

Touchdowns and Field Goals

Adapted by:
Susan Call
George Mason University, COMPLETE Math
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The Task

Emma plays in a flag football league where the only two ways to score are via touchdowns, which are worth 7 points, and field goals, which are worth 3 points. In yesterday's game, her team scored eight times. How many points did her team score?

Find all possible solutions.

Big Ideas

- Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.
- Mathematical situations and structures can be translated and represented abstractly using variables, expressions, and equations.
- Rules of arithmetic and algebra can be used together with notions of equivalence to transform equations and inequalities so solutions can be found.

Standards of Learning for Grades 3-4-5

- 3.2 recognize/use inverse relationships between add/sub and mult/div to complete fact sentences/solve problems
- 3.4 estimate/solve single-step and multistep problems involving sum/diff of two whole numbers 9,999 or less
- 4.16 a) recognize/demonstrate meaning of equality in equation
- 4.4 d) solve single-step and multistep add/sub/mult problems with whole numbers
- 5.18 a) investigate/describe concept of variable; b) write open sentence using variable; c) model one-step linear equations using add/sub; d) create problems based on open sentence

Standards of Learning for Grades 6-7-8

- 6.18 solve one-step linear equations in one variable
- 7.12 represent relationships with tables, graphs, rules, and words
- 7.13 a) write verbal expressions as algebraic expressions and sentences as equations and vice versa; b) evaluate algebraic expressions
- 8.14 make connections between any two representations (tables, graphs, words, rules)
- 8.16 graph linear equation in two variables

Process Goals

- Problem Solving and Reasoning – Students will apply their knowledge of numbers, operations, and equations to make sense and determine solutions to the problem.
- Connections and Representations – Students will represent their solutions with pictures, tables, or equations. They recognize and use mathematical connections to extend or generalize patterns in their solutions. .
- Communication – Students will justify their findings and present their results to the class with precise mathematical language

Related Task – Bicycles and Tricycles

Jenny’s Bicycle Shop sells only bicycles and tricycles. They have a total of 24 seats and 61 wheels in the shop. How many bicycles and how many tricycles are in the shop?

Related Task – Spiders and Ants

A spider’s web contains a certain number of spiders, which have eight legs, and their six-legged meal: ants. There are 64 legs in all, and four times as many ants than spiders. How many of each bug is there?

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Lesson Plan



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Materials

- The task
- Share video clip or pictures of a flag football game
- Large Presentation Paper per group

Facilitating Task

- Begin by sharing video or pictures of flag football game.
- Read the problem together. Have students retell the problem in their own words.
- Provide individual work time for students to begin finding possible solutions.
- Form small groups (4 students maximum) to compare strategies and solutions. After reaching consensus as a group, record solution and justification on Presentation Paper.
- Each group shares and justifies their solution to the class.
- As groups share, the teacher asks questions to support students in connecting the strategies shared and the mathematical ideas highlighted.

Misconceptions

- Students may be confused by the constraints. Students may add field goals and touchdowns before multiplying or find the total points and not count the number of touchdowns and field goals.
- Students may solve the problem without finding all possible ways.

Suggested Prompts or Questions

- How does your solution make sense to you?
- How is your strategy similar to another strategy that someone used?
- What do you know about the problem?
- How do you know you have found all possible ways Emma's team could have scored touchdowns and/or field goals?

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Name _____

Date _____

Task

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Answer the question using pictures, words, tables, graphs, and/or symbols.