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CLASS 8 MATHS NCERT SOLUTIONS

NCERT Solutions for Class 8 Maths Chapter 5: Number Play – Free PDF Download

Chapter 5 — Number Play — explores number theory through puzzles: parity of algebraic expressions, sums of consecutive numbers, divisibility rules (9, 11, 18, 44), digital roots, remainder/modular reasoning, and cryptarithms (letter-for-digit puzzles). The chapter has four Figure It Out blocks totalling 32 quest...

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NCERT Solutions for Class 8 Maths Chapter 5: Number Play

Figure It Out — Section 5.1 (8 Questions)

1. The sum of four consecutive numbers is 34. What are they?
7, 8, 9, 10.

2. If p is the greatest of five consecutive numbers, describe the other four in terms of p.
$p-1$, $p-2$, $p-3$, $p-4$.

3. Always/Sometimes/Never true, with algebraic justification: (i) sum of two even numbers is a multiple of 3 (ii) not divisible by 18 ⍰ not divisible by 9 (iii) two numbers not divisible by 6 ⍰ their sum not divisible by 6 (iv) sum of a multiple of 6 and a multiple of 9 is a multiple of 3 (v) sum of a multiple of 6 and a multiple of 3 is a multiple of 9.
(i) Sometimes (e.g. 2+4=6 yes, 2+6=8 no). (ii) Sometimes (30 confirms, 27 refutes). (iii) Sometimes (9+11=20 no, 8+10=18 yes). (iv) **Always true** ($6x+9y=3(2x+3y)$). (v) Sometimes (18+9=27 yes, 12+9=21 no).

4. Find numbers leaving remainder 2 when divided by both 3 and 4. Give a general expression.
$12n+2$ (e.g. 14, 26, 38…).

5. Pebble riddle: remainder 1 mod 3, remainder 1 mod 5, remainder 0 mod 7, fewer than 100.
91.

6. Tathagat claims: any three numbers leaving remainder 2 mod 6, summed, always give a multiple of 6. True?
Yes, always true — $(6a+2)+(6b+2)+(6c+2)=6(a+b+c+1)$.

7. 661÷7 leaves remainder 3, 4779÷7 leaves remainder 5. Without dividing, find the remainder of (i) their sum (ii) their difference.
(i) remainder **1** (3+5=8=7+1). (ii) remainder **2** (5−3=2).

8. Smallest number leaving remainder 2 mod 3, 3 mod 4, 4 mod 5.
Each remainder is 1 less than its divisor, so the answer is LCM(3,4,5)−1 = **59**.

Figure It Out — Section 5.2 (4 Questions)

1. Without dividing, check divisibility by 9: 123, 405, 8888, 93547, 358095.
Only **405** is divisible by 9 (digit sums 6, 9, 32, 28, 30 — only 9 works).

2. Smallest multiple of 9 with no odd digits.
288 (digits 2,8,8 sum to 18).

3. Multiple of 9 closest to 6000.

6003 (667×9).

4. How many multiples of 9 lie between 4300 and 4400?
11.

Figure It Out — Section 5.3, Digital Roots (4 Questions)

1. An 8-digit number has digital root 5. What is the digital root of that number + 10?
6.

2. Start at any number and repeatedly add 11 — what pattern do the digital roots follow?
The digital roots cycle through all values 1–9, advancing by 2 each time (mod 9) — e.g. 1,3,5,7,9,2,4,6,8,1,3…

3. Digital root of 9a+36b+13?
= 9(a+4b+1)+4, so the digital root is always **4**.

4. Is there a pattern between (i) parity and digital root, (ii) digital root and remainder mod 3 or mod 9?
(i) No consistent pattern. (ii) Digital roots 1,4,7 → remainder 1 mod 3; 2,5,8 → remainder 2 mod 3; 3,6,9 → remainder 0 mod 3. For mod 9: digital root = remainder (except digital root 9 → remainder 0).

Figure It Out — Section 5.4, Cryptarithms & More (16 Questions)

1. If 31z5 is a multiple of 9, find z. Why two answers?
z=0 or z=9 — because the digit sum without z is already 9, so both 9 and the next multiple (18) work.

2. Snehal claims: (12n+8) + (12m−4) is always a multiple of 8. True?
False — the sum simplifies to 12(n+m)+4, which is not generally a multiple of 8.

3. When is the sum of two multiples of 3 also a multiple of 6?
3m+3n=3(m+n); it's a multiple of 6 only when **(m+n) is even**.

4. Sreelatha claims a multiple of 9, reversed, is still a multiple of 9. True? Any other shuffles?
True — digit sum is unchanged by reversal. **Yes**, any digit rearrangement works, since digit sum is invariant.

5. If 48a23b is a multiple of 18, list all (a,b) pairs.
(1,0), (8,2), (6,4), (4,6), (2,8) — b even (div by 2) and 17+a+b a multiple of 9 (div by 9).

6. If 3p7q8 is a multiple of 44, list all (p,q) pairs.
(7,0), (5,2), (3,4), (1,6) — from divisibility by 4 (automatic here) and by 11 (p+q=7).

7. Find three consecutive numbers where the 1st is a multiple of 2, 2nd of 3, 3rd of 4. More such triples?
2, 3, 4; the pattern repeats every LCM(2,3,4)=12, so next is **14, 15, 16**, then 26, 27, 28, and so on.

8. Write five multiples of 36 between 45,000 and 47,000.
45036, 45072, 45108, 45144, 45180 (each 36 apart).

9. The middle of 5 consecutive even numbers is 5p. Express the other four.
5p−4, 5p−2, 5p+2, 5p+4.

10. Write a 6-digit number divisible by 15 that becomes divisible by 6 when reversed.
Example family: **200025, 200055, 202005**, etc. (last digit 5 for div-by-15, first digit even so the reversed number is even, digit sum a multiple of 3).

11. Deepak claims only some multiples of 11, when doubled, stay multiples of 11. True?
False — $2 \times (11k) = 11(2k)$ is always a multiple of 11, for every multiple of 11, not just some.

12. Always/Sometimes/Never true: (i) product of a multiple of 6 and a multiple of 3 is a multiple of 9 (ii) sum of 3 consecutive even numbers is divisible by 6 (iii) if abcdef is a multiple of 6, so is badcef (iv) $8(7b-3)-4(11b+1)$ is a multiple of 12.
(i) **Always true** ($6x \cdot 3y = 18xy$). (ii) **Always true**. (iii) **Always true** (digit sum and last digit unchanged by swapping non-last digits). (iv) **Never true** — simplifies to $12b-28 \equiv 8 \pmod{12}$ always.

13. When is the sum of any 3 chosen numbers divisible by 3?
When all three leave the same remainder mod 3, or their three remainders are 0, 1, 2 in some combination summing to a multiple of 3.

14. Is the product of 2, 3, 4, 5 consecutive integers always a multiple of 2, 6, 24, 120 respectively?
Yes to all — 2 consecutive: always ÷2; 3 consecutive: always ÷6; 4 consecutive: always ÷24; 5 consecutive: always ÷120.

15. Solve the cryptarithms: (i) EF × E = GGG (ii) WOW × 5 = MEOW.
(i) **E=3, F=7, G=1** ($37 \times 3 = 111$). (ii) **W=5, O=7, M=2, E=8** ($575 \times 5 = 2875$).

16. Which Venn diagram shows the relationship between multiples of 4, 8 and 32?
The fully nested diagram: **multiples of 32 ⊂ multiples of 8 ⊂ multiples of 4**.

Selected Math Talk & Try This Highlights

Shortcut for divisibility by 11 (alternating digit-sum difference).
A number is divisible by 11 if the difference between the sum of digits in odd positions and even positions is 0 or a multiple of 11.

Which of $2a+2b$, $3g+5h$, $4m+2n$, $2u-4v$, $13k-5k$, $6m-3n$, x^2+2, b^2+1, $4k \times 3j$ are always even?
Always even: $2a+2b$, $4m+2n$, $2u-4v$, $13k-5k$ ($=8k$), $4k \times 3j$ ($=12kj$). **Not always even:** $3g+5h$, $6m-3n$, x^2+2, b^2+1.

Why This Chapter Matters

This chapter builds algebraic proof skills (proving 'always/sometimes/never true' claims rather than just checking examples) and divisibility reasoning that underlie later algebra, number theory, and competitive-exam number puzzles.

Class 8 Mathematics Chapter 5 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the Class 8 Mathematics Chapter 5 Extra Questions and Class 8 Mathematics Chapter 5 Revision Notes for quick revision and extra practice.