

1. [4 pts] Explain what it means for an operation to be commutative. You may provide an example, but your verbal explanation must be clear without it.

2. [4 pts - 2 each] For each number sentence below, name the property illustrated. Spell correctly.

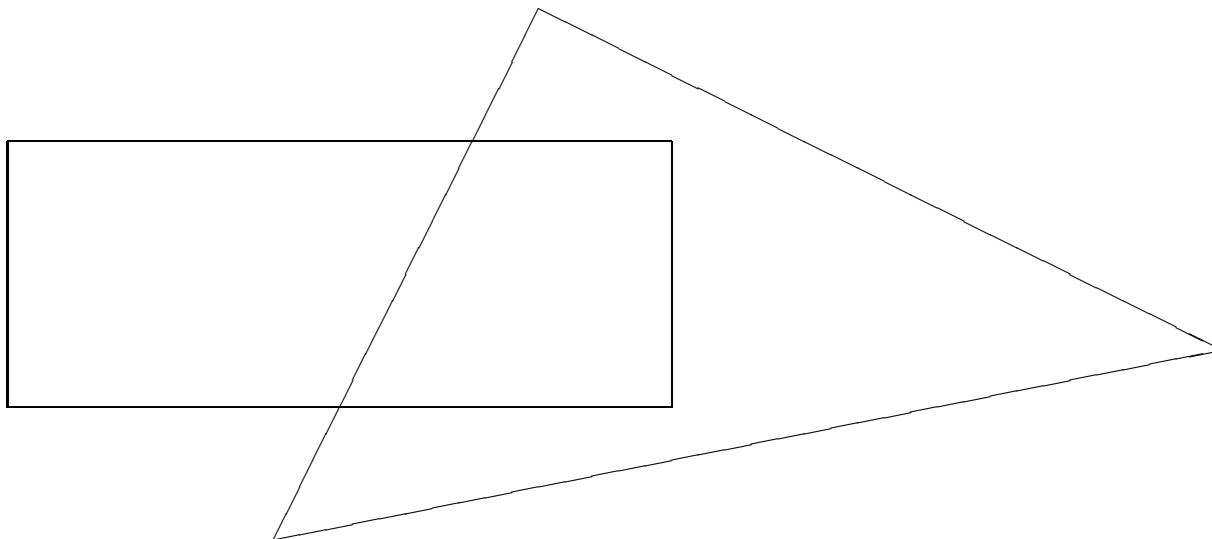
(a) $5 \cdot 4 + (3 + 2) = (5 \cdot 4 + 3) + 2$

(b) $5 \cdot 4 + (3 + 2) = 5 \cdot 4 \cdot 1 + (3 + 2)$

3. [5 pts] Name the part of a fraction that cannot equal zero, then use one of the “part-of” meanings of a fraction to explain why. Spell correctly.

4. [5 pts] Draw stars in the region below so that all of the following conditions are true:

- Half of the stars are somewhere inside the rectangle.
- One third of the stars are in the overlapped area.
- There are some stars outside the shapes.



5. [5 pts] If possible, find a fraction that is between $\frac{9}{20}$ and $\frac{8}{21}$. If not possible, tell why.
6. [6 pts] Create a fraction that is equivalent to $\frac{21}{49}$ and whose denominator is between 850 and 880. Show work.
7. [12 pts] Arrange the fractions below in decreasing order, indicating any “ties.” Demonstrate at least three different comparison methods at some point in your work; indicate where each occurs. You may NOT convert to decimals.
- $$\frac{31}{50} \quad \frac{30}{51} \quad \frac{17}{10} \quad \frac{10}{17}$$
8. [6 pts] Compute the difference $4\frac{1}{5} - 2\frac{3}{4}$ entirely in mixed numbers. Show clear work.

9. [10 pts] If one red Fraction Tile represents $\frac{3}{4}$ of a whole, tell what tiles could represent the fraction $\frac{5}{2}$. Explain your reasoning in a few sentences.

10. [10 pts] Draw and label a diagram to compute $\frac{3}{4} + \frac{5}{6}$ *without* predetermining a common denominator. Explain how the final numerator and denominator are each determined from your diagram.

11. [5 pts] Demonstrate thorough precancelling in the following computation so that its answer is immediately in lowest terms:

$$\frac{12}{25} \times \frac{10}{49} \div \frac{8}{21}$$

12. [5 pts] What number is the multiplicative inverse of $-3\frac{1}{2}$?

13. [10 pts] Draw and label a diagram to represent $5 \div \frac{2}{5}$, then state the answer and thoroughly explain how to determine it from your diagram.

14. [8 pts] Compute the following difference entirely by hand and reduce your answer to lowest terms. Indicate each instance in which you use the Fundamental Law of Fractions.

$$\frac{5}{12} - \frac{1}{15}$$

15. [5 pts] How many $3\frac{1}{2}$ -foot pieces can be cut from a 20-foot length of rope, and how long will the leftover piece be? Show work.