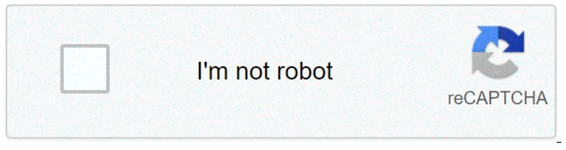

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Formula of area and perimeter of all shapes

Perimeter and Area: Perimeter: The perimeter of a form is the distance around that form. This distance can be formed by straight lines or curves. We can find the perimeter by adding the lengths of these lines and curves together. The first example we will consider is only straight lines. Example 1) Find the perimeter of the following form: To find the perimeter of this shape we will start in a corner and move clockwise around the shape by adding the pieces until we reach the starting point again. Note that in this form some of the lengths are not given and must be found. P= 5 + 6 + 7 + 8 + 2 + 12 = 46 As mentioned above we can have portions of circles as part of our form. To find their lengths, we must use the formula for distance around a circle or circumference of a circle. C= 2r Where "r" represents the length of the circle radius and is constant (about 3.14). In this course we will leave all the answers in their exact form (i.e. in terms of). Example 2) Find the perimeter of the following form: This shape consists of two line segments, a quarter circle and a semicircle. In addition to finding the length of the arches, we must also find the length of the missing part in the lower segment. P= 8 + 6 + 4 + 8 + 12 P= 28 + 10 Area: The area of a form is the number of 1 units per 1 square unit (square unit) which can fit into a form. If our shape is a rectangle or square this number is easy to find. All we have to do is multiply the length and width of the form. But if our shape tilted or curved parts, splitting it into smaller squares is not so easily realized. To find the area of such forms we must rely on formulas for the area of triangles and circles. The following table gives you formulas for the area of some basic forms.A=bh Triangle Circle A=r2 Now we can go back and find the area of the shape in2. example 3) find the area of the following form: to find the area of this form, we will divide it into three pieces; a rectangle (i,) a semicircle (ii) and a quarter circle (iii.) we will find the area of each piece separately and then find their sum. ii: a = 12´ 8 = 96 ii : a = 1⁄2 (62) = 1⁄2 (36) = 18 (we found 1⁄2 of the area of a complete circle) ii: a= 1⁄4 (82) = 1⁄4 (64) = 16 (we found 1⁄4 of the zone of a complete circle) a= 96 + 18 + 16 a= 96 + 34 practical problems: find the area and perimeter for the following: 1. 2. 3. problem sample solutions: 1. perimeter= 18 +12 + = 18+3+12+3= 30+6 area= 9+72+4.5= 72+13.5 2. perimeter= 10 +12 + = 22 + 5 area = 22 - = 22 – 12.5 (note that in this case we must subtract the areas, but the perimeter is still added. the perimeter is the distance around a form and the fact that this curved shape towards the inside does not make the distance shorter.) 3. perimeter= 24= 24 + 7 + 7 = 34 + 14 area = + 70 + 12.25 + 70 + 12.25 = 70 + 24.5 copyright © 1997 bamdad sami perimeter is a one-dimensional measure that is taken around the outside of a closed geometric shape. Let us begin our discussion on the concept of perimeter with an example. Figure 1. Figure 2. Giuseppe doesn't have a car so he has to drive the bus or walk wherever he goes. Monday must go to school, work and go home. his path is depicted in figure 1. The obvious question to ask in this situation is: “How many miles travel joseph on Monday”? to calculate, each distance: 3 + 6 + 6 = 15. joseph travels 15 miles on Monday. another way to work with this situation is to draw a form that represents the journey of trip of jussives and is labeled with the distance from one point to another. Note that the shape made by the path of juseppe is that of a geometric figure closed with three sides (a triangle) (see figure 2.) what we can ask about this form is: “What is theof theperimeter means “distance around a closed figure or shape” and to calculate we add each length: 3 + 6 + 6 = 15 our conclusion is the same as above: joseph travels 15 miles on Monday. However, what we did was model the situation with a geometric shape and then apply a specific geometric concept (perimeter) to the computer as far as joseph traveled. notes on the perimeter perimeter is a one-dimensional measure that represents the distance around a closed geometric figure or shape (without gaps.) to find the perimeter, add the lengths of each side of the shape. if there are units, include units in the final result. the units will always be of single size (i.e. feet, inches, meters, centimeters, etc.) to calculate the perimeter, our forms must be closed. Figure 3 shows the difference between a closed figure and an open figure. Figure 3. find the perimeter for each of the forms below. add the lengths of each side. Sometimes you have to guess if the lengths are not labeled. How do we find the perimeter of this more complicated form? solution continues to add those side lengths. 6 + 7 + 4 + 5 + 6 + 2 = 34 units if you look carefully at the forms in the previous examples, you might notice some ways to write each perimeter as a more explicit formula. see if the results of what we have done so far correspond to the formulas below. a triangle with lateral lengths, a, b, c: [latex]P=a+b+c\[/latex] square with lateral length to: [latex]P=a+a\\\\\[/latex] [latex]P=4a\[/latex] rectangle with lateral lengths to, b: [latex]P=a+b+late the distance around a circle has a special name calledTo find the circumference of a circle, we use this formula: C = 2πr Figure 4. In this formula, π is pronounced “pi”, and is defined as the circumference of afor its diameter: [latex]\displaystyle\pi=\frac{C}{d}\[/latex]. We replace the approximation 3.14. The letter r represents the radius of the circle. Let's see where the circumference formula comes from. Figure 4 shows a generic circle with radius r. Let us remember that in the formula, when calculating the circumference C = 2πr, they multiply as follows usually by replacing 3.14 instead of π: C = 2 × 3.14 × r Often, the use of ( ) will help to make the different parts of the formula easier to see: C = (2)×(3.14)×(r) Origins of C = 2πr As mentioned above, the special number π is defined as the circumference ratio of a circle to its diameter. We can write this in the form of equation as: [latex]\displaystyle\frac{C}{d}=\pi\\[/latex] We know from our previous work that to identify the unknown, C, we can move to the other side of the equation by writing C = πd. The diameter is all the way through the central circle so that the diameter is twice the radius. We can update C in radius terms like C = π(2r). With a small final reorganization of the order our parts are written in, we can say that C = 2πr. We use the formula to find the circumference of some circles. Find the circumference of each of the following circles. Let your answers first in exact form and then in rounded form (in place of cents). (Note that when a beam is given, its value is centered on a radius segment. When a diameter is given, its value is centered above a diameter segment.) Exact solutions 8π in; rounded by the exact response 25.13 in; rounded using 3.14 for π 25.12 in Exactly 12.44π m; rounded by the exact response 39.08 m; rounded using 3.14 for π 39.06 m π is an exact number. It's not rounded. 3.14 is a rounded shape approximation for π Why does it matter what shape we use? It is important because when we approach,the error in our final result. For this class, that error is generally acceptable. However, you will find in other subjects asor chemical, that level of accuracy is a concept of great importance. Let's see an example of the difference in forms. The moon's radius is about 1079 miles. What's the circumference? We solve this using both the exact shape and the rounded shape: Exact solution [latex]C=2\pi{r}= 2\pi(1079)=2158\pi\\\\\\[/latex] To round the exact solution, use the π button on the computer to get [latex]2158\pi\approx6779.56\\\\\\\\\\[/latex] Rounded solution [latex]C=2\pi{r}= 2(3.14)(1079)\approx6776.12\\\\\\[/latex] Note that our final results are different. This difference is the error created using 3.14 as initial approximation for π. When performing tasks and tests, read carefully the indications on each problem to see which form to use. Find the circumference or perimeter given in each situation described below. Include a shape design with the information included. Use examples to determine which forms to draw. Show all the work. As in examples, if the units are included then the units should be present in the final result. I turn to tenths unless otherwise indicated. Find the perimeter of a square with side length 2.17 feet. Find the perimeter of a rectangle with the sides of length 4.2 and 3.8. Find the perimeter of a triangle with sides of length 2, 5, 7. Find the circumference of a circle with a radius of 6 inches. Present exact answer and also calculate using 3.14 for π. Present rounded shape to the nearest tenth. Find the circumference of a circle with a diameter of 14.8 inches. Present exact answer and also calculate using 3.14 for π. Present rounded shape to the nearest tenth. Solutions 8.68 feet 16 14 Exactly 12π in, Rotoned 37.7 in Exactly 14.8π in, Rotoned 46.5 in Basic formulas for perimeter of straight forms and circumference of a circle will help us find the distancemore complicated figures. Find the distance around the following form. Final round answer to tenths and use 3.14 for π. Solution 34.7 in our knowledge ofgeometric shapes can be applied to solve problems of “real-life”. Wally wants to add a fence on the back of his house to make some space for his children to play safely (see diagram below). He began to measure his courtyard, but distracted and forgot to finish measuring before he went to the store. If you remember that the back wall of your house is 15 meters long, you have enough information to buy the fence you need? If so, how many feet should it buy? Solution 81 feet Area Let's take another look at Wally's courtyard by example 7 to introduce the next concept: area. Wally successfully fenced his yard, but now he wants to add some landscapes and create a fat area as below screenshot shown. He goes to the local lawn shop and discovers that to determine how much sod he needs, he has to understand the square footage of the area he wants to add grass. Going home, you realize that if you divide the grassy area into sections that are 1 foot by 1 foot and then count them, you can determine the square footage. That's the information Wally invented when he came home. Wally correctly determined the area of the rectangular grass section to be 30 square feet. Notes on the Area is a two-dimensional measure that represents the amount of space within a two-dimensional shape. To find the area, count the number of squares of units within the form. If there are units, include units in the final result. The units will always be two-dimensional (i.e. square feet, square meters, square miles, etc…) Find the area for each of the forms below. Remember to count the squares of the unit within the form. Is there a pattern that would make our job easier? How do we find the area for more complicated forms? Break the areas in forms that we recognize and add the values of the area together. If you look carefully at thein previous examples, you might notice some ways to write each area as a more explicit formula. see if the results of what wedone so far correspond the formulas below. square shape area with lateral length a latex]A=a\cdot{a}\[/latex latex]A=a^2\\\[/latex rectangle with lateral lengths a, b latex]A=a\cdot{b}\[/latex (see also this as latex) A=\text{length}\cdot\text{width} triangle shape with height h and base b latex]\displaystyle{A}=\frac{1}{2}bh=\frac{bh}{2}\\[/latex read as "the base time height of a half" note that h is the straight distance from the top of the triangle directly to the other side. the small box next to h indicates this. in mathematical terms the box indicates an angle 90o (right.) circle with radius r latex]A=\pi{r}^2\\[/latex reads as “pi times square radius” if the triangle is as depicted on the left, the height is drawn and measured out of the triangle. the formula area is the same. find the area for every situation described. create a shape design with the information included. show all the work. as in examples, if the units are included then the units should be present in the final result. use 3.14 for π and tenth round answers as necessary. find the area of a rectangle whose length is 12,9 meters and the height is a third such amount. find the area of a triangle with base latex]\displaystyle{24}\frac{1}{2}\\[/latex inch and height 7 inches. find the area of a circle with latex radius]\displaystyle{2}\frac{1}{3}\\[/latex inches. This answer in exact form and also calculate rounded shape using 3.14 for π. present rounded form to the nearest tenth. 55.5 m2 or 55.5 square meters (rounded) 85,8 in2 or 85,8 square inches (rounded) exact 49/9 π in2, rounded 17.1 in2 find the given area every situation described. include a design of the shape with theincluded. Show all the work. As in the examples, if the units are included then the units should be present in the final result. Round answers to tenthsotherwise indicated. Find the area of a square with side length 4.2 feet. Find the area of a rectangle with the sides of length 4.2 and 3.8. Find the area of a triangle with height 7 inches and base 12 inches. Find the area of a circle with a radius of 6 inches. Present exact answer and also calculate using 3.14 for π. Present rounded shape to the nearest tenth. Solutions 17.64 ft2 or 17.64 square feet 16.0 42 in2 or 42 square inches Exact 36π in2 or 36π square inches, Rotoned with 3.14 for π 113,0 in2 or 113,0 square inches The basic formulas for the area will help us find the area of more complicated figures. This is the same problem we found the perimeter first. Find the date form area. I buy using 3.14 for π and round to the nearest tenth. Rounded solution using 3.14 for π 25.9 in2 We can combine our area/perimeter knowledge to solve problems like this. Wally's still fixing his house and has a pavement project to complete. He wants to buy enough bamboo floors to cover the floor space in the rooms A, C and corridor B and enough bamboo board for the skirts in all spaces as well. How many square feet of paving and how many feet of a skirt should you buy? 256 ft2 floor solution, 108 ft edge

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