

Print your name:

Show all of your work. Explain your reasoning. NO CALCULATORS.

1. Use the car number line model to explain the computation 3×-35

2. Suppose Mary makes only $\frac{4}{5}$ of Mark's salary for the same type of work. Mary gets a raise that is equal to $\frac{1}{5}$ of her salary. Are things then equitable? Why or why not? Explain.

3. Use the strip model to explain the computation $\frac{2}{3} - \frac{1}{4}$. Show and explain all the steps.

4. Explain the mental math and mathematical reasoning involved in ordering the fractions $\frac{1}{3}$, $\frac{19}{60}$, $\frac{25}{74}$ from smallest to largest (without doing any decimal calculations).

5. Use the charged particle model to explain the computation $(-2) \times (-3)$. Show and explain all the steps.

6. A student is working on fractions using the area model where a circle of diameter 1 inch represents one unit. The student asserts that thus a circle of diameter $\frac{1}{2}$ inch must represent $\frac{1}{2}$ unit. (The student is not expected to know how to find the area of a circle.) What would you say to the student ? Why ? Explain.

7. Determine any and all conditions on the numbers n and m that yield the equation: $|n + m| = |n| + |m|$. Explain your reasoning in a concise and clear fashion.

8. You are substituting for a sick colleague. His notes say "...cakes of equal size..." and "...the students in the big class get smaller slices of cake than the students in the small class. This shows the mathematical..." but the rest is smudged. What is the likely mathematical result that the notes were explaining? Why do you think that?

9. Doing clock arithmetic with an 11 hour clock, express $9 \div 5$ as a missing factor multiplication problem. Then find any and all solutions. Show all of your work.

10. A rectangular plot of land is $1\frac{1}{2}$ miles wide by $2\frac{1}{2}$ miles long. Find its area algebraically and verify the result with an appropriate sketch. Your sketch should clearly show the computation and, in a geometric sense, even explain the result.

11. Find the prime factorization of 1014. How many positive divisors (including 1 and itself) does the number 1014 have ? Show your work and explain your reasoning.

SCRATCH PAPER below– will not be graded