

Primary Number System

Question Paper, Set 03

Time: 1 hour 30 minutes

Maximum marks: 50

Name: _____ Class: _____ Date: _____

1. Answer all 20 questions. The marks for each question are shown in brackets.
2. Show your working for the 2, 3 and 5 mark questions.
3. The key sheet and worked solutions are at the end of this paper.

1. Write the next three natural numbers after 299. [1 mark]
2. Write the odd numbers between 50 and 60. [1 mark]
3. Write the multiples of 16 that are less than 120. [3 marks]
4. Find all the factors of 44 by writing it as a product of two numbers. [2 marks]
5. Find all the factors of 108. How many factors does it have? [5 marks]
6. In $9p$, which is the variable and which is the constant? [1 mark]
7. Simplify $1 \times m$. [1 mark]
8. Simplify: (i) $4p + 11p$ (ii) $15p - 6p$ [2 marks]
9. Write in exponential form: (i) $t \times t$ (ii) $t \times t \times t \times t \times t$ [2 marks]
10. Find the value of 48×48 . [2 marks]
11. Find 2^{11} , showing the steps. [3 marks]
12. Express 15625 in the exponential form (i) with base 5 (ii) with base 25. [5 marks]
13. Is 90316 divisible by 2? Give reason. [1 mark]
14. Is 236145 divisible by 3? Give reason. [2 marks]
15. Find the smallest number greater than 850 that is divisible by 3. [3 marks]
16. Is 31708 divisible by 4? Give reason. [2 marks]
17. Is 91530 divisible by 5? Give reason. [1 mark]
18. Is 9826 divisible by 6? Give reason. [3 marks]
19. Using the divisibility rule for 7, check whether 441, 602 and 834 are divisible by 7. [5 marks]
20. Check whether 52614 is divisible by 2, 3, 4, 5 and 6. [5 marks]

Key sheet

Q	Answer
1	300, 301, 302
2	51, 53, 55, 57, 59
3	16, 32, 48, 64, 80, 96, 112
4	1, 2, 4, 11, 22, 44
5	1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108 (12 divisors)
6	Variable: p ; constant: 9
7	m
8	(i) $15p$ (ii) $9p$
9	(i) t^2 (ii) t^5
10	2304
11	2048
12	(i) 5^6 (ii) 25^3
13	Yes, the unit digit is 6
14	Yes, the sum of the digits is 21
15	852
16	Yes, the last two digits 08 are divisible by 4
17	Yes, the unit digit is 0
18	No, it is not divisible by 3
19	441 and 602 are divisible by 7; 834 is not.
20	Divisible by 2, 3 and 6; not by 4, 5

Solutions

1. Write the next three natural numbers after 299. [1]

Natural numbers are the counting numbers 1, 2, 3, 4, ...; each is 1 more than the one before.

$$299 + 1 = 300, 300 + 1 = 301, 301 + 1 = 302$$

300, 301, 302

Ans: 300, 301, 302

2. Write the odd numbers between 50 and 60. [1]

Odd numbers give remainder 1 when divided by 2: 1, 3, 5, 7, ...

Between 50 and 60: 51, 53, 55, 57, 59

Ans: 51, 53, 55, 57, 59

3. Write the multiples of 16 that are less than 120. [3]

Multiples of 16: $16 \times 1, 16 \times 2, 16 \times 3, \dots$

$$16 \times 1 = 16, 16 \times 2 = 32, 16 \times 3 = 48, 16 \times 4 = 64$$

$$16 \times 5 = 80, 16 \times 6 = 96, 16 \times 7 = 112$$

$$16 \times 8 = 128 \text{ is not less than } 120$$

Multiples of 16 less than 120: 16, 32, 48, 64, 80, 96, 112

Ans: 16, 32, 48, 64, 80, 96, 112

4. Find all the factors of 44 by writing it as a product of two numbers. [2]

$$44 = 1 \times 44$$

$$= 2 \times 22$$

$$= 4 \times 11$$

$\therefore$ Factors of 44 are 1, 2, 4, 11, 22, 44

Ans: 1, 2, 4, 11, 22, 44

5. Find all the factors of 108. How many factors does it have? [5]

$$108 = 1 \times 108$$

$$= 2 \times 54$$

$$= 3 \times 36$$

$$= 4 \times 27$$

$$= 6 \times 18$$

$$= 9 \times 12$$

5, 7, 8, 10 do not divide 108 (they leave a remainder).

$\therefore$ Divisors of 108 are 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108

Number of divisors = 12

Ans: 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108 (12 divisors)

6. In $9p$, which is the variable and which is the constant? [1]

$$9p = 9 \times p$$

p can take various values, so p is the variable; 9 is fixed, so 9 is the constant.

Ans: Variable: p ; constant: 9

7. Simplify $1 \times m$. [1]

As $1 \times a = a$:

$$1 \times m = m$$

Ans: m

8. Simplify: (i) $4p + 11p$ (ii) $15p - 6p$ [2]

$$(i) 4p + 11p = (4 + 11)p = 15p$$

$$(ii) 15p - 6p = (15 - 6)p = 9p$$

Ans: (i) $15p$ (ii) $9p$

9. Write in exponential form: (i) $t \times t$ (ii) $t \times t \times t \times t \times t$ [2]

$$(i) t \times t = t^2$$

$$(ii) t \times t \times t \times t \times t = t^5$$

Ans: (i) t^2 (ii) t^5

10. Find the value of 48×48 . [2]

$$48 \times 8 = 384$$

$$48 \times 4 = 192, \text{ written one place to the left: } 1920$$

$$384 + 1920 = 2304$$

$$\therefore 48 \times 48 = 2304$$

Ans: 2304

11. Find 2^{11} , showing the steps. [3]

$$2^{11} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$2 \times 2 = 4, 4 \times 2 = 8, 8 \times 2 = 16$$

$$16 \times 2 = 32, 32 \times 2 = 64, 64 \times 2 = 128$$

$$128 \times 2 = 256, 256 \times 2 = 512, 512 \times 2 = 1024$$

$$1024 \times 2 = 2048$$

$$\therefore 2^{11} = 2048$$

Ans: 2048

12. Express 15625 in the exponential form (i) with base 5 (ii) with base 25. [5]

(i) Divide by 5 again and again:

$$15625 \div 5 = 3125, 3125 \div 5 = 625, 625 \div 5 = 125$$

$$125 \div 5 = 25, 25 \div 5 = 5$$

$$15625 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 5^6$$

(ii) Divide by 25 again and again:

$$15625 \div 25 = 625, 625 \div 25 = 25$$

$$15625 = 25 \times 25 \times 25 = 25^3$$

Ans: (i) 5^6 (ii) 25^3

13. Is 90316 divisible by 2? Give reason. [1]

A number is divisible by 2 if the digit at its unit place is 0, 2, 4, 6 or 8.

The digit at the unit place of 90316 is 6, so 90316 is divisible by 2.

Ans: Yes, the unit digit is 6

14. Is 236145 divisible by 3? Give reason. [2]

A number is divisible by 3 if the sum of all its digits is divisible by 3.

Sum of the digits of 236145: $2 + 3 + 6 + 1 + 4 + 5 = 21$

21 is divisible by 3 ($21 = 3 \times 7$), so 236145 is divisible by 3.

Ans: Yes, the sum of the digits is 21

15. Find the smallest number greater than 850 that is divisible by 3. [3]

A number is divisible by 3 if the sum of all its digits is divisible by 3.

851: $8 + 5 + 1 = 14$, not divisible by 3

852: $8 + 5 + 2 = 15$, divisible by 3

$\therefore$ The smallest number greater than 850 that is divisible by 3 is 852.

Ans: 852

16. Is 31708 divisible by 4? Give reason. [2]

A number is divisible by 4 if its last two digits together are divisible by 4.

Last two digits of 31708 together: 08; $8 = 4 \times 2$, so 31708 is divisible by 4.

Ans: Yes, the last two digits 08 are divisible by 4

17. Is 91530 divisible by 5? Give reason. [1]

A number is divisible by 5 if the digit at its unit place is 0 or 5.

The digit at the unit place of 91530 is 0, so 91530 is divisible by 5.

Ans: Yes, the unit digit is 0

18. Is 9826 divisible by 6? Give reason. [3]

A number is divisible by 6 if it is divisible by both 2 and 3.

The digit at the unit place of 9826 is 6, so 9826 is divisible by 2.

Sum of the digits of 9826: $9 + 8 + 2 + 6 = 25$

25 is not divisible by 3 ($25 = 3 \times 8 + 1$), so 9826 is not divisible by 3.

$\therefore$ 9826 is not divisible by 6.

Ans: No, it is not divisible by 3

19. Using the divisibility rule for 7, check whether 441, 602 and 834 are divisible by 7. [5]

A number is divisible by 7 if the remaining part minus twice the unit digit is a multiple of 7 (or 0).

441: $44 - 1(2) = 44 - 2 = 42$; $42 = 7 \times 6$, a multiple of 7, so 441 is divisible by 7.

602: $60 - 2(2) = 60 - 4 = 56$; $56 = 7 \times 8$, a multiple of 7, so 602 is divisible by 7.

834: $83 - 4(2) = 83 - 8 = 75$; $75 = 7 \times 10 + 5$, not a multiple of 7, so 834 is not divisible by 7.

Ans: 441 and 602 are divisible by 7; 834 is not.

20. Check whether 52614 is divisible by 2, 3, 4, 5 and 6. [5]

By 2: The digit at the unit place of 52614 is 4, so 52614 is divisible by 2.

By 3: Sum of the digits of 52614: $5 + 2 + 6 + 1 + 4 = 18$; 18 is divisible by 3 ($18 = 3 \times 6$), so 52614 is divisible by 3.

By 4: Last two digits of 52614 together: 14; $14 = 4 \times 3 + 2$, so 52614 is not divisible by 4.

By 5: The digit at the unit place of 52614 is 4, so 52614 is not divisible by 5.

By 6: 52614 is divisible by both 2 and 3, so it is divisible by 6.

$\therefore$ 52614 is divisible by 2, 3 and 6.

Ans: Divisible by 2, 3 and 6; not by 4, 5
