Magical Algebra Practice

Solve these multi-step adventure problems featuring Unicorns, Cats, and Mermaids!

Name: _____ **Date:** _____

1 QUADRATIC OPTIMIZATION

A cat rescue shelter is building a new rectangular outdoor run against a long brick wall, meaning they only need to fence three sides. They have exactly 40 meters of fencing available. To give the cats the most space to play, what is the maximum area in square meters they can enclose?

Work:

Answer: _____

2 MIXTURE PROBLEMS

A unicorn sanctuary wants to prepare 100 pounds of a special healing feed mixture that is 25% pure magic. They have a basic feed that is 10% magic and a premium feed that is 30% magic. How many pounds of the premium 30% magic feed must they mix in to achieve this exact balance?

Work:

Answer: _____

3 EXPONENTIAL GROWTH

A feline rescue sanctuary on a small island notes that their semi-feral cat population triples every 2 years. If they started with an initial population of 12 cats, how many cats will live on the island after 8 years of this unchecked tripling?

Work:

Answer: _____

Excellent work! You have successfully mastered these advanced algebra word problems. · make your own at mathmystery.app

4 SYSTEMS OF LINEAR EQUATI

At the annual reef festival, 3 mermaids and 5 sea turtles can harvest 190 glowing pearls in one hour. Meanwhile, 4 mermaids and 2 sea turtles can harvest 160 pearls in the same amount of time. How many pearls can a single mermaid harvest in one hour?

Work:

Answer: _____

5 RATIONAL EQUATIONS

A mystical unicorn named Sparkle can clear a meadow of dark shadow crystals in 12 hours. If Sparkle works together with her friend Twilight, their combined magical horn power clears the same meadow in just 4 hours. How many hours would it take Twilight to clear the meadow completely on her own?

Work:

Answer: _____

6 QUADRATIC FUNCTIONS

A royal mermaid's deep-sea dive is modeled by the quadratic function d = 36 - (t - 6) * (t - 6), where d represents her depth in meters and t represents time in seconds. What is her exact depth in meters when the timer hits 2 seconds?

Work:

Answer: _____

TEACHER / PARENT

Answer Key

Magical Algebra Practice · Grade 10

1.	A cat rescue shelter is building a new rectangular outdoor run against a long brick wall, meaning they only need to fence three sides. They have exactly 40 meters of fencing available. To give the cats the most space to play, what is the maximum area in square meters they can enclose?	**200**
2.	A unicorn sanctuary wants to prepare 100 pounds of a special healing feed mixture that is 25% pure magic. They have a basic feed that is 10% magic and a premium feed that is 30% magic. How many pounds of the premium 30% magic feed must they mix in to achieve this exact balance?	**75**
3.	A feline rescue sanctuary on a small island notes that their semi-feral cat population triples every 2 years. If they started with an initial population of 12 cats, how many cats will live on the island after 8 years of this unchecked tripling?	**972**
4.	At the annual reef festival, 3 mermaids and 5 sea turtles can harvest 190 glowing pearls in one hour. Meanwhile, 4 mermaids and 2 sea turtles can harvest 160 pearls in the same amount of time. How many pearls can a single mermaid harvest in one hour?	**30**
5.	A mystical unicorn named Sparkle can clear a meadow of dark shadow crystals in 12 hours. If Sparkle works together with her friend Twilight, their combined magical horn power clears the same meadow in just 4 hours. How many hours would it take Twilight to clear the meadow completely on her own?	**6**
6.	A royal mermaid's deep-sea dive is modeled by the quadratic function d = 36 - (t - 6) * (t - 6), where d represents her depth in meters and t represents time in seconds. What is her exact depth in meters when the timer hits 2 seconds?	**20**