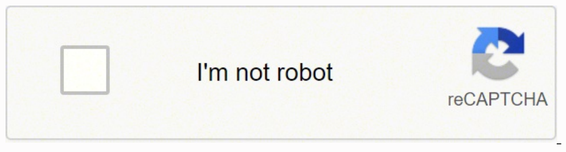
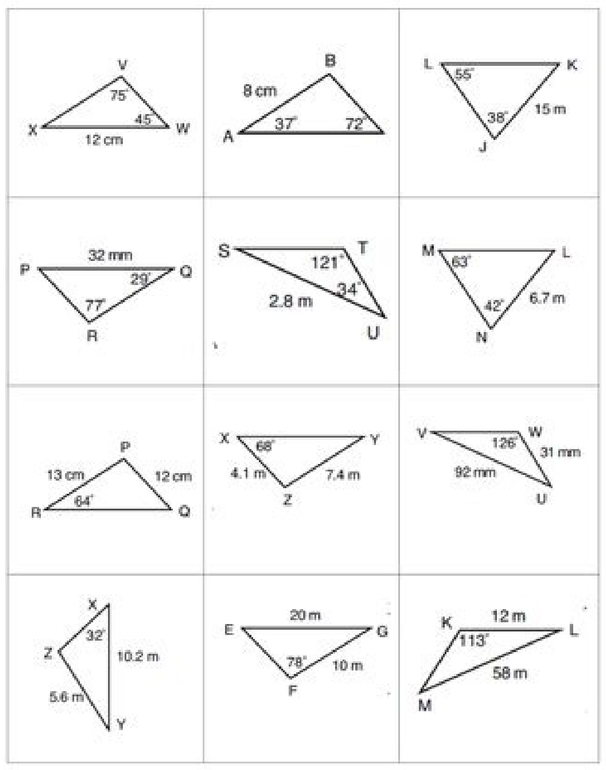
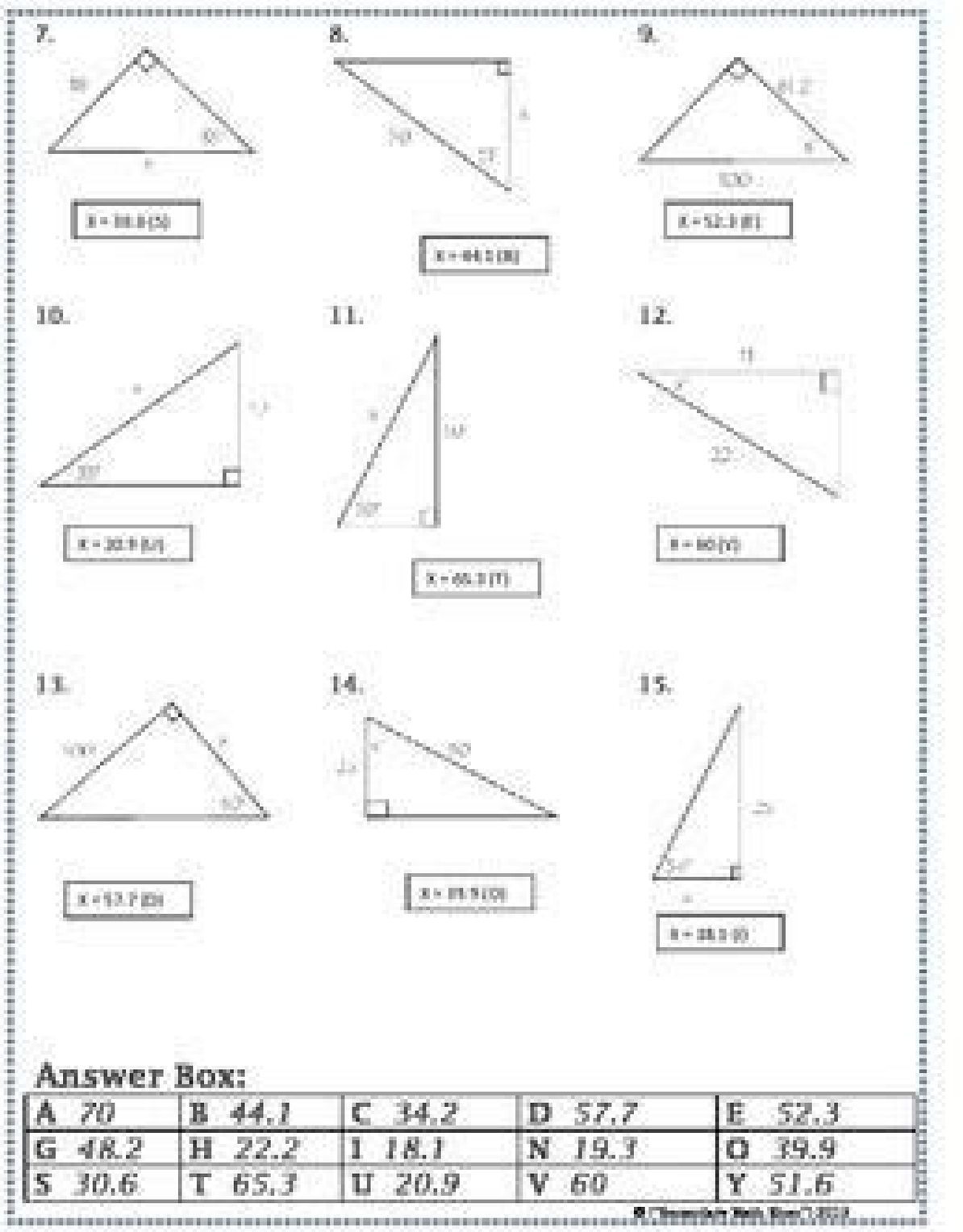


Open

Cosine rule and sine rule worksheets



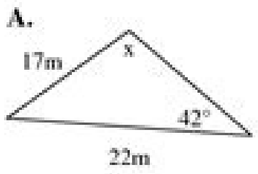
A. Slack (2013)



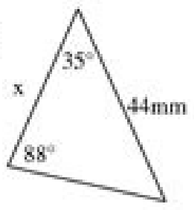
SINE LAW WORKSHEET

1. Solve for the unknown in each triangle. Round to the nearest tenth.

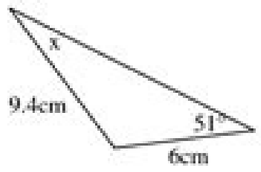
A.



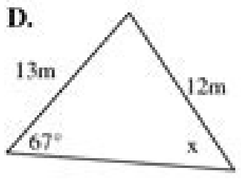
B.



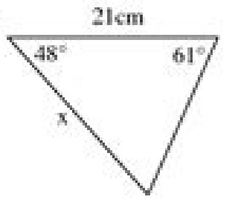
C.



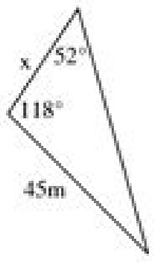
D.



E.

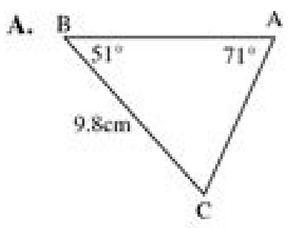


F.

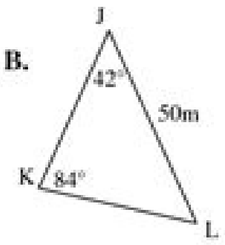


2. Solve for <u>all</u> missing sides and angles in each triangle. Round to the nearest tenth.

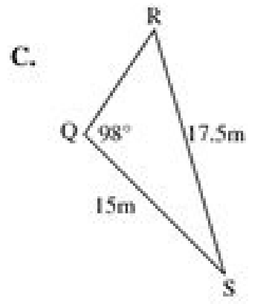
A.



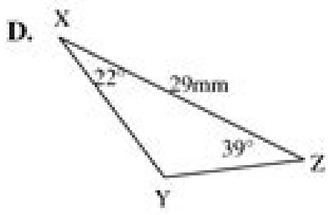
B.



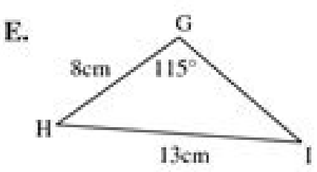
C.



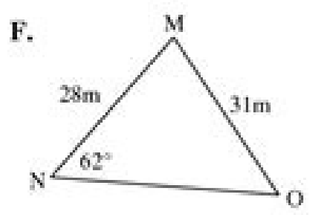
D.



E.



F.



Homework - due Friday 11/9/09

1) Find the length x in each of these triangles.

a

b

c

2) In triangle ABC, AB = 5 cm, BC = 6 cm and angle ABC = 55°. Find AC.

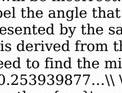
3) A triangle has two sides of length 40 cm and an angle of 110°. Work out the length of the third side of the triangle.

May 06, 2015

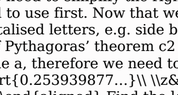
Worksheet

Task 1 - Find the length or angle x in each of these triangles

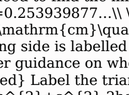
a)



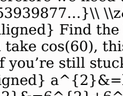
b)



c)



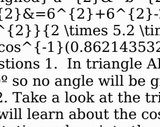
d)



Task 2 - Exam question

In triangle ABC, $AB = 11$ cm, $BC = 9$ cm and $CA = 10$ cm.

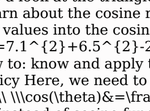
Work out the angle CAB.



Task 3 - Exam question

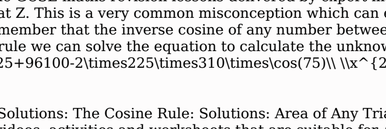
The diagram shows a sketch of a field ABCD. A farmer wants to put a new fence round the perimeter of the field.

Calculate the perimeter of the field.



Extension

The angle of elevation of the top of a building measured from point A is 25°. At point D which is 15m closer to the building, the angle of elevation is 35° Calculate the height of the building.



As we need to know the angle at Z, this will be labelled as A and the opposing side is labelled as a. Get your free cosine rule worksheet of 20+ questions and answers. Here, we need to find the missing angle A, therefore we need to state the cosine rule with cos(A) as the subject: \begin{aligned} \\\cos(A)&=\frac{b^2+c^2-a^2}{2bc}\\ \\\cos(\theta)&=\frac{29.7^2+13.8^2-27.5^2}{2\times29.7\times13.8}\\ \end{aligned} \begin{aligned} \\\cos(\theta)&=\frac{882.09+190.44-756.25}{819.72}\\ \\\cos(\theta)&=\frac{316.28}{819.72}\\ \\\cos(\theta)&=0.385839067…\\ \\\theta&=\cos^{-1}(0.385839067…)\\ \\\theta&=67.3^{\circ}\quad(3sf)\\ \end{aligned} Find the size of the angle θ for triangle XYZ. In order to use the cosine rule we need to know an angle that lies between the two sides. For more information, see Trigonometric Graphs. Here, we need to find the missing angle A, therefore we need to state the cosine rule with cos(A) as the subject: \begin{aligned} \\\cos(A)&=\frac{b^2+c^2-a^2}{2bc}\\ \\\cos(\theta)&=\frac{6^2+12^2-12^2}{2\times6\times12}\\ \end{aligned} \begin{aligned} \\\cos(\theta)&=\frac{36+144-144}{144}\\ \\\cos(\theta)&=\frac{36}{144}\\ \\\cos(\theta)&=0.25\\ \\\theta&=\cos^{-1}(0.25)\\ \\\theta&=76^{\circ}\quad(2sf)\\ \end{aligned} Find the size of the angle θ for triangle EFG. To do this we need to know the two arrangements of the formula and what each variable represents. For this question, we need to find the side with length x which is opposite the angle at R. We can then label vertex Z as A, the length z as a, and the other angles and sides accordingly. The simple answer is no because of the nature of the cosine function and the link to finding an angle inside a triangle. (3 marks) \cos(A)=\frac{4.5^{2}+8.3^{2}-6.1^{2}}{2\times 4.5 \times 8.3} (1) \begin{aligned} \cos(A)&=\frac{51.93}{74.7}\\\\ \cos(A)&=0.695… \end{aligned} (1) \begin{aligned} A&=\cos^{-1}(0.695…)\\\\ A&=46.0^{\circ} \end{aligned} (1) 2. The quadrilateral ABCD is made from two triangles. 2State the cosine rule then substitute the given values into the formula. (5 marks) \tan(44)=\frac{BD}{76} (1) \begin{aligned} BD&=76 \times \tan(44)\\\\ BD&=73.39 \mathrm{cm} \end{aligned} (1) (AD)^{2}=63^{2}+73.39^{2}-2 \times 63 \times 73.39 \times \cos(79) (1) \begin{aligned} (AD)^{2}&=9355.0921-9247.14\cos(79)\\\\ (AD)^{2}&=7590.655 \end{aligned} (1) AD = 87.12cm (1) 3. A satellite takes measurements to some triangulation stations. In order to find the missing side or angle of a triangle using the cosine rule: Label each angle (A, B, C) and each side (a, b, c) of the triangle.State the cosine rule then substitute the given values into the formula.Solve the equation. Write your answer to 3 significant figures. We can then use Pythagoras' theorem to work out c2 and a2 separately, and then we use the cosine function to calculate the width of one of the two triangles. Note: You are not required to know how to derive the cosine rule, however the derivation only requires knowledge of the GCSE curriculum, similar to the derivation of the quadratic formula. 2State the cosine rule then substitute the given values into the formula. Give your answer to 3 sf. The cosine rule (or the law of cosines) is a formula which can be used to calculate the missing sides of a triangle or to find a missing angle. It is common to use one of the angles in the triangle in place of the angle at A and therefore the calculation will be incorrect. First we need to simplify the right hand side of the equation, and then square root the solution to find the value for x. Here, the vertices are already labelled, and the angle we need to find is already A so we just need to fill in the opposing sides with a, b, and c. Write your answer to 2 decimal places. Here, it is important for us to label the angle that we need to use first. Now that we know which sides and angles we have, we need to substitute this information into the cosine rule. Label each angle (A, B, C) and each side (a, b, c) of the triangle. This triangle has exactly the same set up as the sine rule, with the sides represented by lower case letters and the opposite angles represented by the same capitalised letters, e.g. side b is opposite the angle at B. (3 marks) a^{2}=230^{2}+201^{2}-2 \times 230 \times 201 \times \cos(4) (1) \begin{aligned} a^{2}&=93310-92460 \times \cos(4)\\\\ a^{2}&=1066.228 \end{aligned} (1) \begin{aligned} a&=\sqrt{1066.228}\\\\ a&=32.7\mathrm{km} \end{aligned} (1) The cosine rule is derived from the use of Pythagoras' theorem c2 = a2 + b2 and the cosine function: \[\cos(\theta)=\frac{A}{H}\] To do this, the triangle is split into two right-angled triangles. Calculate the distance between the triangulation stations. Label each angle (A, B, C) and each side (a, b, c) of the triangle. Work out the size of the angle BAC . Here, we need to find the missing side a, therefore we need to state the cosine rule with a2 as the subject: \begin{aligned} \\a^{2}&=b^{2}+c^{2}-2bc\cos(A)\\ \\z^{2}&=0.8^{2}+0.6^{2}-2\times0.8\times0.6\times\cos(39)\\ \end{aligned} \begin{aligned} \\z^{2}&=0.64+0.36-2\times0.8\times0.6\times\cos(39)\\ \\z^{2}&=1-0.746060123…\\ \\z^{2}&=0.253939877…\\ \\z&=\sqrt{0.253939877…}\\ \\z&=0.504\mathrm{mm}\quad(3dp)\\ \end{aligned} Find the size of the angle θ for the isosceles triangle ABC. \begin{aligned} \\x^{2}&=50.41+42.25-92.3\times\cos(32)\\ \\x^{2}&=92.66-78.27483928…\\ \\x^{2}&=14.38516072…\\ \\x&=\sqrt{14.38516072…}\\ \\x&=3.79\mathrm{cm}\quad(2dp)\\ \end{aligned} Find the length of PQ for triangle PQR, correct to 3 significant figures. Angle B and angle C can be either vertex with side b and side c being their opposite sides. State the cosine rule then substitute the given values into the formula. As we need to know the angle at F, this will be labelled as A and the opposing side is labelled as a. E.g.If you take cos(60), this will return the same answer on a calculator as cos(300). Write your answer to 2 significant figures. The other two vertices are then labelled as B and C with sides b and c labelled accordingly. There are also cosine rule worksheets based on Edexcel, AQA and OCR exam questions, along with further guidance on where to go next if you're still stuck. Practice cosine rule questions Label the triangle: \begin{aligned} a^{2}&=b^{2}+c^{2}-2bc \cos(A)\\\\ x^{2}&=12^{2}+8^{2}-2 \times 12 \times 8 \times \cos(97)\\\\ x^{2}&=208-192 \cos(97)\\\\ x^{2}&=231.3989139\\\\ x&=\sqrt{231.3989139}\\\\ x&=15.2 ~(1\mathrm{dp}) \end{aligned} Label the triangle: \begin{aligned} a^{2}&=b^{2}+c^{2}-2bc \cos(A)\\\\ x^{2}&=6.3^{2}+5.4^{2}-2 \times 6.3 \times 5.4 \times \cos(59)\\\\ x^{2}&=68.85-68.04\cos(59)\\\\ x^{2}&=33.80680938 \\\\ x&=\sqrt{33.80680938}\\\\ x&=5.8 ~(1\mathrm{dp}) \end{aligned} Label the triangle: \begin{aligned} a^{2}&=b^{2}+c^{2}-2bc \cos(A)\\\\ x^{2}&=6^{2}+6^{2}-2 \times 6 \times 6 \times \cos(122)\\\\ x^{2}&=72-72 \cos(122)\\\\ x^{2}&=110.154187\\\\ x&=\sqrt{110.145187}\\\\ x&=10.5 ~(1\mathrm{dp}) \end{aligned} Label the triangle: \begin{aligned} \cos(A) &= \frac{b^{2}+c^{2}-a^{2}}{2bc}\\\\ \cos(\theta)&=\frac{5.2^{2}+7.8^{2}-12^{2}}{2 \times 5.2 \times 7.8}\\\\ \cos(\theta)&= -0.6918145957\\\\ \theta&=\cos^{-1}(-0.6918145957)\\\\ \theta&=134^{\circ} \end{aligned} Label the triangle: \begin{aligned} \cos(A) &= \frac{b^{2}+c^{2}-a^{2}}{2bc}\\\\ \cos(\theta)&=\frac{15.1^{2}+9.8^{2}-8.3^{2}}{2 \times 15.1 \times 9.8}\\\\ \cos(\theta)&= 0.8621435329\\\\ \theta&=\cos^{-1}(0.8621435329)\\\\ \theta&=30.4^{\circ} \end{aligned} Label the triangle: \begin{aligned} \cos(A) &= \frac{b^{2}+c^{2}-a^{2}}{2bc}\\\\ \cos(\theta)&=\frac{25^{2}+25^{2}-7^{2}}{2 \times 25 \times 25}\\\\ \cos(\theta)&= 0.9608\\\\ \theta&=\cos^{-1}(0.9608)\\\\ \theta&=16.10^{\circ} \end{aligned} Cosine rule GCSE exam questions 1. In triangle ABC, AB = 4.5mm, AC = 8.3mm and BC = 6.1mm. DOWNLOAD FREE Find the value of x for triangle ABC, correct to 2 decimal places. We need to label the angle R as A. Take a look at the diagram, Here, the angle at A lies between the sides of b, and c (a bit like an angle sandwich). The sum of angles in a triangle must add to 180º so no angle will be greater than 180º. Here are the two versions: To find a missing side: \\a^{2}=b^{2}+c^{2}-2bc\cos(A)\\ To find a missing angle: \cos(A)=\frac{b^2+c^2-a^2}{2bc} One equation is a rearrangement of the other. Incorrectly using the cosine rule as a2 = b2 + c2 + 2bcCos(A) Here, 2bcCos(A) has been added to b2 + c2. Take a look at the triangle ABC below. As we know the other two angles, 180 − (79 + 62) = 39º so Z = 39º. Purposeful practice, lots of things to think about, clear explanations and examples with differentiated worksheets.Area of non-RA triangles RAG September 9, 2019 corbettmaths Click here for Answers Advanced Trigonometry Here we will learn about the cosine rule including how to use the cosine rule to find missing sides and angles in a non right-angled triangles and when to use the cosine rule instead of using the sine rule, Pythagoras' Theorem or SOHCAHTOA. A common error is to incorrectly substitute into the cosine rule using the side length 'a' instead of the angle A Substituting values into the cosine rule without the correct application of BIDMAS It is important to follow the order of operations when evaluating the cosine rule. Here, we need to find the missing side a, therefore we need to state the cosine rule with a2 as the subject: \begin{aligned} \\a^{2}&=b^{2}+c^{2}-2bc\cos(A)\\ \\x^{2}&=7.1^{2}+6.5^{2}-2\times7.1\times6.5\times\cos(32)\\ \end{aligned} 3Solve the equation. The vertices are already labelled with A located on the angle we are using so we only need to label the opposite sides of a, b, and c. Write your answer to a suitable degree of accuracy. Here, we need to label each vertex and angle. You have now learned how to: know and apply the cosine rule to find unknown lengths and angles Pythagoras' theoremAlternate anglesBearings Prepare your KS4 students for maths GCSEs success with Third Space Learning. Please read our Cookies Policy for information on how we use cookies and how to manage or change your cookie settings.AcceptPrivacy & Cookies Policy Here, we need to find the missing angle A, therefore we need to state the cosine rule with cos(A) as the subject: \begin{aligned} \\\cos(A)&=\frac{b^2+c^2-a^2}{2bc}\\ \\\cos(\theta)&=\frac{7.29+14.44-26.01}{20.52}\\ \\\cos(\theta)&=\frac{-4.28}{20.52}\\ \\\cos(\theta)&=-0.2085769981…\\ \\\theta&=\cos^{-1}(-0.2085769981…)\\ \\\theta&=102.04^{\circ}\quad(2dp)\\ \end{aligned} Pythagoras' Theorem and trigonometry A common error is to use Pythagoras' Theorem instead of trigonometry to find the missing side of the non right angle triangle Sine function instead of cosine function A common error is to use the sine function instead of cosine function Incorrect labelling of the vertices and sides 'A' is the included angle between the two sides b and c. As these are calculated slightly differently, we can rearrange the cosine rule to suit what we are trying to find. Find the length AD. Find out more about our GCSE maths revision programme. The other vertices are labelled as B and C (it doesn't matter which) and their opposite side b and c as given below. This is the cosine rule: \[\\a^{2}=b^{2}+c^{2}-2bc\cos(A)\\\] We can use the cosine rule to find missing sides and missing angles in triangles. Weekly online one to one GCSE maths revision lessons delivered by expert maths tutors. Following conversations on Twitter about teaching sine and cosine rules (and area of a non-right-angled triangle), I am pretty pleased with this lesson. We can then solve this equation to find the missing side or angle. In order to find the length of z, we need to know the opposite angle at Z. This is a very common misconception which can easily be avoided. Label each angle (A, B, C) and each side (a, b, c) of the triangle. The other vertices are labelled as B and C and their opposite side b and c respectively. 3Solve the equation. We use essential and non-essential cookies to improve the experience on our website. It is important to remember that the inverse cosine of any number between 0 and -1 will return an obtuse angle. We always label the angle we are going to be using as A, then it doesn't matter how you label the other vertices (corners). DOWNLOAD FREE x Get your free cosine rule worksheet of 20+ questions and answers. Once everything is substituted into the cosine rule we can solve the equation to calculate the unknown side or angle. Here, we need to find the missing side a, therefore we need to state the cosine rule with a2 as the subject: \begin{aligned} \\a^{2}&=b^{2}+c^{2}-2bc\cos(A)\\ \\x^{2}&=225^{2}+310^{2}-2\times225\times310\times\cos(75)\\ \end{aligned} \begin{aligned} \\x^{2}&=50625+96100-2\times225\times310\times\cos(75)\\ \\x^{2}&=146725-36105.25679…\\ \\x^{2}&=110619.7432…\\ \\x&=\sqrt{110619.7432…}\\ \\x&=333\mathrm{m}\quad(3sf)\\ \end{aligned} Find the length of z for triangle XYZ. Includes reasoning and applied questions. Is there an ambiguous case for the cosine rule like there is for the sine rule?

The Sine Rule: Solutions: The Cosine Rule: Solutions: Area of Any Triangle: Solutions: Mixed Cosine, Sine and Area of Triangle: Solutions: 3D Pythagoras: Solutions: Inverse and Composite Functions: Solutions: ... If you're confused with any question on our Edexcel GCSE Maths Worksheets, please make a thread about it on the forum and someone ... A collection of videos, activities and worksheets that are suitable for A Level Maths. C2 Sine and Cosine Rule Questions in Context Bearings Examples: Fred is standing at a point looking north. He walks on a bearing 056° for 9.8km before stopping. He then walks an additional 3.5 km on a bearing of 112° before stopping to rest. 07/10/2019 · The Corbettmaths Textbook Exercise on Sine Rule. Videos, worksheets, 5-a-day and much more These lessons included in this resource revise Pythagoras Theorem, the knowledge of Right Angled Trigonometry, the knowledge of the sine rule cosine rule and 3D trigonometry. Accompanied with the lessons are worksheets for students to attempt in class or as homework. Plenty of revision for all typ... Maths Genie - A Level Maths revision page. Exam questions for C1, C2, C3, C4, S1 and M1 arranged by module and topic. Use our printable 9th grade worksheets in your classroom as part of your lesson plan or hand them out as homework. Our 9th grade math worksheets cover topics from … For all triangles, angles and sides are related by the law of cosines and law of sines (also called the cosine rule and sine rule). Existence of a triangle Condition on the sides. The triangle inequality states that the sum of the lengths of any two sides of a triangle must be greater than or equal to the length of the third side. That sum can ... Domain of arcus cosine is [-1, 1] and codomain $ [0, \pi]$. You do everything the same as for the sine. Graph of arcus cosine is symmetrical to the graph of cosine considering line $ x = y$. first mark your endpoints, and line $ x = y$, and do the symmetrical mapping. Graph of arcus tangent is gained the same. Prepare your students for calculus with topics like continuity, limits, rate of change, vectors, matrices, and more. Use our printable precalculus worksheets for in … Derivative Worksheets. Derivative Worksheets include practice handouts based on power rule, product rule, quotient rule, exponents, logarithms, trigonometric angles, hyperbolic functions, implicit differentiation and more. Power Rule in

Differential Calculus. Apply the power rule of derivative to solve these pdf worksheets. Law of Sines and Cosines Worksheets Law of Sines and Cosines Worksheet (This sheet is a summative worksheet that focuses on deciding when to use the law of sines or cosines as well as on using both formulas to solve for a single triangle's side or angle) ; Law of Sines; Ambiguous Case of the Law of Sines; Law of Cosines The reason why an electromechanical alternator outputs sine-wave AC is due to the physics of its operation. The voltage produced by the stationary coils by the motion of the rotating magnet is proportional to the rate at which the magnetic flux is changing perpendicular to the coils (Faraday's Law of Electromagnetic Induction).That rate is greatest when the magnet poles are ... At Cazoom Maths we provide a trigonometry worksheet for every question your student might encounter, from a sine and cosine rule worksheet with answers, special triangles worksheet and 3d trigonometry worksheet questions and answers. Your student will have no fear of angles and triangles with the help of our Cazoom Maths Trigonometry worksheets. Algebra 2/Trig R Homework Worksheets; ... The Multiplication Rule Video Notes: Mult Rule 1 Video Notes: Mult Rule 2. T 5/19 Notes: Independence Video Notes: Independence 1 Video Notes: Independence 2 ... Graphing Sine and Cosine Video Notes: Graph Sin ... 09/09/2019 · Sine Rule and Cosine Rule Practice Questions Click here for Questions . Click here for Answers. Practice Questions Transformations are a process by which a shape is moved in some way, whilst retaining its identity. All transformations maintain the basic shape and the angles within the shape that is being transformed. Write equations of sine and cosine functions from graphs ... 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When we first learn the cosine function, we learn how to use it to find missing side-lengths & angles in right-angled triangles. The cosine rule is an equation that can help us find missing side-lengths and angles in any triangle.. Make sure you are happy with the following topics before continuing: – Trigonometry – Rearranging Formula Sine and Cosine Rules Following conversations on Twitter about teaching sine and cosine rules (and area of a non-right-angled triangle), I am pretty pleased with this lesson. Purposeful practice, lots of things to think about, clear explanations and examples with differentiated worksheets. Ready-to-use mathematics resources for Key Stage 3, Key Stage 4 and GCSE maths classes. The Sine Rule. When we first learn the sine function, we learn how to use it to find missing side-lengths & angles in right-angled triangles. The sine rule is an equation that can help us find missing side-lengths and angles in any triangle.. 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