

have a π key on your calculator. This key will give you an approximation for π that varies according to how many digits your calculator holds.

CIRCUMFERENCE OF A CIRCLE

Now that you know about the irrational number π , it's time to start working with circles. The distance around a circle is called its circumference. There are many reasons why people need to find a circle's circumference. For example, the amount of lace edge around a circular skirt can be found by using the circumference formula. The amount of fencing for a circular garden is another example of when the circumference formula is needed.

Since π is the ratio of circumference to diameter, then the approximation of π times the diameter of the circle gives you the circumference of the circle. The diameter of a circle is the distance across a circle through its center. A radius is the distance from the center to the edge of the circle. One half the diameter is equal to the radius or two radii are equal to the length of the diameter.

$$d = 2r \text{ or } r = \frac{1}{2}d$$

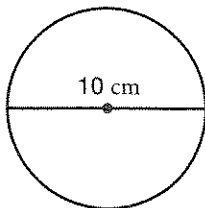
Here is a theorem that will help you to solve circumference problems:

Theorem: The circumference of any circle is the product of its diameter and π .
 $C = \pi d$ or $C = 2\pi r$

Since π is approximately 3.14 (and not exactly equal to 3.14), after you substitute the value 3.14 for π in the formula, you should use \approx instead of $=$. The symbol \approx means *approximately equal to*.

Examples: Find the approximate circumference of each circle. Use the approximation of 3.14 for π .

(a)



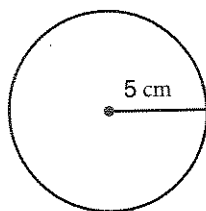
Solution: Use the $C = \pi d$ formula since the diameter of the circle is given.

$$C = \pi d$$

$$C \approx (3.14)(10)$$

$$C \approx 31.4 \text{ cm}$$

(b)



Solution: Use the $C = 2\pi r$ formula, since the radius of the circle is given.

$$C = 2\pi r$$

$$C \approx 2(3.14)(5)$$

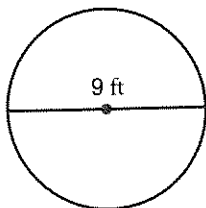
$$C \approx 31.4 \text{ cm}$$

Notice that these two circles have the same circumference because a circle with a diameter of 10 cm has a radius of 5 cm. You pick which formula to use based on what information you are given—either the circle's radius or its diameter.

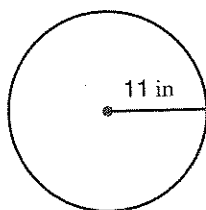
PRACTICE

Find the approximate circumference of each circle shown or described. Use 3.14 for π .

_____ 1.



_____ 2.



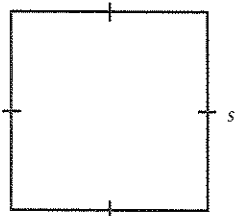
_____ 3. $d = 7 \text{ m}$

_____ 4. $r = 13 \text{ m}$

PERIMETER FORMULAS

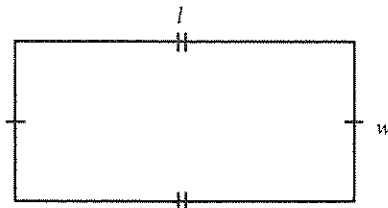
For certain shapes, you can find the perimeter in a more efficient manner. Using a standard formula for a particular shape is faster and easier than adding all the sides. The following are the most commonly used perimeter formulas.

Square



$$p = 4s$$

Rectangle

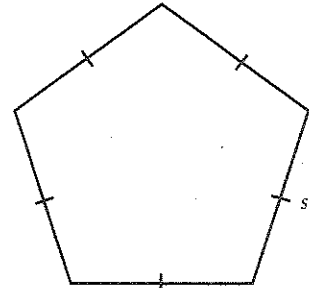


$$p = 2l + 2w$$

or

$$p = 2(l + w)$$

Regular Pentagon

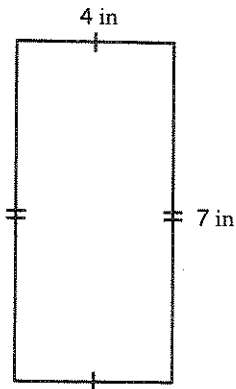


$$p = 5s$$

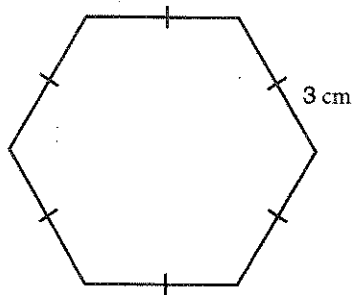
PRACTICE

Use a formula to find the perimeter of each polygon.

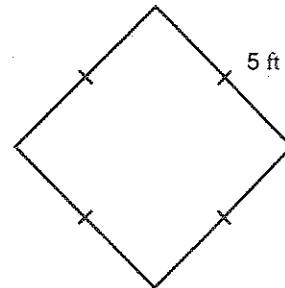
_____ 5.



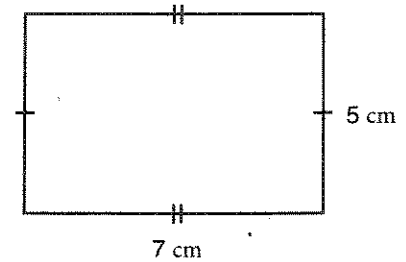
_____ 6.



_____ 7.



_____ 8.



_____ 9. square: $s = 20$ cm

_____ 10. rectangle: $l = 12$ in, $w = 6$ in

_____ 11. regular octagon: $s = 10$ in

_____ 12. regular pentagon: $s = 7$ ft