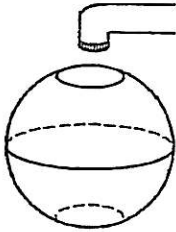


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**F&A 10.2** Demonstrates conceptual understanding of linear and nonlinear functions and relations (including characteristics of classes of functions) through an analysis of constant, variable, or average rates of change, intercepts, domain, range, maximum and minimum values, increasing and decreasing intervals and rates of change (e.g., the height is increasing at a decreasing rate); describes how change in the value of one variable relates to change in the value of a second variable; or works between and among different representations of functions and relations (e.g., graphs, tables, equations, function notation).

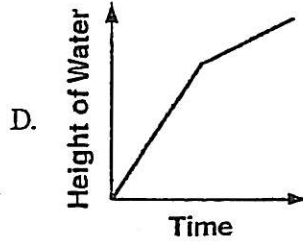
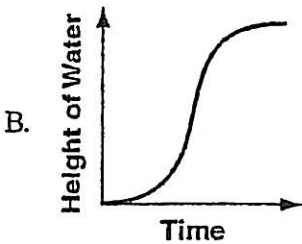
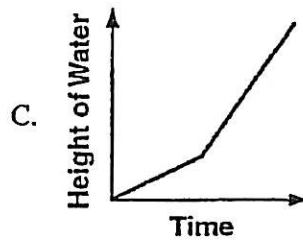
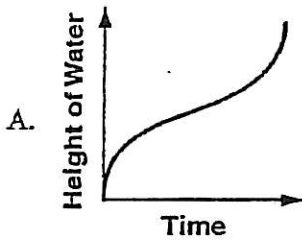


9 Look at this container.



This is a multiple-choice item (1 point).  
 42% of our students selected the correct answer - A.

Water flows into this container at a constant rate. Which graph could represent the height of the water in the container over time?



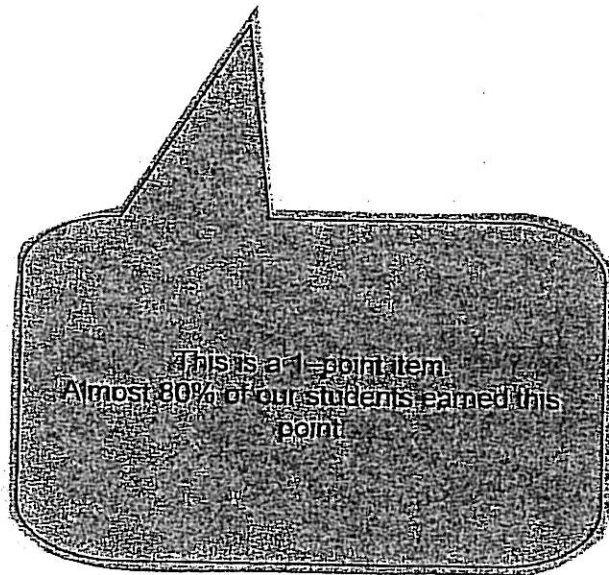
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**F&A 10.4** Demonstrates conceptual understanding of equality by solving problems involving algebraic reasoning about equality; by translating problem situations into equations; by solving linear equations (symbolically and graphically) and expressing the solution set symbolically or graphically, or provides the meaning of the graphical interpretations of solution(s) in problem-solving situations; or by solving problems involving systems of linear equations in a context (using equations or graphs) or using models or representations.

16 Zack has \$60 to spend on a fish tank, supplies, and some fish.

- The fish tank and supplies cost \$29.50.
- Each fish costs \$2.70.

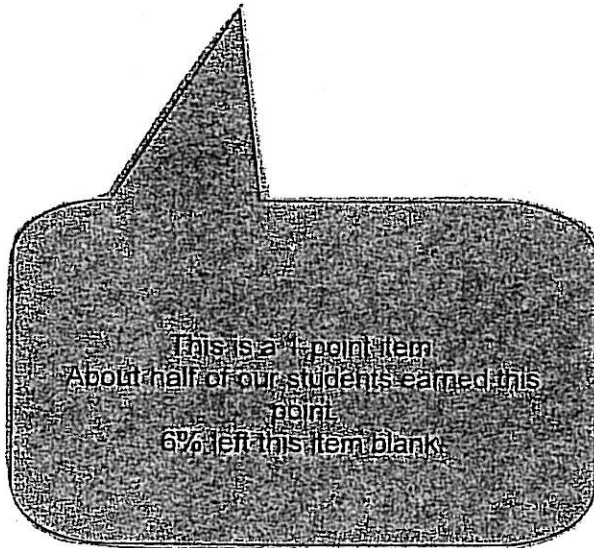
What is the maximum number of fish that Zack can buy?



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**DSP 10.4** Uses counting techniques to solve problems in contexts involving combinations or permutations using a variety of strategies (e.g., organized lists, tables, tree diagrams, models, Fundamental Counting Principle, or<sup>sc</sup> others).

- 17 Al, Chris, Janet, and Tara will each give a speech to their class. In how many different orders can they give their speeches if Al must speak immediately after Tara?



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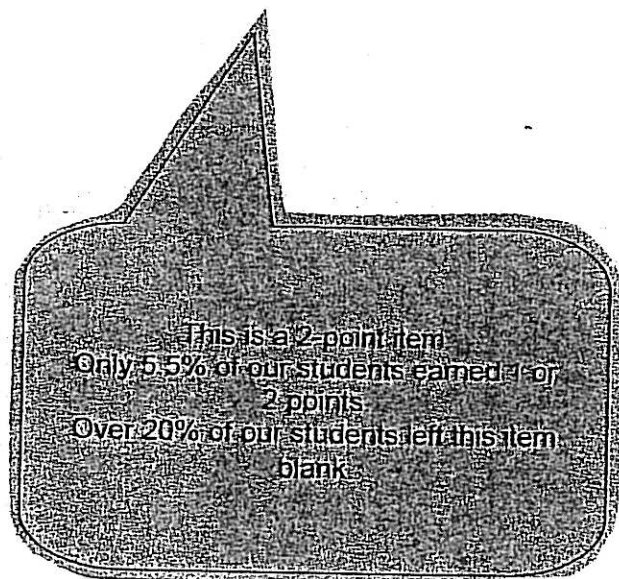
N&O 10.4 Accurately solves problems involving rational numbers within mathematics, across content strands, disciplines or contexts (with emphasis on, but not limited to, proportions, percents, ratios, and rates).



19 The Doucettes produce and sell maple syrup.

- Each year they sell all the maple syrup they produce.
- Last year they sold 640 gallons of maple syrup.
- This year they will sell maple syrup at a price that is 20% lower than it was last year.

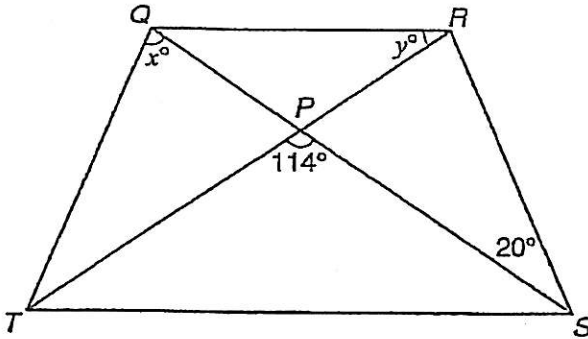
How many gallons of maple syrup must the Doucettes sell this year so their income from maple syrup sales stays the same as it was last year? Show your work or explain how you know.





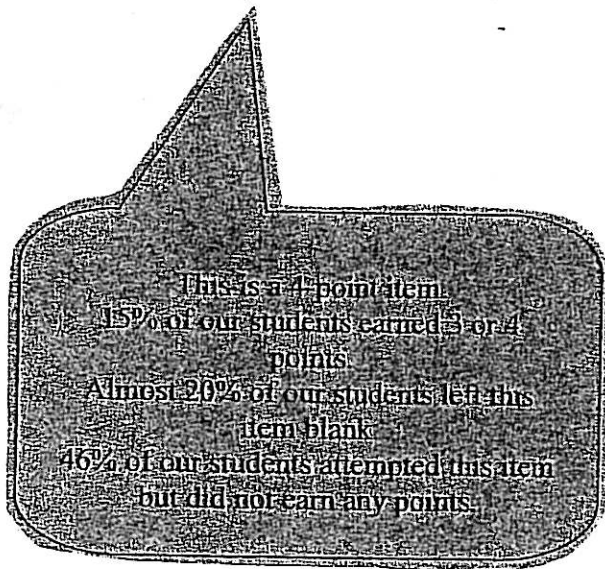
ID:259942 AF11608\_trapizoid\_proof.e Common

22 Look at this diagram.



not drawn to scale

- Quadrilateral  $QRST$  has diagonals  $\overline{QS}$  and  $\overline{RT}$  that intersect at point  $P$ .
  - Triangle  $QPT$  is congruent to triangle  $RPS$  ( $\triangle QPT \cong \triangle RPS$ ).
- a. What is the value of  $x$ ? Show your work or explain how you know.
- b. What is the value of  $y$ ? Show your work or explain how you know.

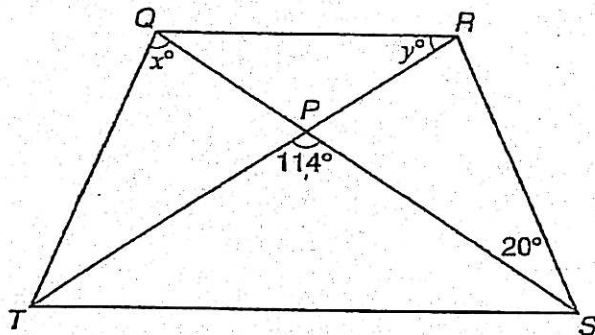


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**G&M 10.2** Makes and defends conjectures, constructs geometric arguments, uses geometric properties, or uses theorems to solve problems involving angles, lines, polygons, circles, or right triangle ratios (sine, cosine, tangent) within mathematics or across disciplines or contexts (e.g., Pythagorean Theorem, Triangle Inequality Theorem).



22. Look at this diagram.



not drawn to scale

- Quadrilateral  $QRST$  has diagonals  $\overline{QS}$  and  $\overline{RT}$  that intersect at point  $P$ .
  - Triangle  $QPT$  is congruent to triangle  $RPS$  ( $\triangle QPT \cong \triangle RPS$ ).
- a. What is the value of  $x$ ? Show your work or explain how you know.
- b. What is the value of  $y$ ? Show your work or explain how you know.

This is a 4-point item.  
45% of our students earned 3 or 4 points.  
Almost 20% of our students left this item blank.  
46% of our students attempted this item but did not earn any points.