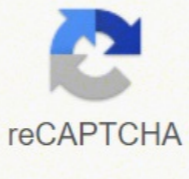




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Special right triangles worksheet

With this 30 60 90 triangle calculator you can solve this special right triangle. Whether you're looking for the 30 60 90 triangle formulas for hypotenuse, wondering about 30 60 90 triangle ratio or simply you want to check how this triangle looks like, you've found the right website. Keep scrolling to learn more about this specific right triangle or check out our tool for the twin of our triangle - 45 45 90 triangle calc. Assume that the shorter leg of a 30 60 90 triangle is equal to a. Then: the second leg is equal to $a\sqrt{3}$ the hypotenuse is $2a$ the area is equal to $a^2\sqrt{3}/2$ the perimeter equals $a(3 + \sqrt{3})$ The formulas are quite easy, but what's the math behind them? Let's check which methods you can use to prove them: Using the properties of the equilateral triangle Did you notice that our triangle of interest is simply a half of the equilateral triangle? If you remember the formula for the height of such a regular triangle, you have the answer what's the second leg length. It's equal to side times a square root of 3, divided by 2; $h = c\sqrt{3}/2$, $h = b$ and $c = 2a$ so $b = c\sqrt{3}/2 = a\sqrt{3}$ 2. Using trigonometry If you are familiar with the trigonometric basics, you can use, e.g. the sine and cosine of 30° to find out the others sides lengths: $a/c = \sin(30^\circ) = 1/2$ so $c = 2a$ $b/c = \sin(60^\circ) = \sqrt{3}/2$ so $b = c\sqrt{3}/2 = a\sqrt{3}$ Also, if you know two sides of the triangle, you can find the third one from the Pythagorean theorem. However, the methods described above are more useful as they need to have only one side of the 30 60 90 triangle given. If we know the shorter leg length a, we can find out that: If the longer leg length b is the one parameter given, then: For hypotenuse c known, the legs formulas look as follows: Or simply type your given values and the 30 60 90 triangle calculator will do the rest! The most important rule to remember is that this special right triangle has one right angle and its sides are in an easy-to-remember consistent relationship with one another - the ratio is $a : a\sqrt{3} : 2a$. Also, the unusual property of this 30 60 90 triangle is that it's the only right triangle with angles in an arithmetic progression. Triangles (set square). The red one is the 30-60-90 degree angle triangle In 30 60 90 triangle the ratios are: $1 : 2 : 3$ for angles ($30^\circ : 60^\circ : 90^\circ$) $1 : \sqrt{3} : 2$ for sides ($a : a\sqrt{3} : 2a$) You read about 30 60 90 triangle rules. Now it's high time you practiced! Enter the given value. Let's say we want to check how to solve the 30 60 90 triangle from our triangle set. There's a scale on the longer leg, assume its length is 11 inches. All the other values appear! Thanks to this 30 60 90 triangle calculator you find out that: shorter leg is 6.35 in - because $a = b\sqrt{3}/3 = 11\text{in} * \sqrt{3}/3 \sim 6.35$ in hypotenuse is equal to 12.7 in - because $c = 2b\sqrt{3}/3 = 2a \sim 12.7$ in area is 34.9 in^2 - it's the result of multiplying the legs length and dividing by 2 $\text{area} = a^2\sqrt{3} \approx 34.9$ in perimeter equals 30.05 in - adding all sides gives that result $\text{perimeter} = a + a\sqrt{3} + 2a = a(3 + \sqrt{3}) = 30.05$ in If you're seeing this message, it means we're having trouble loading external resources on our website. If you're behind a web filter, please make sure that the domains *.kastatic.org and *.kasandbox.org are unblocked. Find free maths worksheets organised by year level and topics. 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There can be 3, 2 or no equal sides/angles: Three equal sides Three equal angles, always 60° Two equal sides Two equal angles No equal sides No equal angles How to remember? Alphabetically they go 3, 2, none. Equilateral: "equal" lateral (lateral means side) so they have all equal sides Isosceles: means "equal legs", and we have two legs, right? Also ISOSeles has two equal "Sides" joined by an "Odd" side. Scalene: means "uneven" or "odd", so no equal sides. What Type of Angle? Triangles can also have names that tell you what type of angle is inside: All angles are less than 90° Has a right angle (90°) Has an angle more than 90° Combining the Names Sometimes a triangle will have two names, for example: Has a right angle (90°), and also two equal angles Can you guess what the equal angles are? Play With It ... Try dragging the points around and make different triangles: geometry/images/triangle.js?mode=type You might also like to play with the Interactive Triangle. Angles The three interior angles always add to 180° geometry/images/triangle.js?mode=angles The perimeter is the distance around the edge of the triangle: just add up the three sides: geometry/images/triangle.js?mode=perim The area is half of the base times height. "b" is the distance along the base "h" is the height (measured at right angles to the base) $\text{Area} = \frac{1}{2} \times b \times h$ The formula works for all triangles. Note: a simpler way of writing the formula is $bh/2$ (Note: 12 is the height, not the length of the left-hand side) Height = $h = 12$ Base = $b = 20$ Area = $\frac{1}{2} \times b \times h = \frac{1}{2} \times 20 \times 12 = 120$ The base can be any side. Just be sure the "height" is measured at right angles to the "base": geometry/images/triangle.js?mode=area (Note: You can also calculate the area from the lengths of all three sides using Heron's Formula.) Imagine you "doubled" the triangle (flip it around one of the upper edges) to make a square-like shape (a parallelogram) which can be changed to a simple rectangle: THEN the whole area is bh , which is for both triangles, so just one is $\frac{1}{2} \times bh$. 6702, 6708,720, 3134, 5032,627,723, 3132, 3133, 7502 Copyright © 2021 MathsIsFun.com

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