

Geometry references

References

circle $A=\pi r^2$; $C=2\pi r$; $2\pi=360$

rectangular $A=lw$

triangle $A=1/2bh$

$$c^2=a^2+b^2; 3-4-5, 5-12-13$$

$$s-s-\text{ssqrt}(2); x-x\text{sqrt}(3)-2x;$$

$$180=\text{sum}$$

rectangular prism $V=lwh$; $sa=2(lw+lh+hw)$

cylinder $V=\pi r^2 h$; $sa=2\pi rh + \pi r^2$

cone $V=\pi r^2 h/3$

triangular prism $V=lwh/3$

sphere $V=4\pi r^3/3$; $sa=4\pi r^2$

Line and angles

LINEs and ANGLEs

line, ray, line segment 0, 1, 2 ends

supplementary angle $180=\text{angle}+\text{supplementary angle}$

vertical angle cross line

big/small angle parallel line

Being Aggressive on Geometry Problems: whenever you have a diagram, ask yourself What else do I know? write it down anyway.

ETS is also fond of disguising familiar figures within more complex shapes by extending lines, overlapping figures, or combining several basic shapes. So be on the lookout for the basic figures hidden in complicated shapes.

Triangles

QUADRILATERAL

parallelogram quadrilateral in which opposite sides are parallel

rectangle a parallelogram in which all angles equal 90°

square rectangle in which all angles and all sides are equal

TRIANGLES

180 rules $A=bh/2$

isosceles triangles $s_1=s_2$

equilateral 60

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

3;4;5, 5;12;13 rules

special right triangles 30-60-90: $x-\text{sqrt}(3)x-2x$ (hypotenuse)

45-45-90: $x-x-\text{sqrt}(2)x$

SOHCAHTOA opposite, adjacent, hypotenuse

SOH: $\text{sine}=\text{opposite}/\text{hypotenuse}$

CAH: $\text{cos}=\text{Adjacent}/\text{hypotenuse}$

TOA: $\text{tangent}=\text{opposite}/\text{Adjacent}$

similar triangles same shape (angles)

diff size, same corresponding side ratio

Circles

Circle radius

diameter

chord: any line segment in side circle

arc: part of circumference (edge)

circumference $=2\pi \times \text{radius}$

area $=\pi r^2$

Proportionality Arc measure is proportional to interior angle measure, which is proportional to sector area.

An interior angle is an angle formed by two radii.

A sector is the portion of the circle between the two radii.

tangents $OPN=90$; $OQN=90$; $PNQ=45$,

Equation (x,y) is point of circle, (h,k) is the center, r is radius

$$xy \text{ plane: } (x-h)^2 + (y-k)^2 = r^2$$

What is the center of a circle with equation $x^2 + y^2 - 2x + 8y + 8 = 0$?

Volume

ref to equation of volumes

Plug in on Geometry

(Hidden) variable in choice answer

180 rule for triangle

outside angle $=$ inner angle 1 + inner angle 2

A rectangular box is half as long as it is wide and one-third as wide as it is tall. If the volume of the box is 96, then what is its surface area?

C

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imaginary and complex

$\sqrt{-1}$ italicized i
 i^n $i^1=i; i^2=-1; i^3=-i; i^4=1$
 $i^5=i; i^6=-1; i^7=-i; i^8=1$

complex number $a+bi$

treat i as variable when do arithmetic

add/subtraction (distribute the minus sign)

multiplication: FOIL

Summary

Be sure to review your basic geometry rules before the test; often, problems hinge on knowing that vertical angles are equal or that the sum of the angles in a quadrilateral is 360° .

On all geometry problems, draw figures out and aggressively fill in everything you know.

When two parallel lines are cut by a third line, the small angles are equal, the big angles are equal, and the sum of a big angle and a small angle is 180° .

The perimeter of a rectangle is the sum of the lengths of its sides. The area of a rectangle is length \times width.

The perimeter of a triangle is the sum of the lengths of its sides. The area of a triangle is $\frac{1}{2}$ base \times height.

Knowing the Pythagorean Theorem, common right triangles (such as 3-4-5 and 5- 12-13), and special right triangles (45° - 45° - 90° and 30° - 60° - 90°) will help you figure out angles and lengths in a right triangle.

For trigonometry questions, remember SOHCAHTOA: sine=opposite/hypotenuse; cosine=adjacent/hypotenuse; tangent=opposite/adjacent

Summary (cont)

Similar triangles have the same angles and their lengths are proportional.

The circumference of a circle is $2\pi r$. The area of a circle is πr^2 .

Circles that show an interior angle (an angle that extends from the center of the circle) have proportionality. The interior angle over the whole degree measure (360°) equals the same fraction as the arc enclosed by that angle over the circumference. Likewise, both of these fractions are equal to the area of the segment over the entire area of the circle.

When you see a line that is "tangent to" a circle, remember two things: The line touches the circle at exactly one point. The radius of the circle that intersects the tangent line is perpendicular (90°) to that tangent line.

The formulas to compute the volumes of many three-dimensional figures are supplied in the instructions at the front of both Math sections.

When plugging in on geometry problems, remember to use your knowledge of basic geometry rules; e.g., there are still 180° in a triangle when you're using Plugging In.

The imaginary number $i = \sqrt{-1}$, and there is a repeating pattern when you raise i to a power: $i, -1, -i, 1$. When doing algebra with i , treat it as a variable, unless you are able to substitute -1 for i^2 when appropriate.

