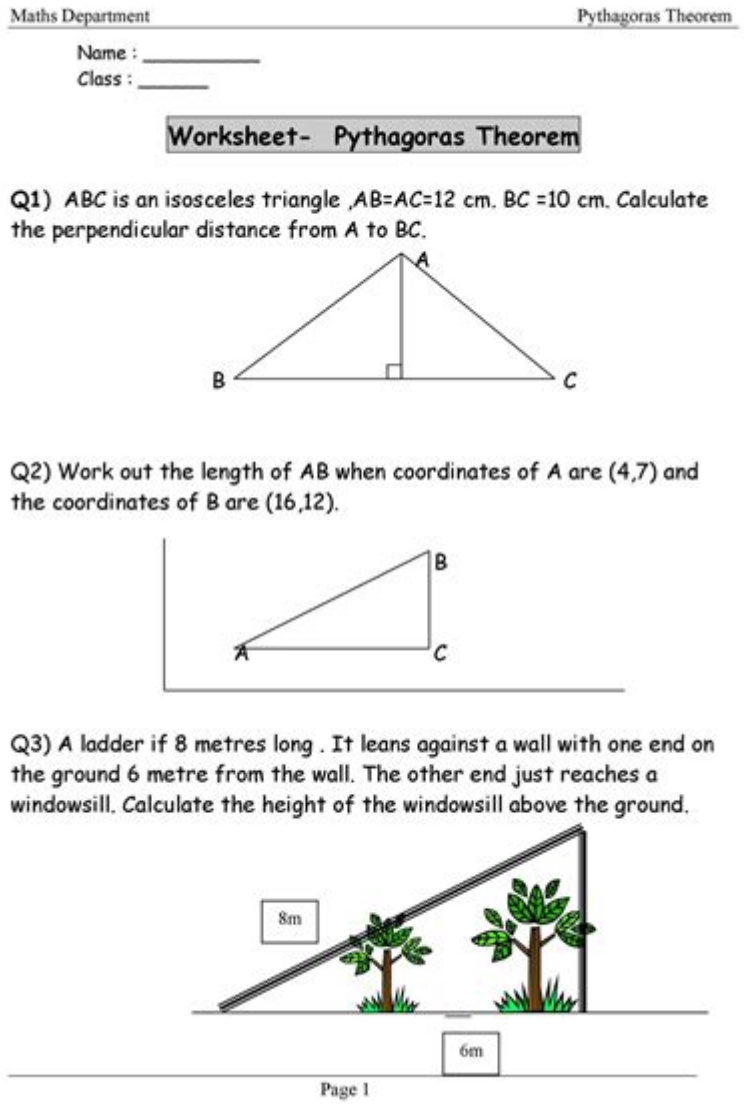
Pythagorean Theorem Word Problems Answer Key



Maths Department Pythagoras Theorem

Name : _____

Class : _____

Worksheet- Pythagoras Theorem

Q1) ABC is an isosceles triangle ,AB=AC=12 cm. BC =10 cm. Calculate the perpendicular distance from A to BC.

Q2) Work out the length of AB when coordinates of A are (4,7) and the coordinates of B are (16,12).

Q3) A ladder if 8 metres long . It leans against a wall with one end on the ground 6 metre from the wall. The other end just reaches a windowsill. Calculate the height of the windowsill above the ground.

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Pythagorean theorem word problems answer key are essential resources for students and educators alike, as they offer clarity and solutions to various mathematical challenges. The Pythagorean theorem, a fundamental principle in geometry, relates the lengths of the sides of a right triangle. It states that the square of the length of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides. This theorem is expressed mathematically as $a^2 + b^2 = c^2$, where c represents the length of the hypotenuse, while a and b represent the lengths of the other two sides.

This article will explore various word problems that utilize the Pythagorean theorem, provide detailed solutions, and present an answer key for further

understanding.

Understanding the Pythagorean Theorem

Before diving into the word problems, it is crucial to understand the components of the Pythagorean theorem:

- Right Triangle: A triangle with one angle measuring 90 degrees.
- Hypotenuse: The longest side of the right triangle, opposite the right angle.
- Legs: The other two sides of the triangle, which are perpendicular to each other.

Basic Formula

The basic formula used to solve problems involving the Pythagorean theorem is:

$$ c = \sqrt{a^2 + b^2} $$

Where:
- c = length of the hypotenuse
- a = length of one leg
- b = length of the other leg

Types of Word Problems

Word problems involving the Pythagorean theorem can generally be categorized into the following types:

1. Finding the length of a side: Given two sides of a triangle, find the length of the third side.
2. Distance problems: Involving distances between points in a coordinate plane or real-world scenarios.
3. Application problems: Real-life situations where the Pythagorean theorem is applicable.

Examples of Word Problems

Let’s explore a series of word problems that illustrate the application of the Pythagorean theorem.

Example Problem 1: Finding the Length of a Side

Problem: A right triangle has one leg that measures 6 cm and another leg that measures 8 cm. What is the length of the hypotenuse?

Solution:
Using the Pythagorean theorem:

1. Identify the lengths:
- $a = 6$ cm
- $b = 8$ cm

2. Apply the formula:
$$
c^2 = a^2 + b^2
$$
$$
c^2 = 6^2 + 8^2
$$
$$
c^2 = 36 + 64
$$
$$
c^2 = 100
$$
$$
c = \sqrt{100} = 10 \text{ cm}
$$

The length of the hypotenuse is 10 cm.

Example Problem 2: Distance Between Points

Problem: Find the distance between the points (3, 4) and (7, 1) in a coordinate plane.

Solution:
1. Calculate the differences in the x and y coordinates:
- $a = 7 - 3 = 4$
- $b = 4 - 1 = 3$

2. Apply the Pythagorean theorem:
$$
c^2 = a^2 + b^2
$$
$$
c^2 = 4^2 + 3^2
$$

$$
c^2 = 16 + 9
$$
$$
c^2 = 25
$$
$$
c = \sqrt{25} = 5
$$

The distance between the points (3, 4) and (7, 1) is 5 units.

Example Problem 3: Application Problem

Problem: A ladder leans against a wall, forming a right triangle with the ground. If the base of the ladder is 4 feet away from the wall and the ladder reaches a height of 3 feet on the wall, what is the length of the ladder?

Solution:
1. Identify the legs of the triangle:
- One leg (a) = 3 feet (height)
- The other leg (b) = 4 feet (distance from the wall)

2. Apply the Pythagorean theorem:
$$
c^2 = a^2 + b^2
$$
$$
c^2 = 3^2 + 4^2
$$
$$
c^2 = 9 + 16
$$
$$
c^2 = 25
$$
$$
c = \sqrt{25} = 5
$$

The length of the ladder is 5 feet.

Answer Key for Word Problems

Here is a concise answer key for the problems discussed:

1. Problem 1: Hypotenuse = 10 cm

2. Problem 2: Distance = 5 units
3. Problem 3: Length of the ladder = 5 feet

Practice Problems

To further practice using the Pythagorean theorem, consider the following problems:

1. A right triangle has legs of lengths 9 cm and 12 cm. Find the length of the hypotenuse.
2. Find the distance between the points (1, 2) and (4, 6).
3. A triangular park has a right angle where one side is 15 meters long and the other side is 20 meters long. What is the length of the diagonal path across the park?

Conclusion

Pythagorean theorem word problems are instrumental in understanding the application of geometry in real life. By breaking down the problems and applying the theorem step-by-step, students can develop a clearer comprehension of how to tackle various mathematical challenges. The answer key provided helps reinforce learning by allowing students to check their work and understand their mistakes. Mastery of the Pythagorean theorem not only aids in geometry but also lays a strong foundation for more advanced mathematical concepts.

Frequently Asked Questions

What is the Pythagorean theorem and how is it applied in word problems?

The Pythagorean theorem states that in a right triangle, the square of the length of the hypotenuse is equal to the sum of the squares of the lengths of the other two sides ($a^2 + b^2 = c^2$). In word problems, it's applied by identifying the lengths of the two legs of a right triangle and solving for the hypotenuse, or vice versa.

Can you provide an example of a word problem that uses the Pythagorean theorem?

Sure! A ladder is leaning against a wall. If the foot of the ladder is 4 feet away from the wall and the ladder is 10 feet long, how high does the ladder reach on the wall? Using the Pythagorean theorem, we can solve for the height (h): $4^2 + h^2 = 10^2$, leading to h = 8 feet.

What are some common mistakes to avoid when solving Pythagorean theorem word problems?

Common mistakes include confusing the legs and the hypotenuse, miscalculating the squares of the lengths, or neglecting to check if the triangle is a right triangle before applying the theorem.

How do you determine which sides to use in a word problem involving the Pythagorean theorem?

Identify the right triangle within the problem and determine which two sides are the legs (perpendicular) and which side is the hypotenuse (the longest side opposite the right angle). Use the lengths of the legs to find the hypotenuse or vice versa.

What is the solution key for a word problem that asks for the distance between two points using the Pythagorean theorem?

To find the distance between two points (x1, y1) and (x2, y2), use the formula: distance = √((x2 - x1)² + (y2 - y1)²). This can be modeled as a right triangle where the difference in x-coordinates and y-coordinates represent the legs.

How can I practice Pythagorean theorem word problems effectively?

You can practice by solving a variety of real-world word problems, utilizing online resources, worksheets, and textbooks. Focus on problems that require you to visualize the triangle, identify known and unknown values, and apply the theorem correctly.

Pythagorean Theorem Word Problems Answer Key

Is there a tag to turn off caching in all browsers?
The list is just examples of different techniques, it's not for direct insertion. If copied, the second would overwrite the first and the fourth would overwrite the third because of the http-equiv ...

regex - Adding ?nocache=1 to every url (including the assets like ...
Jul 12, 2016 · But what I would like to do is to apply ?nocache=1 to every URL related to the site

(including the assets like style.css) so that I get the non cached version of the files.

How to force Docker for a clean build of an image
Feb 24, 2016 · I have build a Docker image from a Docker file using the below command. $ docker build -t u12_core -f u12_core . When I am trying to rebuild it with the same command, it's using …

http - What is the difference between no-cache and no-store in …
I don't find get the practical difference between Cache-Control:no-store and Cache-Control:no-cache. As far as I know, no-store means that no cache device is allowed to cache that response. …

How to prevent caching of my Javascript file? - Stack Overflow
I add timestamps to the script-sources but several users still need to fire F5 or Ctrl+F5 to get the new script. How's that? (Intranet not WWW)

Alpine Dockerfile advantages of --no-cache vs. rm /var/cache/apk/*
When creating Dockerfiles using an Alpine image, I have often seen the use of either apk add --no-cache, or apk add followed by an rm /var/cache/apk/* statement. I am curious to know whether …

Difference between Pragma and Cache-Control headers?
Pragma is the HTTP/1.0 implementation and cache-control is the HTTP/1.1 implementation of the same concept. They both are meant to prevent the client from caching the response. Older …

msbuild - NuGet without cache in VS 2017 - Stack Overflow
May 31, 2019 · I know you can pass the -NoCache parameter to nuget from the command line, but VS doesnt give me the options to set those command line parameters. I've tried clearing the local …

Prevent browser caching of AJAX call result - Stack Overflow
Dec 15, 2008 · Another good answer. I have to say, for me, most of the time globally disabling the cache has been of great benefit. It all depends on how your application is designed though. …

c# - Prevent Caching in ASP.NET MVC for specific actions using an ...
Apr 4, 2012 · If your class or action didn't have NoCache when it was rendered in your browser and you want to check it's working, remember that after compiling the changes you need to do a …

BingHomepageQuiz - Reddit
Microsoft Bing Homepage daily quiz questions and their answers

Start home page daily quiz : r/MicrosoftRewards - Reddit
Apr 5, 2024 · Confusingly, I appeared to receive 10 points just from clicking the tile and then no points after completing the quiz (so maybe you need to get the correct answers which I did not.)

Bing homepage quiz : r/MicrosoftRewards - Reddit
Dec 4, 2021 · While these are the right answers and this quiz is still currently bugged, you don't lose points for wrong answers on this quiz.

EveryDayBingQuiz - Reddit
Welcome all of you, here you will get daily answers of Microsoft Rewards (Bing Quiz) like Bing Homepage Quiz, Bing Supersonic Quiz, Bing News Quiz, Bing Entertainment Quiz, Warpspeed Quiz, Turbocharger Quiz & Etc.

Bing Homepage Quiz (9-3-2023) : r/AnswerDailyQuiz - Reddit

Sep 3, 2023 · Microsoft Rewards Bing Homepage Quiz Questions and Answers (9-3-2023) Which is New York City's tallest building? A 30 Hudson Yards B Empire State…

Is there some secret "trick" to solving these? - Reddit
Is there some secret "trick" to solving these? Bing Sort by: Add a Comment propheticjustice

Bing Homepage Quiz not working : r/MicrosoftRewards - Reddit
Microsoft sucks soooo much arse. I have been complaining for weeks about not getting points from the Bing Homepage Quizzes. It doesn't matter if I clear the cache, clear the browser, update said browser, complete the quiz on my phone, or complete it on my tablet, I STILL DON'T RECEIVE POINTS.

[US] Test your smarts [01-07-22] : r/MicrosoftRewards - Reddit
Jan 7, 2022 · AmySueF [US] Test your smarts [01-07-22] Quiz and Answers News this week quiz answers Pittsburgh 119 Little Caesars Hot and Ready Pizza Is also a solar panel 21 Dogs Melania Trump Pakistan Leonardo DiCaprio Paper Moon

Microsoft Rewards Bing Homepage Quiz Answers Today : r
Jun 15, 2024 · Bing Homepage Quiz Answers What animal father-child duo is in today's image? A Red foxes B Coyotes C Gray wolves The correct answer is…

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[1-8-2022] Microsoft Rewards Bing Homepage Quiz Questions and Answers: Question: Today we're befriending a frosty bison foursome in Yellowstone National Park. Bison are… Herbivores Omnivores Carnivores Correct Answer Question: Are these bison male or female? Female Male Hard to say Correct Answer Question: In 2016, the American bison was declared what? The …

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