

ALGEBRA 1
TEAM ROUND

- Plant City '01

1. The sum of two numbers is 100. When the greater number is divided by the lesser, the partial quotient is 7 and the remainder is 4. Find the absolute value of the difference of the numbers. 76

2. Bill owns a vacant lot that is 32 m wide and 40 m long. He makes a rectangular basketball court in the middle by subtracting equal amounts from the length and width. The area of the court is 560 m^2 . How far from the edge of the lot is an edge of the court? (Note—we are looking for the shortest possible distance.) 6 m

3. The sum of the digits of a three-digit number is nine. The units digit is three times the hundreds digit and is seven less than twice the tens digit. Find the number. 153

4. What is the units digit of the simplified form of 1987^{1987} . 3

5. Find the sum of all possible solutions of the equation $\frac{1}{x^2 - x} = \frac{1}{2x - 2}$

6. Place the numbers 1, 2, 3, and 4 in the boxes (without repetition) so that the smallest possible positive difference is obtained. $\frac{\square}{\square} - \frac{\square}{\square}$

7. Find the rational number that is one half of the way from a to b if a and b are the numbers that are, respectively, one third and two thirds of the way from $\frac{3}{7}$ to $\frac{12}{5}$.

99
70

8. The five engines on the first stage of the Saturn V moon rocket each burned $\frac{1}{2}$ ton of liquid kerosene every second. How many total pounds of liquid kerosene was burned by the five engines during the two and one-half minute flight of the first stage? Express the answer in scientific notation.

9. Simplify and write with only positive exponents:

$$\frac{(3x^2y)^2}{(2x^{-2})^3} \cdot \frac{4x^{-1}y^4}{xy^2}$$

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10. Find integral values of a , b , and c such that $ax + b$ is a factor of both $2x^2 - 5x + c$ and $4x^2 + 4x + 1$. What is the value of $a + b + c$? $a = 2, b = 1, c = -3$

11. John has 50 coins, all nickels, dimes and quarters. The number of quarters is 2 less than the number of dimes and the number of nickels is 10 more than 5 times the number of dimes. What is the total value of the 50 coins?

12. Working alone, Dana can complete a project in 3 hours. Jane can do it in 2.5 hours. How long will it take them working together? Round your answer to the nearest minute.

13. A painter has a can that contains 2 liters of paint thinner that is 70% alcohol. How many liters of pure alcohol needs to be added to bring the concentration up to 80% alcohol?

14. Solve for x in terms of the other variables. Indicate any restrictions on the variables.

$$ax - 1 = 2r + bx$$

15. Martin left his home at 1:30 pm and drove to the airport at an average speed of 45 km/h. After a 40 minute wait, he took off on a flight with an average speed of 350 km/h. He reached his destination at 4:20 pm. If the total distance that Martin traveled by car and by plane was 555 km, how far was Martin's home from the airport? 30 km