

Math Elem Ed Exam 1

Do the problems in order in your bluebook. Show your work.

1. Suppose $f(x) = 4x - 5$ and $g(x) = x^2$. Draw a black box diagram for the composite function $g \circ f(x)$ and compute its value when $x = 3$.
2. Consider the following trick: “think of a number, multiply it by 3, add 6, divide by 3, subtract 2.” What happened? Using algebra explain why it works.
3. Use both a partition model and repeated subtractions to describe $11 \div 3$
4. Add $342_5 + 424_5$ working only in base 5. Explain your steps.
5. Explain why the commutative law of multiplication holds using areas of rectangles.
6. Use a Venn diagram to determine if the following is valid:
Math classes are always a lot of fun.
Watching TV is a lot of fun.
Therefore, watching TV is a Math class
7. Use a truth table to determine when if ever the formula $p \rightarrow (\neg q)$ is true?
8. List the *nonempty* subsets of the set $B = \{\emptyset, a, 21\}$.
9. Write the contrapositive of the statement “if Resistance is futile then the Borg win”.
10. Find the cardinality of the set $\{x \mid x = i^2 - j, \text{ where } i, j \in \{1, 2\}\}$