



Robots & Reefs: High School Algebra Practice

Solve these multi-step algebraic word problems featuring undersea mermaids and high-tech robots.

Name: _____ Date: _____

1 SYSTEMS OF EQUATIONS

A robotic assembly line has 3 type-A humanoid robots and 5 type-B quadcopter robots. Together they assemble 190 circuit boards per hour. If a type-A robot assembles 10 more boards per hour than a type-B robot, how many boards does one type-A robot assemble?

Work: _____

Answer: _____

2 GEOMETRY ALGEBRA

A mermaid is building a rectangular garden of bioluminescent sea-kelp. The length of the garden is 5 meters more than twice its width. If the perimeter of the garden is 70 meters, what is the length of the garden in meters?

Work: _____

Answer: _____

3 DISTANCE, RATE, AND TIME

A deep-sea exploration robot travels at a constant speed of 15 meters per minute. A rescue robot starts from the same origin 8 minutes later, traveling at 20 meters per minute along the same path to catch up. How many minutes does it take the rescue robot to catch the exploration robot?

Work: _____

Answer: _____

4 MIXTURE PROBLEMS

A mermaid alchemist wants to create 60 liters of a custom healing saltwater solution with exactly 12% salinity. She plans to mix a high-salinity solution of 15% with a low-salinity solution of 5%. How many liters of the 15% salinity solution must she use?

Work:

Answer: _____

5 LINEAR MODELS & PROFIT

A robotics club designs and sells custom mini-bot kits. Their fixed workshop rent is \$120, and each kit costs \$15 to manufacture. If they sell each kit for \$25, how many kits must they sell to make a net profit of exactly \$350?

Work:

Answer: _____

6 WORK & RATE RATIOS

Three mermaid sisters, Adella, Aquata, and Arista, can clean a coral reef together. Adella works twice as fast as Aquata, and Aquata works twice as fast as Arista. If they can clean a reef of 280 square meters in 8 hours when working together, how many square meters can Aquata clean alone in 10 hours?

Work:

Answer: _____

Answer Key

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1. A robotic assembly line has 3 type-A humanoid robots and 5 type-B quadcopter robots. Together they assemble 190 circuit boards per hour. If a type-A robot assembles 10 more boards per hour than a type-B robot, how many boards does one type-A robot assemble? **30**
2. A mermaid is building a rectangular garden of bioluminescent sea-kelp. The length of the garden is 5 meters more than twice its width. If the perimeter of the garden is 70 meters, what is the length of the garden in meters? **25**
3. A deep-sea exploration robot travels at a constant speed of 15 meters per minute. A rescue robot starts from the same origin 8 minutes later, traveling at 20 meters per minute along the same path to catch up. How many minutes does it take the rescue robot to catch the exploration robot? **24**
4. A mermaid alchemist wants to create 60 liters of a custom healing saltwater solution with exactly 12% salinity. She plans to mix a high-salinity solution of 15% with a low-salinity solution of 5%. How many liters of the 15% salinity solution must she use? **42**
5. A robotics club designs and sells custom mini-bot kits. Their fixed workshop rent is \$120, and each kit costs \$15 to manufacture. If they sell each kit for \$25, how many kits must they sell to make a net profit of exactly \$350? **47**
6. Three mermaid sisters, Adella, Aquata, and Arista, can clean a coral reef together. Adella works twice as fast as Aquata, and Aquata works twice as fast as Arista. If they can clean a reef of 280 square meters in 8 hours when working together, how many square meters can Aquata clean alone in 10 hours? **100**