers in the answers-only column

Time allowed: 20 minutes

Total marks = 15

| Questions | Answers only | Marks |
|--|--------------|-------|
| 1 List the first four odd numbers. | _____ | 1 |
| 2 How do you know if a number is even? | _____ | 1 |
| 3 How many even prime numbers are there? | _____ | 1 |
| 4 Write the next prime number greater than 59. | _____ | 1 |
| 5 What is the 8th square number? | _____ | 1 |
| 6 Write 9^5 in expanded form. | _____ | 1 |
| 7 List the first six triangular numbers. | _____ | 1 |
| 8 Write the next three numbers greater than 20 that have only two factors. | _____ | 1 |
| 9 Which of the following numbers are multiples of 3? 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26 | _____ | 1 |
| 10 List the common factors of 24 and 36. | _____ | 1 |
| 11 Write $9 \ 9 \ 9 \ 9 \ 9 \ 9 \ 9 \ 9 \ 9$ in index form. | _____ | 1 |
| 12 If $9^3 = 729$ then find $\sqrt[3]{729}$ | _____ | 1 |
| 13 Write the product of the third triangular number and the fourth square number. | _____ | 1 |
| 14 Find the sum of the first seven square numbers. | _____ | 1 |
| 15 Find the sum of the first eight triangular numbers. | _____ | 1 |

Total marks achieved for PART B

15

