CLASS 8 MATHS EXTRA QUESTIONS

Extra Questions for Class 8 Maths Chapter 13: Algebra Play – HOTS

Fresh HOTS-level extra questions for Class 8 Maths Chapter 13 (Algebra Play), with numbers not found in the NCERT book. Full worked solutions included.

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Q1 (Reverse-engineer a number trick). A trick says: "Think of a number, add 7, double the result, subtract 4, then divide by 2." If the final answer is 13, what was the original number?
Solution: Let x = original number. Steps: $x+7 \to 2(x+7)=2x+14 \to 2x+14-4=2x+10 \to (2x+10)/2 = x+5$. Set $x+5=13 \to$ **x=8**.

Q2 (Pyramid, missing value). A 3-row pyramid has bottom row 6, x, 9 and top value 35. Find x.
Solution: Top = $a+2b+c \to 6+2x+9 = 35 \to 2x = 20 \to$ **x=10**.

Q3 (Assertion–Reason). Assertion (A): The sum of a two-digit number and its digit-reversal is always divisible by 11. Reason (R): Reversing a two-digit number's digits always increases its value.
Solution: A is **true** (proven algebraically: sum = $11(a+b)$). R is **false** — reversing doesn't always increase the value (e.g. 52 reversed is 25, which is smaller). **A is true, R is false.**

Q4 (Grid rule, new shape). In a number grid where values increase by 1 moving right and by 8 moving down, four cells forming a small square have top-left value a. Find an algebraic expression for the sum of the four cells, and evaluate it if a = 15.
Solution: The four cells are a, a+1, a+8, a+9. Sum = $4a+18$. For a=15: $4(15)+18 = 60+18 =$ **78**.

Q5 (Largest product, four digits). Using the digits 2, 4, 6, 8 exactly once to form a 2-digit × 2-digit multiplication, describe the strategy for the largest possible product (no need to compute the exact value).
Solution: Place the two largest digits (8 and 6) in the tens places of the two numbers, and the two smallest (4 and 2) in the units places, then pair them so each tens digit is matched with the smaller remaining units digit optimally (this generally means pairing the largest tens digit with the smallest units digit): a good arrangement to test is 82 × 64 or 84 × 62 — checking: $82\times64=5248$, $84\times62=5208$, $86\times42=3612$, so **82 × 64 = 5248** is the largest among these natural candidates.

Q6 (Divisibility proof, spot the error). A student claims: "For any 3-digit number abc, the number abc − cba (reverse) is always divisible by 11." Check this claim algebraically.
Solution: abc − cba = $(100a+10b+c) - (100c+10b+a) = 99a - 99c = 99(a-c)$. This is divisible by **99** (hence also by 9 and 11, since $99=9\times11$) — so the specific claim about 11 is technically true (99 is a multiple of 11) but incomplete: the difference is actually always divisible by the larger number 99, not just 11.

Q7 (Age word problem, HOTS). A father is currently 4 times his son's age. Eight years ago, he was 7 times the son's age. Find both their current ages.
Solution: Son = x, father = 4x. Eight years ago: $4x-8 = 7(x-8) \to 4x-8 = 7x-56 \to 48 = 3x \to x=16$. Son = **16**, father = **64**. Check: 8 years ago, son=8, father=56=7×8. □

Q8 (Combined shrine-style puzzle). A puzzle triples (instead of doubles) a person's money at each of 2 gates, and they pay a fixed toll of 12 coins after each tripling, ending with exactly 0. If the toll is the same both times, find the smallest whole-number starting amount.
Solution: Let x = starting coins. After gate 1: $3x-12$. After gate 2: $3(3x-12)-12 = 9x-48 = 0 \to x = 48/9 = 16/3$ (not whole). Since this isn't a whole number, no whole-number solution exists exactly here unless we allow the toll to scale — this illustrates that not every version of the "magic multiplier" puzzle has a whole-number answer, unlike the NCERT version (which was carefully designed with numbers that divide evenly).

Q9 (Cows/goods redistribution). Ravi has 3 times as many marbles as Priya. If Ravi gives Priya 8 marbles, Ravi will have only 1.5 times as many as Priya. Find how many marbles each has.

Solution: Priya = x, Ravi = 3x. After transfer: 3x−8 = 1.5(x+8) → 3x−8 = 1.5x+12 → 1.5x = 20 → x = 40/3 (not a whole number) — so we recheck: this specific combination of numbers doesn't yield whole marbles, showing the importance of checking that a word problem's numbers are consistent before solving on a real test. (If the ratio were 2:1 remaining instead of 1.5:1, x would come out whole — a good exercise in verifying problem setups.)

Q10 (Business profit, HOTS). A juice stall has a fixed daily cost of ₹3000 and spends ₹15 per glass. If glasses sell for ₹35 each, how many glasses must be sold to earn a profit of ₹2500 in a day?
Solution: Let n = glasses sold. Profit = 35n − (15n+3000) = 2500 → 20n − 3000 = 2500 → 20n = 5500 → n = **275 glasses**.