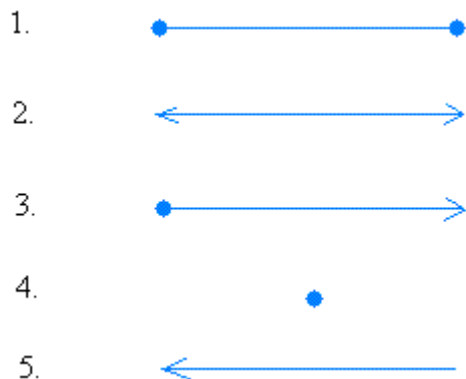


Geometry test solution

1.



Number 1 is a segment. A segment is a portion of a line with two endpoints.

Number 2 is a line. A line extends in both directions infinitely and this is represented by two arrows.

Number 3 is a ray. A ray has one endpoint and extends infinitely in one side.

Number 4 is a point

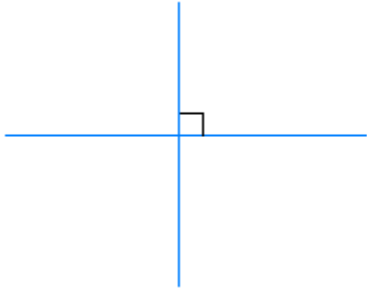
Number 5 is still a ray even though we don't see the endpoint.

6.

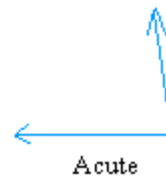
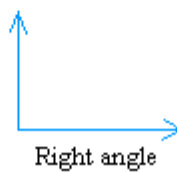
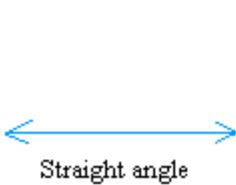
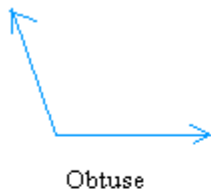
Parallel lines are lines that never meet.



Perpendicular lines are lines that make a right angle when they meet.



7.



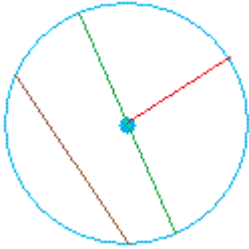
The measure of an acute angle is less than 90 degrees

The measure of an obtuse angle is more than 90 degrees

The measure of a straight angle is equal to 180 degrees

The measure of a right angle is equal to 90 degrees

8.



8. What is the name of the segment in red? A. Radius B. Diameter C. Chord

The segment in red is a radius. A radius is a segment that starts from the center of the circle and goes all the way to the contour of the circle

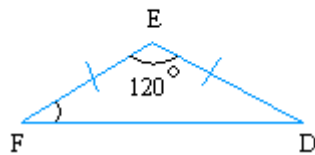
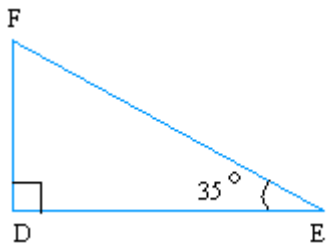
9. What is the name of the segment in green? A. Radius B. Diameter C. Chord

The segment in green is called a diameter. A diameter is a segment that goes through the center and then touches the contour of the circle in two points

10. What is the name of the segment in brown? A. Radius B. Diameter C. Chord

The segment in brown is called a chord. A chord is a segment that does not go through the center and then touches the contour of the circle in two points

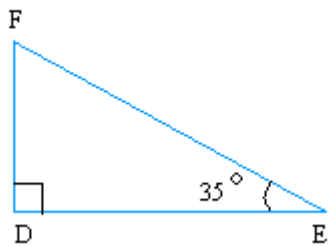
11.



The sum of the angles in any triangle is equal to 180 degrees.

$m(\text{angle D})$: this means measure of angle D.

Let us find $m(\text{angle F})$ for the triangle on the left



$$m(\text{angle F}) + m(\text{angle D}) + m(\text{angle E}) = 180$$

$$m(\text{angle F}) + 90 + 35 = 180$$

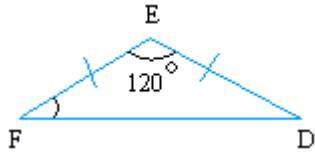
$$m(\text{angle F}) + 125 = 180$$

$$m(\text{angle F}) + 125 - 125 = 180 - 125$$

$$m(\text{angle F}) + 0 = 180 - 125$$

$$m(\text{angle F}) = 55$$

Let us find $m(\text{angle } F)$ for the triangle on the right



The trick here is to see that the triangle is an isosceles triangle.

Thus, $m(\text{angle } F) = m(\text{angle } D)$

$$m(\text{angle } F) + m(\text{angle } D) + m(\text{angle } E) = 180$$

$$m(\text{angle } F) + m(\text{angle } F) + 120 = 180$$

$$2 \times m(\text{angle } F) + 120 = 180$$

$$2 \times m(\text{angle } F) + 120 = 180$$

$$2 \times m(\text{angle } F) + 120 - 120 = 180 - 120$$

$$2 \times m(\text{angle } F) + 0 = 180 - 120$$

$$2 \times m(\text{angle } F) = 180 - 120$$

$$2 \times m(\text{angle } F) = 60$$

Since 2 times 30 = 60

$$m(\text{angle } F) = 30$$

12.

Find the perimeter of a regular hexagon if the length of one side is 5 m. (Hint: A hexagon has six equal sides)

Since a hexagon has 6 sides, $\text{perimeter} = s + s + s + s + s + s = 6 \times s$

Here $s = 5$ m, so $\text{perimeter} = 6 \times 5 = 30$ m

13.

A cube has a volume of 8 cm^3 . What is the length of one side?

$$V = a^3 = a \times a \times a$$

$$8 = a \times a \times a$$

Now ask yourself. What number do I multiply by itself 3 times to get 8?

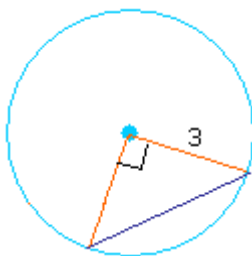
$$8 = a \times a \times a$$

Since $8 = 2 \times 2 \times 2$, $a = 2$.

The length of one side of this cube is 2 cm

14.

In the circle below, what is the length of the chord if the radius is equal 3 inches?



The triangle inside the circle is a right triangle, so you can use the Pythagorean Theorem to solve the problem.

$$c^2 = a^2 + b^2$$

The side that you are looking for is shown in blue and it is c in the Pythagorean Theorem.

$$c^2 = a^2 + b^2$$

$$c^2 = 3^2 + 3^2 \quad a = b = 3 \text{ since the radius is always the same}$$

$$c^2 = 3 \times 3 + 3 \times 3$$

$$c^2 = 9 + 9$$

$$c^2 = 18$$

$$c = \sqrt{18}$$

$$c = \sqrt{9 \times 2}$$

$$c = \sqrt{9} \times \sqrt{2}$$

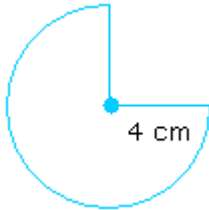
$$c = 3 \times \sqrt{2}$$

$$c = 3 \times 1.4142$$

$$c = 4.2426$$

15.

What is the area of the figure below. The radius is 4 centimeters



The trick here is to see that only $\frac{3}{4}$ of the circle is taken.

The formula to get the area of a circle is $A = \pi \times r^2$

Since you are taking only $\frac{3}{4}$ of the circle,

$$A = \frac{3}{4} \times \pi \times r^2$$

$$A = \frac{3}{4} \times 3.14 \times 4^2$$

$$A = \frac{3}{4} \times 3.14 \times 16$$

$$A = \frac{3}{4} \times 50.24$$

$$A = \frac{3}{4} \times \frac{50.24}{1}$$

$$A = \frac{3 \times 50.24}{4 \times 1}$$

$$A = \frac{150.72}{4}$$

$$A = \frac{150.72}{4}$$

$$A = 37.68 \text{ cm}^2$$

16. The perimeter of a rectangular garden is 16 feet. What is the width of the garden if the length is 5

$$P = 2 \times L + 2 \times w$$

Replace everything you know into the formula.

$$16 = 2 \times 5 + 2 \times w$$

$$16 = 10 + 2 \times w$$

$$16 - 10 = 10 - 10 + 2 \times w$$

$$6 = 0 + 2 \times w$$

$$6 = 2 \times w$$

Since 2 times 3 equals 6, $w = 3$.

17.

The bases of a trapezoid measure 5 cm and 6 cm. What is the area of the trapezoid if the height is 4?

$$A = \frac{b_1 + b_2}{2} \times h$$

$$A = \frac{5 + 6}{2} \times 4$$

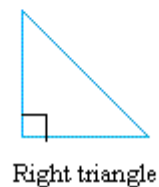
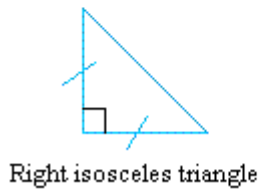
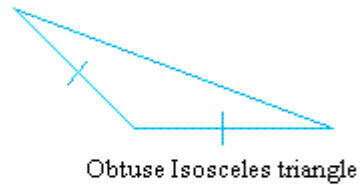
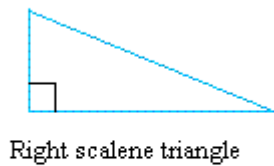
$$A = \frac{11}{2} \times 4$$

$$A = 5.5 \times 4$$

$$A = 22 \text{ cm}^2$$

18.

Name or label the following triangles with the following names. Each name can only be used once!



Explanations:

Scalene: No equal sides. This is shown with no marks even if it looks like some sides could be equal.

Isosceles: Two equal sides. This is shown with one mark on each side

Obtuse: An angle bigger than 90 degrees.

Right: shown with two black lines.

19.

Explain why a triangle cannot be right and equilateral at the same time. Explain also why a triangle cannot be obtuse and right at the same time.

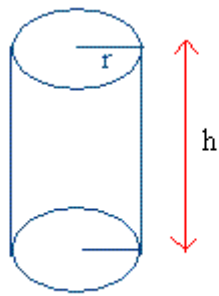
If the triangle is right, one angle equals to 90 degrees. If the triangle is equilateral, all

three angles should be equal. However, $90 + 90 + 90 \neq 180$

If a triangle is obtuse, one angle is already bigger than 90 degrees. If the triangle is right, one angle is equal to 90 degrees. So the sum of just two angles is already bigger than 180 degrees. However, the sum of all 3 angles should be 180 degrees.

20.

20. Draw a cylinder. Show the radius of the base. If the radius is 2 inches and the height is 7 inches, what is the volume of the cylinder?



$$V = \pi \times r^2 \times h$$

$$V = 3.14 \times 2^2 \times 7$$

$$V = 3.14 \times 4 \times 7$$

$$V = 3.14 \times 28$$

$$V = 87.92 \text{ cm}^3$$