Cosine law and sine law worksheet

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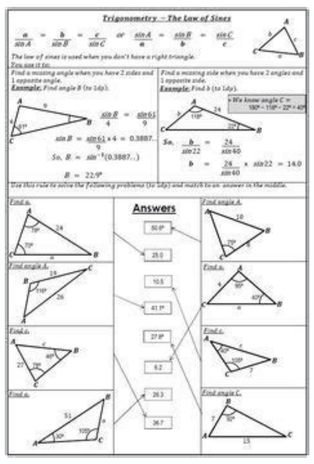

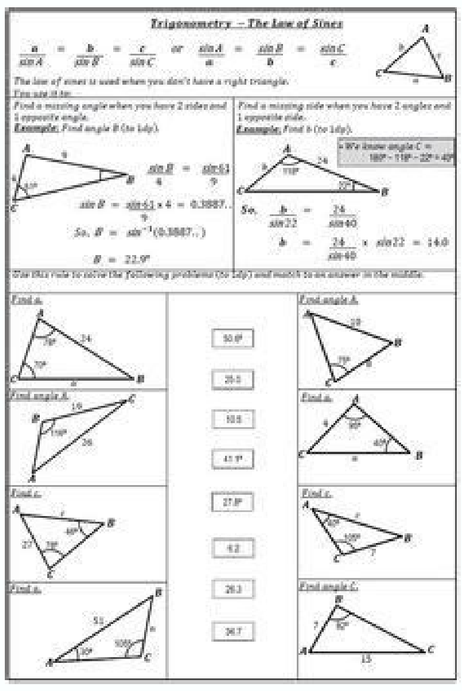

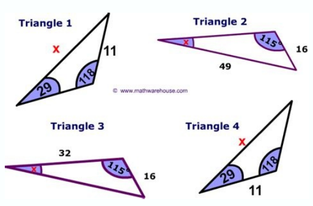

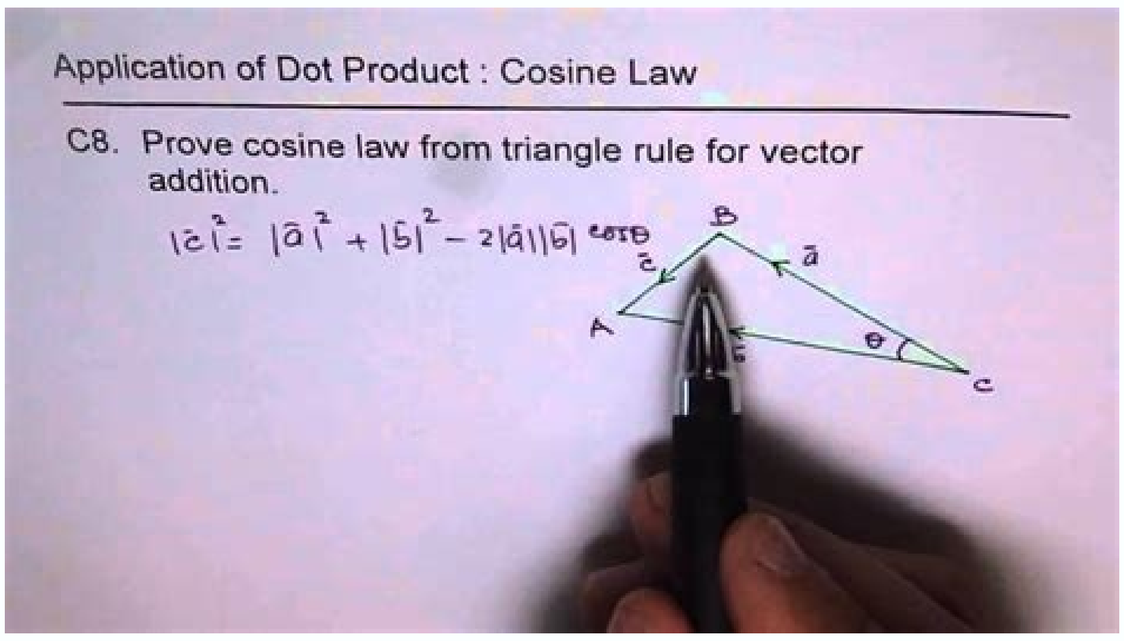

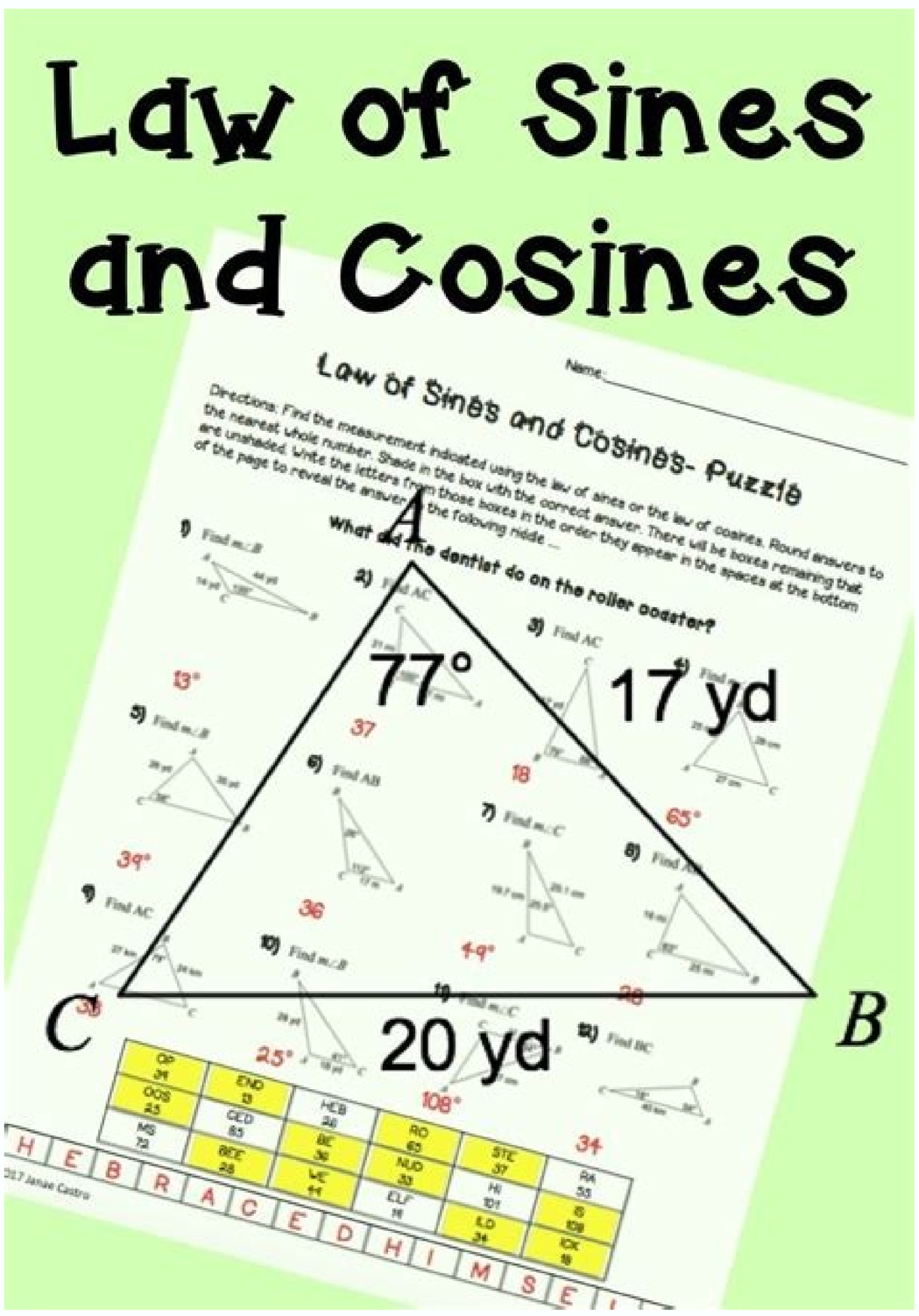

Extra practice - sine law and cosine law worksheet answers with work. Sine law and cosine law word problems worksheet pdf. Kuta software sine law and cosine law worksheet answers with work. Sine law and cosine law worksheet answer key. When to use sine law and when to use cosine law.

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. 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. 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. To do this we need to know the two arrangements of the formula and what each variable represents. Take a look at the triangle ABC below. 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. 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. Label each angle (A, B, C) and each side (a, b, c) of the triangle. In order to use the cosine rule we need to consider the angle that lies between two known sides. 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). 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). Angle B and angle C can be either vertex with side b and side c being their opposite sides. 2State the cosine rule then substitute the given values into the formula. Now that we know which sides and angles we have, we need to substitute this information into the cosine rule. We can then solve this equation to find the missing side or angle. As these are calculated slightly differently, we can rearrange the cosine rule to suit what we are trying to find. 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. 3Solve the equation. Once everything is substituted into the cosine rule we can solve the equation to calculate the unknown side or angle. 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. Get your free cosine rule worksheet of 20+ questions and answers. Includes reasoning and applied questions. DOWNLOAD FREE x Get your free cosine rule worksheet of 20+ questions and answers. Includes reasoning and applied questions. DOWNLOAD FREE Find the value of x for triangle ABC, correct to 2 decimal places. Label each angle (A, B, C) and each side (a, b, c) of the triangle. 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. 2State the cosine rule then substitute the given values into the formula. 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. First we need to simplify the right hand side of the equation, and then square root the solution to find the value for x. \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. Label each angle (A, B, C) and each side (a, b, c) of the triangle. Here, it is important for us to label the angle that we need to use first. For this question, we need to find the side with length x which is opposite the angle at R. We need to label the angle R as A. The other two vertices are then labelled as B and C with sides b and c labelled accordingly. State the cosine rule then substitute the given values into the formula. 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. Write your answer to a suitable degree of accuracy. Label each angle (A, B, C) and each side (a, b, c) of the triangle. In order to find the length of z, we need to know the opposite angle at Z. As we know the other two angles, 180 − (79 + 62) = 39º so Z = 39º. We can then label vertex Z as A, the length z as a, and the other angles and sides accordingly. State the cosine rule then substitute the given values into the formula. 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. Write your answer to 2 significant figures. Label each angle (A, B, C) and each side (a, b, c) of the triangle. 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. State the cosine rule then substitute the given values into the formula. 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. Write your answer to 3 significant figures. Label each angle (A, B, C) and each side (a, b, c) of the triangle. Here, we need to label each vertex and angle. As we need to know the angle at F, this will be labelled as A and the opposing side is labelled as a. The other vertices are labelled as B and C (it doesn’t matter which) and their opposite side b and c as given below. State the cosine rule then substitute the given values into the formula. 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. Write your answer to 2 decimal places. Label each angle (A, B, C) and each side (a, b, c) of the triangle. Here, we need to know the angle at Z, this will be labelled as A and the opposing side is labelled as a. The other vertices are labelled as B and C and their opposite side b and c respectively. State the cosine rule then substitute the given values into the formula. As 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{2.7^2+3.8^2-5.1^2}{2\times2.7\times3.8}\\ \end{aligned} \begin{aligned} \\\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. 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. Incorrectly using the cosine rule as a2 = b2 + c2 + 2bcCos(A) Here, 2bcCos(A) has been added to b2 + c2. This is a very common misconception which can easily be avoided. 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. Is there an ambiguous case for the cosine rule like there is for the sine rule? The simple answer is no because of the nature of the cosine function and the link to finding an angle inside a triangle. E.g.If you take cos(60), this will return the same answer on a calculator as cos(300). The sum of angles in a triangle must add to 180º so no angle will be greater than 180º. It is important to remember that the inverse cosine of any number between 0 and -1 will return an obtuse angle. For more information, see Trigonometric Graphs. 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. Work out the size of the angle BAC . Give your answer to 3 sf. (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. Find the length AD. (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. Calculate the distance between the triangulation stations. (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. 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. 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. Weekly online one to one GCSE maths revision lessons delivered by expert maths tutors. Find out more about our GCSE maths revision programme. We use essential and non-essential cookies to improve the experience on our website. Please read our Cookies Policy for information on how we use cookies and how to manage or change your cookie settings.AcceptPrivacy & Cookies Policy

The sine law gives the ratio of the sides and the angle opposite to the side. As an example, the ratio is taken for the side 'a' and its opposite angle 'A'. (sin A)/a = (sin B)/b = (sin C)/c. Cosine Law: The cosine law helps to find the length of aside, for the given lengths of the other two sides and the included angle. As an example the ... (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; Sine, Cosine, Tangent Worksheets. SOHCAHTOA; Sine, Cosine, Tangent, to Find Side Length Using SOHCAHTOA for Sine, Cosine & Other Trig Problems . ... Worksheet & Practice Problems - Practice Converting Radians to Degrees ... Using the Law of Cosines to Solve Oblique Triangles . 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) ... Graphing Sine and Cosine Worksheet; Sine Cosine Graphs with Vertical Translations; Sine, Cosine, Tangent Graphs with Phase ... Objective. Students will practice deciding when to apply the law of cosines vs the law of sines to calculate the side length of a triangle and to calculate the measure of an angle. The second part of the sheet focuses on problems that require using the formulas more than once (law of cosines to get side, then law of sides to get angle etc..) () Aug 22, 2022 · From the law of sines, s ... For the best accuracy, the Taylor series of f (x) f(x) f (x) itself should be used as opposed to the series for sine and cosine separately: Small-angle approximations to f (x) f(x) f (x) based on different truncations of the Taylor series for cosine. The refined truncation is necessary to obtain any useful precision ... The basis functions are sine and cosine waves with increasing frequencies, i.e. F(0,0) represents the DC-component of the image which corresponds to the average brightness and F(N-1,N-1) represents the highest frequency. In a similar way, the Fourier image can be re-transformed to the spatial domain. The inverse Fourier transform is given by: Grab our trigonometric ratio worksheets to hone your skills in finding the value of six trig ratios sine, cosine, tangent, cosecant, secant and cotangent. ... Law of Sines; Law of Cosines; Solving Triangles; Principal Solutions - Trig Equations ... The 1st part of the worksheet includes degrees while the 2nd has radians. 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 ... Quiz & Worksheet - Law of Detachment in Geometry. 71K. Geometry. Quiz & Worksheet - Law of Sines. 23K. ... Quiz & Worksheet - Sine & Cosine of Complementary Angles. 5.7K. Geometry. Quiz ... Law of Sine Functions in Trigonometry. According to law of sines in trigonometry, a relation is established between the sides a, b, and c and angles opposite to those sides A, B and C for an arbitary triangle. The relation is as follows. In the above diagram, A, B, C are the angles while a, b, c are the lengths of the sides. Now, according to ... A compilation of free math worksheets categorized by topics. Some worksheets are dynamically generated to give you a different set to practice each time. They are also interactive and will give you immediate feedback, Number, fractions, addition, subtraction, division, multiplication, order of operations, money and time worksheets, with video lessons, examples and step-by-step ... Math is the basic building blocks that deals with all sort of calculations such as Addition, subtraction, multiplication, division and much more. Mathematics is useful in every walk of our lives. Practice Maths with Vedantu to understand concepts right from basic maths to Algebra, Geometry, Trigonometry, Arithmetic, Probability, Calculus and many more. Learn the important rules - the Sine Law/rule and the Cosine Law/rule; relating the angles and sides of a triangle from this printable display chart for ...