QUANTITATIVE APTITUDE

GEOMETRY

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Quantitative Aptitude – Geometry – Formulas E - book

Quantitative Aptitude – Geometry – Formulas

Introduction to Quantitative Aptitude:

Quantitative Aptitude is an important section in the employment-related competitive exams in India. Quantitative **Aptitude** Section is one of the key sections in recruitment exams in India including but not limited to **Banking, Railways, and Staff Selection Commission, Insurance, Teaching, UPSC** and many others. The Quantitative Aptitude section has questions related to **Profit and Loss, Percentage and Discount, Simple Equations, Time and Work and Quadratic Equations, Geometry etc.**

Geometry – Important Terms:

1. What is Geometry?

- **Geometry is a branch of mathematics** that deals with **shape, size, relative position of figures, and the properties of space**. It emerges independently in number of early cultures as a practical way of dealing with lengths, area and volumes.
- **Geometry can be divided into two different types**: Plane Geometry and Solid Geometry. The Plane Geometry deals with shapes such as circles, triangles, rectangles, square and more. Whereas, the Solid Geometry is concerned in calculating the length, perimeter, area and volume of various geometric figures and shapes. And are also used to calculate the arc length and radius etc.

2. What is Angle?

- Angle is formed when two rays intersect i.e. half-lines projected with a common endpoint. The corner points of angle is known as the vertex of the angle and the rays as the sides, i.e. the lines are known as the arms. It is defined as the measure of turn between the two lines. The unit of angle is radians or degrees. There are different types of formulas for angles some of them are double-angle formula, half angle formula, compound angle formula, interior angle formula etc.

3. What is Area?

- Area is the size of a two-dimensional surface. It is defined as the amount of two-dimensional space occupied by an object. Area formulas have many practical applications in building, farming, architecture, science. The area of a shape can be determined by placing the shape over a grid and counting the number of squares that covers the entire space. For example, area of square can be calculated using a^2 where, a is the length of its side.

4. What is Volume?

- The volume of an object is the amount of space occupied by the object, which is three dimensional in shape. It is usually measured in terms of cubic units.

5. What is Midpoint?

- Midpoint formula is used to find the center point of a straight line. Sometimes you will need to find the number that is half of two particular numbers. For that, you find the average of the two numbers. In that similar fashion, we use the midpoint formula in coordinate geometry to find the halfway number (i.e. point) of two coordinates.

6. What is Vertex?

- In geometry, a vertex is a point where two or more curves, lines, or edges meet. As a consequence of this definition, the point where two lines meets to form an angle and the corners of polygons and polyhedral are vertices.

7. What is Triangle?

- A triangle is a polygon with three edges and three vertices. It is one of the basic shapes in geometry. A triangle with vertices A, B, and C. The length of the sides of a triangle may be same or different. If all the 3 sides of a triangle are equal, then it is an equilateral triangle.

8. What is Rectangle?

- Rectangle formulas include the formula for area, perimeter, and diagonal of a rectangle. To recall, a rectangle is a four sided polygon and the length of the opposite sides are equal. A rectangle is also called as an equiangular quadrilateral, as all the angles of a rectangle are right angled. A rectangle is a parallelogram with right angles in it. When the four sides of a rectangle are equal, then it is called a square.

9. What **is Circle?**

- Circle is a particular shape and defined as the set of points in a plane placed at equal distance from a single point called the center of the circle. We use the circle formula to calculate the area, diameter, and circumference of a circle. The length between any point on the circle and its center is known as its radius.

10. What is parabola?

- A set of points on a plain surface that forms a **curve** such that any point on the curve is at equidistant from the focus is a **parabola**. One of the properties of parabolas is they are made of a material that reflects light that travels parallel to the **axis of symmetry** of a parabola and strikes its concave side which is reflected its focus. It divides the graph into two equal parts.

11. What is Cylinder?

- The volume of a cylinder is the density of the cylinder which signifies the amount of material it can carry or how much amount of any material can be immersed in it. It is given by the formula, πr2h, where r is the radius of the circular base and h is the height of the cylinder.

12. What is Pyramid?

- A polyhedron that has a polygonal base and triangles for sides is a pyramid. The three main parts of any pyramid's: apex, face and base. The base of a pyramid may be of any shape. Faces usually take the shape of an isosceles triangle. All the triangle meets at a point on the top of the pyramid that is called "Apex".

13. What is Sphere?

- A perfectly symmetrical 3 – Dimensional circular shaped object is a Sphere. The line that connects from the center to the boundary is called radius of the square. You will find a point equidistant from any point on the surface of a sphere. The longest straight line that passes through the center of the sphere is called the diameter of the sphere. It is twice the length of the radius of the sphere.

14. What is Axis of symmetry?

- Axis of symmetry is a line that divides an object into two equal halves, thereby creating a mirror like reflection of either side of the object. The word symmetry implies balance. Symmetry can be applied to various contexts and situations.

15. What is Hexagon?

- A polygon is a two-dimensional (2-D) closed figure made up of straight line segments. In geometry, hexagon is a polygon with 6 sides. If the lengths of all the sides and the measurement of all the angles are equal, such hexagon is called a regular hexagon. In other words, sides of a regular hexagon are congruent.

16. What is Polygon?

- Polygon is a word derived from The Greek language, where poly means many and gonna means angle. So we can say that in a plane, closed figure with many angles is called a polygon.

17. What is Rotation?

- Think of a compass and draw a circle, the point where you put the pin to rotate the compass to draw the circle, is the point which is called as a "centre of rotation". The rotation turns the circle through an angle. Rotation can be done clockwise as well as counter clockwise. The most common rotation angles are 90 degrees, 180 degrees, 270 degrees etc.

18. What is Cyclic quadrilateral?

- A quadrilateral whose vertices lie on a single circle is called cyclic quadrilateral. This circle is called the circum circle, and the vertices are known to be con cyclic.

19. What is perimeter?

- A perimeter means the distance of the boundary of a two dimensional shape. Also defined as the total sum of the length of all the sides of the object.

20. What is Surface area?

- Surface area formulas in geometry refer to the lateral surface and total surface areas of different geometrical objects. To recall, the surface area of an object is the total area of the outside surfaces of the three-dimensional object i.e., the total sum of the area of the faces of the object.

21. What is Equation of a Line?

- An equation of a line can be expressed in many ways – Slope Intercept, Standard or Point-Slope. Here we will discuss Point-Slope Equation of a Line.

22. What is Slope?

- The slope formula is used to calculate the steepness or the incline of a line. The x and y coordinates of the lines are used to calculate the slope of the lines. It is the ratio of the change in the y-axis to the change in the x-axis.

23. What is Tangent line?

- The line that touches the curve at a point called the point of tangency is a tangent line.

24. What is Square?

- Square is a regular quadrilateral. All the four sides and angles of a square are equal. The four angles are 90 degrees each, that is, right angles.

25. What is Octagon?

- A polygon is a two-dimensional (2-D) closed figure made up of straight line segments. In geometry, the octagon is a polygon with 8 sides. If the lengths of all the sides and the measurement of all the angles are equal, the octagon is called a regular octagon.

26. What is Ellipse?

- In geometry, an ellipse is described as a curve on a plane that surrounds two focal points such that the sum of the distances to the two focal points is constant for every point on the curve. In the following figure, F1 and F2 are called the foci of the ellipse.

27. What is Hyperbola?

- In simple sense, hyperbola looks similar to mirrored parabolas. The two halves are called the branches. When the plane intersects on the halves of a right circular cone angle of which will be parallel to the axis of the cone, a parabola is formed. A hyperbola contains: two foci and two vertices.

28. What is Cone?

- Cone is a three-dimensional structure having a circular base where a set of line segments, connecting all of the points on the base to a common point called apex. There is a predefined set of formulas for the calculation of curved surface area and total surface area of a cone which is collectively called as cone formula.

29. What is prism?

- A polyhedron with two polygonal bases parallel to each other is a prism. In optics, the prism is the transparent optical element with flat polished surfaces that refract light.

30. What is Rate of Change?

- The dictionary meaning of slope is a gradient, pitch or inclines. This formula is used to measure the steepness of a straight line.

31. What is Parallelogram?

- A geometric shape with two similar opposite sides and equal opposite angles is a parallelogram. This is termed a parallelogram when the image is two dimensional and if the image is three dimensional, then it is termed as parallelepiped.

32. What is Great Circle?

- The largest circle that can be drawn on the sphere surface is the great circle. The shortest distance between any two points on the sphere surface is the Great Circle distance.

33. What is The Distance?

- In analytic geometry, the distance between two points of the *xy*-plane can be found using the distance formula. Distance Formula is used to calculate the distance between two points.

34. What is Tangential Quadrilateral?

- In geometry, the tangential quadrilateral is a convex quadrilateral whose sides are all tangent to a single circle within the quadrilateral. This circle is called the in circle of the quadrilateral or its inscribed circle, its center is the in center and its radius is called the in radius.

35. What is Asymptote?

- Asymptote is defined as a line which is tangent to a curve at infinity. There are two types of asymptote: one is horizontal and other is vertical. Below mentioned is asymptote formula.

FORMULA 1 - ANGLE:

i. Central Angle Formula = Angle $\frac{Arc\ Lenth\ X\ 360}{2\pi\ Radius}$

Formula for Central Angle s=rθ

Where, s represents the arc length,

S = rθ represents the central angle in radians and r is the length of the radius.

ii. Formula for Double Angle

cos (2a) = $\cos^2(a) - \sin^2(a) = 2\cos^2(a) - 1 = 1 - 2\sin^2(a)$

sin (2a) = 2sin(a) cos(a)

tan (2a) = $\frac{2\tan(a)}{1 - \tan2(a)}$

FORMULA 2 - AREA:

Figures	**Area Formula**	**Variables**
Area of Rectangle	Area = l × w	l = length w = width
Area of Square	Area = a^2	a = sides of square
Area of a Triangle	Area = $\frac{1}{2}$bh	b = base h = height
Area of a Circle	Area = πr^2	r= radius of circle
Area of a Trapezoid	Area = $\frac{1}{2}$ (a + b)h	a =base 1 b = base 2 h = vertical height

Area of Ellipse	Area = πab	a = radius of major axis b = area of minor axis

FORMULA 3 - VOLUME:

Shapes	**Volume Formula**	**Variables**
Rectangular Solid or Cuboid	$V = l \times w \times h$	l = Length, w = Width, h = Height
Cube	$V = a^3$	a = length of edge or side
Cylinder	$V = \pi r^2 h$	r = radius of the circular edge, h = height
Prism	$V = B \times h$	B = area of base, (B = side^2 or length. Breadth) h = height
Sphere	$V = (\frac{4}{3})\pi r^3$	r = radius of the sphere
Pyramid	$V = (\frac{1}{3}) \times B \times h$	B = area of the base, h = height of the pyramid
Right Circular Cone	$V = (\frac{1}{3})\pi r^2 h$	r = radius of the circular base, h = height (base to tip)
Square or Rectangular Pyramid	$V = (\frac{1}{3}) \times l \times w \times h$	l = length of the base, w = width of base, h = height (base to tip)
Ellipsoid	$V = (\frac{4}{3}) \times \pi \times a \times b \times c$	a, b, c = semi-axes of ellipsoid
Tetrahedron	$V = \frac{a3}{(6\sqrt{2})}$	a = length of the edge

FORMULA 4 - MIDPOINT:

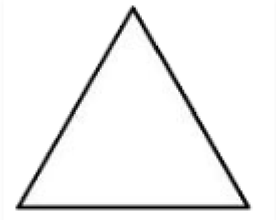
(x, y) = $[\frac{(x1 + x2)}{2}, \frac{(y1 + y2)}{2}]$

FORMULA 5 - VERTEX:

Vertex = (h, k) = $(\frac{-b}{2a}, c - \frac{b^2}{4a})$

FORMULA 6 - TRIANGLES:

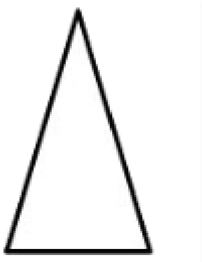
i. Equilateral Triangles



The Equilateral Triangles have the following properties (in addition to the properties above for all triangles):

- Three straight sides of equal length
- Three angles, all equal to 60°
- Three lines of symmetry

ii. Isosceles Triangles:

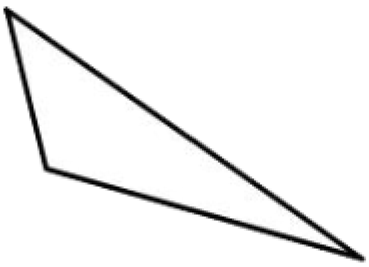


The Isosceles Triangles have the following properties:

- Two sides of equal length

- Two equal angles
- One line of symmetry

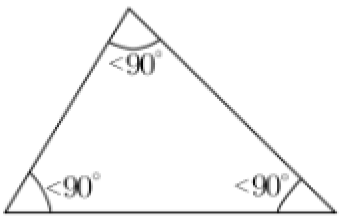
iii. Scalene Triangle



Scalene triangles have the following properties

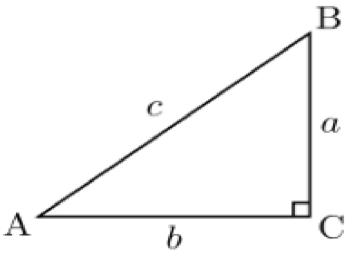
- No sides of equal length
- No equal angles
- No lines of symmetry

iv. Acute triangles



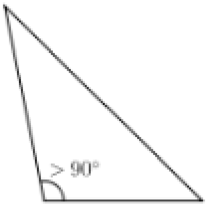
Acute triangles have all acute angles (angles less than 90°). It is possible to have an acute triangle which is also an isosceles triangle – these are called acute isosceles triangles.

v. Right triangles



The Right Triangles (right-angled triangles) have one right angle (equal to 90°).It is possible to have a right isosceles triangle – a triangle with a right angle and two equal sides.

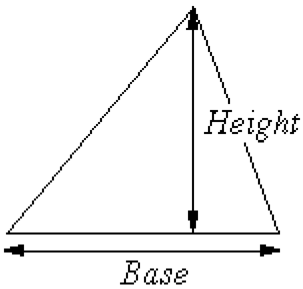
vi. Obtuse triangles



Obtuse triangles have one obtuse angle (angle which is greater than 90°). It is possible to have a obtuse isosceles triangle – a triangle with an obtuse angle and two equal sides.

The Triangle Formula are given below as,

$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$



- Perimeter of a triangle = a + b + c
- Area of a triangle = $\frac{1}{2}$ bh

Where,

b is the base of the triangle.

h is the height of the triangle.

If only 2 sides and an internal angle are given, then the remaining sides and angles can be calculated using the below formula:

$\frac{a}{\text{asinA}} = \frac{b}{\text{asinB}} = \frac{c}{\text{asinC}}$

FORMULA 7 - RECTANGLE:

Rectangle Formulas	
Perimeter of a Rectangle Formula	P = 2 (l + b)
Area of a Rectangle Formula	A = l × b
Diagonal of a Rectangle Formula	D = √ l2+b2

FORMULA 8 - CIRCLE:

Circle Formulas	
Diameter of a Circle	D = 2 × r
Circumference of a Circle	C = 2 × π × r
Area of a Circle	$A = \pi \times r^2$

FORMULAS 9 - PARABOLA:

- Vertex of the parabola = $\frac{-b}{2a}, \frac{4ac- b^2}{4a}$
- Focus of the parabola = $(\frac{-b}{2a}, \frac{4ac- b^2+1}{4a})$
- Direction of the parabola = $\frac{4ac- b^2+1}{4a}$

FORMULAS 10 - CYLINDER:

- Volume of Hollow Cylinder: V = πh (r12 – r22)
- Surface Area of Cylinder: A = 2πr2 + 2πrh

FORMULA 11 - PYRAMID:

The formula for finding the volume and surface area of the pyramid is given as, Surface of a pyramid = Base Area

$+\frac{1}{2}$(Number of Base Sides X Slant Height X Base Length)

Volume of a pyramid = $\frac{1}{2}$ X Base Area X Height

i. Square Pyramid

- Base Area of a Square Pyramid = b^2
- Surface Area of a Square Pyramid = 2bs + b^2
- Volume Area of a Square Pyramid = $\frac{1}{3}b^2$h

Where,
b – base length of the square pyramid.
s – Slant height of the square pyramid.
h – Height of the square pyramid.

ii. Triangular pyramid

- Base Area of a Triangular pyramid = $\frac{1}{2}$ ab
- Surface Area of a Triangular pyramid = $\frac{1}{2}$ ab + $\frac{3}{2}$ bs
- Volume Area of a Triangular pyramid = $\frac{1}{2}$ abh

Where,
a – Apothem length of the triangular pyramid.
b – Base length of the triangular pyramid.
s – Slant height of the triangular pyramid.
h – Height of the triangular pyramid.

iii. Pentagonal pyramid

- Base Area of a Pentagonal pyramid = $\frac{5}{2}$ ab
- Surface Area of a Pentagonal pyramid = $\frac{5}{2}$ ab + $\frac{5}{2}$ bs
- Volume Area of a Pentagonal pyramid = $\frac{5}{6}$ abh

Where,
a – Apothem length of the pentagonal pyramid.
b – Base length of the pentagonal pyramid.
s – Slant height of the pentagonal pyramid.
h – Height of the pentagonal pyramid.

iv. Hexagonal pyramid

- Base Area of a Hexagonal pyramid = 3ab
- Surface Area of a Hexagonal pyramid = 3ab + 3bs
- Volume Area of a Hexagonal pyramid = abh

Where,
a – Apothem length of the hexagonal pyramid.
b – Base length of the hexagonal pyramid.
s – Slant height of the hexagonal pyramid.
h – Height of the hexagonal pyramid.

FORMULA 12 - SPHERE:

Sphere Formulas	
Diameter of a Sphere	D = 2 r
Circumference of a Sphere	C = 2 π r
Surface Area of a Sphere	$A = 4 \pi r^2$
Volume of a Sphere	$V = (4/3) \pi r^3$

FORMULA 13 - AXIS OF SYMMETRY:

$X = \frac{-b}{2a}$ for Quandratic Equation, $y = ax^2 + bx + c$

Where,

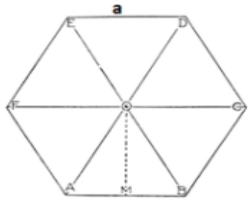
a and b are coefficients of x2 and x respectively.

c is a constant term.

FORMULA 14 - HEXAGON:

Formula for area of a hexagon: Area of a hexagon is defined as the region occupied inside the boundary of a hexagon.

In order to calculate the area of a hexagon, we divide it into small six isosceles triangles. Calculate the area of one of the triangles and then we can multiply by 6 to find the total area of the polygon.



Perimeter of an Hexagon = 6a

Area of an Hexagon = $\frac{3\sqrt{3}}{2} \times a^2$

FORMULA 15 - POLYGON:

Polygon formula to find area: Area of regular Polygon = $\frac{1}{2} n \sin\left(\frac{360^0}{n}\right) s^2$

Polygon formula to find interior angles: Interior angle of a regular Polygon = (n - 2) 180^0

Polygon formula to find the triangles: (n - 2)

Where, n is the number of sides and S is the length from center to corner.

FORMULA 16 - ROTATION:

Rotation 90^0 : $R_{90^0}(x, y) = (-y, x)$

Rotation 180^0 : $R_{180^0}(x,y) = (-x,-y)$

Rotation 90^0 : $R_{270^0}(x,y) = (y,-x)$

FORMULA 17 - CYCLIC QUADRILATERAL:

The formula for the area of a cyclic quadrilateral is:

$\sqrt{(s-a)(s-b)(s-c)(s-d)}$

Where "s" is called the semi-perimeter,

$s = \frac{a + b + c + d}{2}$

FORMULA 18 - PERIMETER:

Geometric Shape	Perimeter Formula	Metrics
Parallelogram	2(Base + Height)	
Triangle	A + b + c	a , b and c being the side lengths
Rectangle	2(Length + Width)	
Square	4a	a =Length of a side
Trapezoid	a +b+c+d	A, b, c, d being the sides of the trapezoid
Kite	2a + 2b	a = Length of first pair b = Length of second pair
Rhombus	4 x a	a = Length of a side
Hexagon	6 x a	a = Length of a side

FORMULA 19 - SURFACE AREA:

Shape	Lateral Surface Area (LSA)	Total Surface Area (TSA)
Cuboid	2h(l + b)	2(lb + bh + lh)
Cube	$4a^2$	6a2
Right Prism	Base perimeter × Height	LSA + 2 (area of one end)
Right Circular Cylinder	2πrh	2πr(r + h)
Right Pyramid	Perimeter of base × Slant Height	LSA + Area of Base
Right Circular Cone	πrl	πr(l + r)
Solid Sphere	$4\pi r^2$	
Hemisphere	$\frac{1}{2} \times 4 \times \pi r^2$	3πr2

FORMULA 20 - EQUATION OF A LINE:

$y - y_1 = m(x - x_1)$

Where,
m is the slope of the line.
x_1 is the co-ordinate of x-axis.
y_1 is the co-ordinate of y-axis

FORMULA 21 - SLOPE:

$m = \frac{y_2 - y_1}{x_2 - x_1}$

Where m is the slope of the line.

x_1, x_2 are the coordinates of x-axis and

y_1, y_2 are the coordinates of y-axis

FORMULA 22 - TANGENT LINE:

Y – f (a) = m (x – a)

Where,

f (a) is the value of the curve function at a point 'a '

m is the value of the derivative of the curve function at a point 'a '

FORMULA 23 - Square:

Area of a Square=a2
Perimeter of a Square = 4a

Diagonal of a Square = a√2
Where 'a' is the length of a side of the square.

FORMULA 24 - OCTAGON:

Formulas for Octagon	
Area of an Octagon	$2a^2(1+\sqrt{2})$
Perimeter of an Octagon	8a

FORMULA 25 - ELLIPSE:

Area of the Ellipse = $\pi r_1 r_2$

Perimeter of the Ellipse =2 $\pi\sqrt{\frac{r_1^2+r_2^2}{2}}$

Where,
r_1 is the semi major axis of the ellipse.
r_2 is the semi minor axis of the ellipse.

FORMULA 26 - HYPERBOLA:

$\frac{(x-x_0)^2}{a^2}$ - $\frac{(y-y_0)^2}{a^2}$ = 1

Where,
x0,y0 are the center points.
a = semi-major axis.
b = semi-minor axis.

DirectX of a hyperbola:

X = $\frac{\pm a^2}{\sqrt{a^2+b^2}}$

FORMULAS 27 - CONE:

Curved surface area of a cone = πrl
Total surface area of a cone = πr (l + r)

l = $\sqrt{h^2} + r^2$

Where, r is the base radius, h is the height and *l* is the slant height of the cone.

FORMULAS 28 - PRISM:

The Prism Formula in general is given as,

Surface Area of a Prism = (2X Base Area) + Lateral Surface Area

Volume of Prism = Base Area X Height

Rectangular prism:

- Base Area of a Rectangular prism: bl
- Surface Area of a Rectangular prism = 2(bl + lh + hb)
- Volume of a Rectangular prism = lbh

Where,
b – Base length of the rectangular prism.
l – Base width of the rectangular prism.
h – Height of the rectangular prism.

Triangular Prism:

- Base Area of a Triangular prism: 12ab
- Surface Area of a Triangular prism = ab + 3bh
- Volume of a Triangular prism = $\frac{1}{2}$ $a$bh

Where,

a – Apothem length of the triangular prism.

b – Base length of the triangular prism.

h – Height of the triangular prism.

Pentagonal Prism:

- Base Area of a Pentagonal prism: $\frac{5}{2}$ab
- Surface Area of a Pentagonal prism = 5ab + 5bh
- Volume of a Pentagonal prism = $\frac{5}{2}$ $a$bh

Where,

a – Apothem length of the pentagonal prism.

b – Base length of the pentagonal prism.

h – Height of the pentagonal prism.

Hexagonal Prism:

- Base Area of a Hexagonal prism: 3ab
- Surface Area of a Hexagonal prism = 6ab + 6bh

- Volume of a Hexagonal prism = $3abh$

Where,

a – Apothem length of the hexagonal prism.

b – Base length of the hexagonal prism.

h – Height of the hexagonal prism.

FORMULA 29 - RATE OF CHANGE:

Rate of change = $\frac{y_2 - y_1}{x_2 - x_1}$

FORMULA 30 - PARALLELOGRAM:

The equation for area of a parallelogram is,

Area = b × h

The equation for perimeter of a parallelogram is,

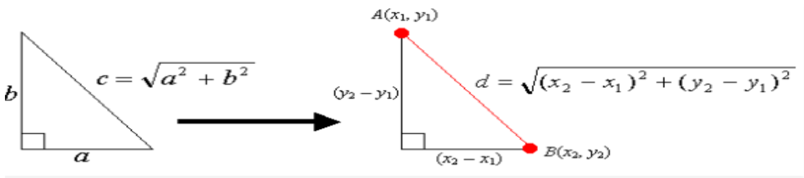
Perimeter = 2(b + h)

Where b is the base and h is the height of a parallelogram

FORMULA 31 - GREAT CIRCLE:

$$d = r\ cos^{-1}[\ cos\ \sigma_1 cos\ \sigma_2 cos\ (\Lambda_1 - \Lambda_2) + sin\ \sigma_1 sin\ \sigma_2]$$

FORMULA 32 - DISTANCE:



$$d = \sqrt{(x_2^2 - x_1^2) + (y_2^2 - y_1^2)}$$

FORMULA 33 - TANGENTIAL QUADRILATERAL:

Let a convex quadrilateral with sides a, b, c, d, then the area of a Tangential quadrilateral is, a + c = b + d

Area = $\sqrt{abcd}$

Or the formula can also be written as

A = rs

Where,

r = radius of inscribed circle

s = semi-perimeter = (a + b + c + d)

QUICK LOOKS:

1. Perimeter of a Square = P = 4a

- Where a = Length of the sides of a Square

2. Perimeter of a Rectangle = P = 2(l+b)

- Where, l = Length; b = Breadth

3. Area of a Square = A = a^2

- Where a = Length of the sides of a Square

4. Area of a Rectangle = A = l×b

- Where, l = Length; b = Breadth

5. Area of a Triangle = A = $\frac{1}{2} \times b \times h$

- Where, b = base of the triangle; h = height of the triangle

6. Area of a Trapezoid = A = $\frac{1}{2} \times (b1 + b2) \times h$

- Where, b1 & b2 are the bases of the Trapezoid; h = height of the Trapezoid

7. Area of a Circle = A = $\pi \times r^2$

8. Circumference of a Circle = A = $2\pi r$

- Where, r = Radius of the Circle

9. Surface Area of a Cube = S = $6a^2$

- Where, a = Length of the sides of a Cube

10. Surface Area of a Cylinder = S = $2\pi rh$

11. Volume of a Cylinder = V = $\pi r^2 h$

- Where, r = Radius of the base of the Cylinder; h = Height of the Cylinder

12. Surface Area of a Cone = S = $\pi r[r+\sqrt{(h2+r2)}]$

13. Volume of a Cone = V = $\frac{1}{3} \times \pi r^2 h$

- Where, r = Radius of the base of the Cone, h = Height of the Cone

14. Surface Area of a Sphere = S = $4\pi r^2$

15. Volume of a Sphere = V = $\frac{4}{3}$×πr3

- Where, r = Radius of the Sphere

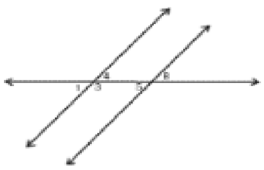
GEOMETRY TIPS & TRICKS

1. Point: Point has no dimensions like length, width, depth etc. and it lies at a location.

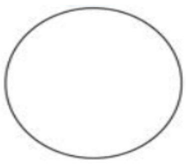
2. Line: line is a set of points arranged in straight path that infinity extends on both directions.

3. Parallel Line: Parallel lines are the lines that are parallel to each other and never intersect.

4. Parallel Lines and Transversals: In this, a set of parallel lines are intersected by one more straight line.



5. Circle: Circle is a set of points arranged in a loop such that all points are equidistant from the center.



EXAMPLES:

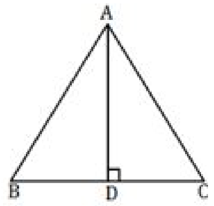
1. If ABC is an equilateral triangle and D is a point on BC such that AD is perpendicular to BC?

- **A.** AB : BD = 1 : 1
- **B.** AB : BD = 1 : 2
- **C.** AB : BD = 2 : 1

D. AB : BD = 3 : 2

Answer: C

Explanation:



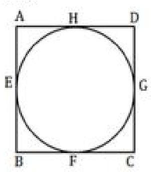
Let, AB be 2x units.
⇒ BD = DC = x units
AB: BD = 2 : 1

2. All sides of a quadrilateral ABCD touch a circle. If AB = 6 cm, BC = 7.5 cm, CD = 3 cm, then DA is?

A. 3.5 cm
B. 4.5 cm
C. 2.5 cm
D. 1.5 cm

Answer: D

Explanation:



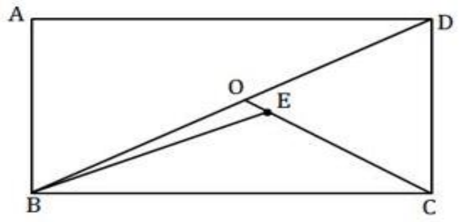
AE = AH, BE = BF, GC = FC, GD = HD
⇒ AE + BE + GC + GD = AH + BE + FC + HD
⇒ AB + CD = AD + BC
⇒ 6 + 3 = AD + 7.5
⇒ AD = 9 - 7.5 = 1.5 cm

3. Inside a square ABCD, triangle BEC is an equilateral triangle. If CE and BD intersect at O, then ∠BOC is equal to?

A. 60°
B. 75°
C. 90°
D. 120°

Answer: B

Explanation:



$\angle OBC = 45°, \angle OCB = 60°$

$\therefore \angle BOC = 180° - 60° - 45° = 75°$

4. Angle 'A' of a quadrilateral ABCD is 26° less than angle B. Angle B is twice angle C and angle C is 10° more than angle D. What would be the measure of angle A?

- **A.** 104°
- **B.** 126°
- **C.** 106°
- **D.** 132°

Answer: C

Explanation:

$A + B + C + D = 360°$

$\Rightarrow B - 26° + B + \frac{B}{2} + \frac{B}{2} - 10° = 360°$

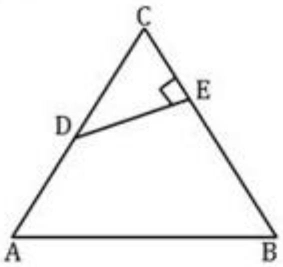
$\Rightarrow B = 132°; A = 132° - 26° = 106°$

5. D and E are two points on the sides AC and BC, respectively of ΔABC such that DE = 18 cm, CE = 5 cm and ∠DEC = 90°. If tan (∠ABC) = 3.6, then ∠A =?

- **A.** 2∠C
- **B.** 2∠B
- **C.** 2∠D
- **D.** None of these

Answer: C

Explanation:



$\angle DEC = 90°$, DE = 18 cm, CE = 5 cm

$\tan C = \frac{DE}{CE} = \frac{18}{5} = 3.6$

$\tan \angle ABC = 3.6$

$\therefore \angle C = \angle B \therefore AC = AB$

$\angle C + \angle D = 90°$

$\Rightarrow 2\angle C + 2\angle D = 180°$

$\angle C + \angle A + \angle B = 180°$

$\Rightarrow 2C + \angle A = 180°$

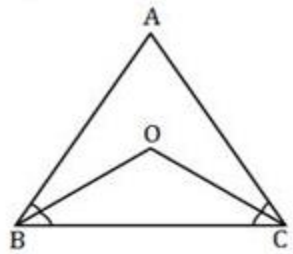
$\therefore \angle A = 2\angle D$

6. If the internal bisectors of ∠ABC = ∠ACB of the ΔABC meet at O and also ∠BAC = 80°, then ∠BOC is equal to?

- **A.** 50°
- **B.** 160°
- **C.** 40°
- **D.** 130°

Answer: D

Explanation:



$\angle BAC = 80°$

$\therefore \angle ABC + \angle ACB = 100°$

$\therefore \angle OBC + \angle OCB = 50°$

$\therefore \angle BOC = 180° - 50° = 130°$

7. Suppose ΔABC be a right-angled triangle where ∠A = 90° and AD ⊥ BC. If area of triangle ABC is 40 cm square, area of triangle ΔACD = 10 cm square and AC = 9 cm, then the length of BC is?

- **A.** 12 cm
- **B.** 18 cm
- **C.** 4 cm
- **D.** 6 cm

Answer: B

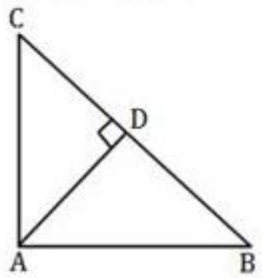
Explanation:

In ΔACD and ΔABC,

$\angle CDA = \angle CAB = 90°$

$\angle C$ is common

$\therefore \Delta ACD \sim \Delta ABC$



$\therefore \frac{\Delta ACD}{\Delta ABC} = \frac{AC^2}{BC^2}$

$\Rightarrow \frac{10}{40} = \frac{9^2}{BC^2} \quad \Rightarrow BC^2 = 4 \times 9^2$

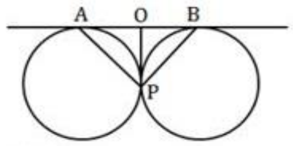
$\therefore BC = (2 \times 9) = 18$ cm

8. Two circles touch each other externally at P. AB is a direct common tangent to the two circles, A and B are points of contact and ∠PAB = 35°. Then ∠ABP is?

- **A.** 35°
- **B.** 55°
- **C.** 65°
- **D.** 75°

Answer: B

Explanation:



OA = OP

∴ ∠PAB = OPA = 35°

∴ ∠AOP = 110° ⇒ ∠POB = 70°

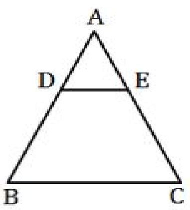
∴ $\angle ABP = \frac{180° - 70°}{2} = \frac{110}{2} = 55°$

9. In triangle ABC, D and E are points on AB and AC respectively such that DE is parallel to BC and DE divides the triangle ABC into two parts of equal areas. Then ratio of the AD: BD is?

- **A.** 1: 1
- **B.** 1: √2-1
- **C.** 1:√2
- **D.** 1:√2+1

Answer: B

Explanation:



DE || BC

∠ADE = ∠ABC

∠AED = ∠ACB

∴ ΔADE ~ ΔABC

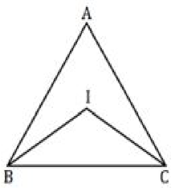
$$\frac{\text{ar BDEC}}{\Delta\text{ADE}} = \frac{1}{1} \Rightarrow \frac{\text{ar BDEC}}{\Delta\text{ADE}} + 1 = 1 + 1$$
$$\Rightarrow \frac{\Delta\text{ABC}}{\Delta\text{ADE}} = 2 = \frac{\text{AB}^2}{\text{AD}^2}$$
$$\Rightarrow \frac{\text{AB}}{\text{AD}} = \sqrt{2} \Rightarrow \frac{\text{AB}}{\text{AD}} - 1 = \sqrt{2} - 1$$
$$\Rightarrow \frac{\text{BD}}{\text{AD}} = \sqrt{2} - 1 \Rightarrow \frac{\text{AD}}{\text{BD}} = \frac{1}{\sqrt{2} - 1}$$

10. I am the in Centre of a triangle ABC. If ∠ABC = 65° and ∠ACB = 55°, then the value of ∠BIC is?

- **A.** 130°
- **B.** 120°
- **C.** 140°
- **D.** 110°

Answer: B

Explanation:



$\angle IBC = \frac{1}{2}\angle ABC = \frac{65}{2} = 32.5°$

$\angle ICB = \frac{1}{2}\angle ACB = \frac{55}{2} = 27.5°$

$\therefore \angle BIC = 180 - 32.5° - 27.5° = 120°$

11. The angles of a triangle are in Arithmetic progression. The ratio of the least angle in degrees to the number of radians in the greatest angle is 60: π. The angles in degrees are?

- **A.** 30°, 60°, 90°
- **B.** 35°, 55°, 90°
- **C.** 40°, 50°, 90°
- **D.** 40°, 55°, 85°

Answer: A

Explanation:

Angles of triangle = (a - d)°, a°, (a + d)°

$\therefore$ a - d + a + a + d = 180°

$\Rightarrow$ 3a = 180° $\Rightarrow$ a = 60°

$\therefore \frac{a-d}{a+d} = \frac{60}{\pi} = \frac{60}{180} = \frac{1}{3}$

$\Rightarrow \frac{60-d}{60+d} = \frac{1}{3} \Rightarrow 180 - 3d = 60 + d$

4d = 120° $\Rightarrow$ d = 30°

$\therefore$ Angles of triangle:

a - d = 60° - 30° = 30°

a = 60°

a + d = 60 + 30 = 90°

12. One of the angles of a triangle is two-thirds of the sum of the adjacent angles of a parallelogram. Remaining angles of the triangle are in the ratio 5: 7. What is the value of the second largest angle of the triangle?

- **A.** 25°
- **B.** 40°
- **C.** 35°
- **D.** Cannot be determined

Answer: C

Explanation:

Sum of the adjacent angles of a parallelogram = 180°

$\therefore$ one angle of triangle = $\frac{2}{3}$ × 180 = 120°

Sum of remaining two angles = 180 − 120 = 60°

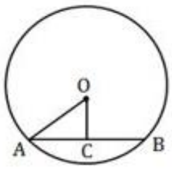
$\therefore$ second largest angle = $\frac{60}{12}$ × 7 = 35°

13. If the length of a chord of a circle at a distance of 12 cm from the center is 10 cm, then the diameter of the circle is?

- **A.** 13 cm
- **B.** 15 cm
- **C.** 26 cm
- **D.** 30 cm

Answer: C

Explanation:



OC = 12 cm; AC = CB = 5 cm

∴ Radius OA = $\sqrt{OC^2 + AC^2}$

$= \sqrt{12^2 + 5^2} = \sqrt{144 + 25} = \sqrt{169} = 13$ cm

∴ Diameter of circle = (2 × 13) = 26 cm

14. What is the length of the radius of the circumcircle of the equilateral triangle, the length of whose side is 6√3 cm?

- **A.** 6√3 cm
- **B.** 6 cm
- **C.** 5.4 cm
- **D.** 3√6 cm

Answer: B

Explanation:

The length of the radius of the circum-circle of an equilateral triangle $= \frac{\text{Side}}{\sqrt{3}} = \frac{6\sqrt{3}}{\sqrt{3}}$ cm = 6 cm

15. In the triangle ABC, ∠BAC = 50° and the bisectors of ∠ABC and ∠ACB meets at P. What is the value (in degrees) of ∠BPC?

- **A.** 100
- **B.** 105
- **C.** 115
- **D.** 125

Answer: C

Explanation:

∠BAC = 50°

Let ∠ABC = 2x

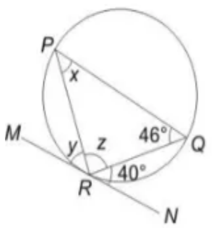
Then, ∠ACB = 180° – 50° – 2x = 130° – 2x

BP and CP are the bisectors of ∠ABC and ∠ACB respectively.

So, ∠PBC = x, ∠PCB = 65° – x

=> ∠BPC = 180° – x – 65° + x = 115°

16. In the given figure ∠QRN = 40°, ∠PQR = 46° and MN is a tangent at R. What is the value (in degrees) of x, y and z respectively?



- **A.** 40, 46,94
- **B.** 40, 50,90
- **C.** 46,54,80
- **D.** 50,40,90

Answer: A

Explanation:

x = ∠QRN = 40°

y = ∠PQR = 46° (Alternate segment theorem)

z = 180° – x – 46° = 180° – 86° = 94°

17. In ΔPQR, ∠R = 54°, the perpendicular bisector of PQ at S meets QR at T. If ∠TPR = 46°, then what is the value (in degrees) of ∠PQR?

- **A.** 25
- **B.** 40
- **C.** 50
- **D.** 60

Answer: B

Explanation:

∠PRQ = 54°, ∠TPR = 46°

So, ∠PTQ = 54° + 46° = 100° (External angle property)

Perpendicular bisector of PQ meets PQ at S and QR at T.

So, ΔPTS ≅ ΔQTS

=> ∠TPQ = ∠TQP = x

=> 100° + x + x = 180°

=> x = 40°

So, ∠PQR = 40°

18. If D and E are points on the sides AB and AC respectively of a triangle ABC such that DE||BC. If AD = x cm, DB = (x – 3) cm, AE = (x +3) cm and EC = (x – 2) cm, then what is the value (in cm) of x?

- **A.** 3
- **B.** 3.5
- **C.** 4
- **D.** 4.5

Answer: D

Explanation:

$\frac{AD}{DB} = \frac{AE}{EC}$

=> $\frac{x}{x-3} = \frac{x+3}{x-2}$

=> $x^2 - 2x = x^2 - 9$

=> $2x = 9$

=> $x = 4.5$

19. In triangle ABC, ∠ABC = 90°. BP is drawn perpendicular to AC. If ∠BAP = 50°, then what is the value (in degrees) of ∠PBC?

- **A.** 30
- **B.** 45
- **C.** 50
- **D.** 60

Answer: C

Explanation:

$\angle ABC = 90°, \angle BAC = 50°$

$\angle ACB = 180° - 90° - 50° = 40°$

In $\Delta PBC, \angle BPC = 90°$

$\angle PBC = 180° - 90° - 40° = 50°$

20. In triangle PQR, the sides PQ and PR are produced to A and B respectively. The bisectors of ∠AQR and ∠BRQ intersect at point O. If ∠QOR = 50°, then what is the value (in degrees) of ∠QPR?

- **A.** 50
- **B.** 60
- **C.** 80
- **D.** 100

Answer: C

Explanation:

$\angle QOR = 50°$

QO and RO are the bisectors of ∠AQR and ∠BRQ.

Let $\angle AQO = \angle RQO = x$

Let $\angle BRO = \angle QRO = y$

So, $\angle PQR = 180° - 2x$

$\angle PRQ = 180° - 2y$

By Angle sum property of quadrilateral PROQ,

$\angle QPR + 180° - 2x + x + 50° + 180° - 2y + y = 360°$

=> $\angle QPR - x - y + 50° = 0$

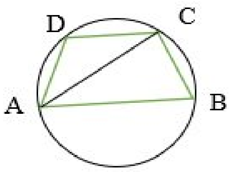
=> $\angle QPR = x + y - 50° = 130° - 50° = 80°$

21. ABCD is a cyclic quadrilateral and AB is the diameter of the circle. If ∠CAB = 48 °, then what is the value (in degrees) of ∠ADC?

- **A.** 52°
- **B.** 77°
- **C.** 138°
- **D.** 142°

Answer: C

Explanation:



AB is a diameter

Therefore, ∠ACB = 90°

Also, given that, ∠CAB = 48°

∠ABC = 180° - (90° + 48°)

= 42°

ABCD is a cyclic quadrilateral

∠ADC = 180° - ∠ABC

= 180° - 42°

= 138°

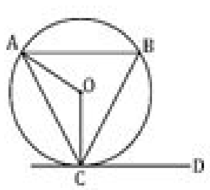
22. In the given diagram O is the center of the circle and CD is a tangent. ∠CAB and ∠ACD are supplementary to each other ∠OAC = 30°. Find the value of ∠OCB.

- **A.** 30°
- **B.** 20°

C. 60°
D. 80°

Answer: A

Explanation:



Given:

∠CAB and ∠ACD are supplementary to each other.

∠CAB + ∠ACD = 180°

In the given diagram, AB || CD

∠DCB = ∠ABC

Also given, ∠OAC = 30°

∠OAC = ∠OCA = 30°

Therefore, ∠AOC = 120°

∠ABC = 60°

Since, ∠DCB = ∠ABC

∠DCB = 60°

∠OCD = 90°

∠OCB = ∠OCD - ∠DCB = 90° - 60°

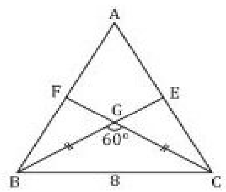
∠OCB = 30°.

23. If two medians BE and CF of a triangle ABC, intersect each other at G and if BG = CG, ∠BGC = 60°, BC = 8 cm, then area of the triangle ABC is

- **A.** $96\sqrt{3}$ cm^2
- **B.** $48\sqrt{3}$ cm^2
- **C.** 48 cm^2
- **D.** $54\sqrt{3}$ cm^2

Answer: B

Explanation:



Here, âˆ†BGC is an equilateral triangle.

Area of âˆ†BGC = $\sqrt{3}/4\ a^2$

= $(\sqrt{3}/4)(8)^2$

= $(\sqrt{3}/4)64$

= $16\sqrt{3}$

Area of âˆ†BGC = (1/3)Area of âˆ†ABC

$16\sqrt{3}$ = (1/3) x Area of âˆ†ABC

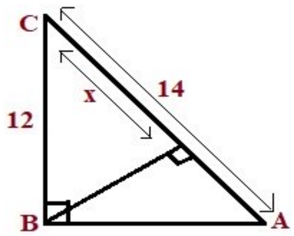
Area of âˆ†ABC = $48\sqrt{3}$ cm^2.

24. âˆ†ABC is a right angle triangle, ∠B = 90°, BD is perpendicular to AC. If AC = 14 cm, BC= 12 cm, find the length of CD.

- **A.** $10(\frac{2}{7})$
- **B.** $11(\frac{2}{7})$ cm
- **C.** 77 cm
- **D.** 68 cm

Answer: A

Explanation:



Let CD = x

In â^†BDC, cosC = $\frac{x}{12}$

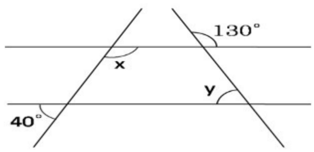
In â^†ABC, cosC = $\frac{12}{14}$

equate cosθ => $\frac{x}{12} = \frac{12}{14}$

x = 12*$\frac{12}{14} = \frac{72}{7}$

CD = 10($\frac{2}{7}$) cm

26. What is the average of angles x and y?



- **A.** 80°
- **B.** 90°
- **C.** 95°
- **D.** 85°

Answer:

Explanation:

∠a = 40° (Vertically opposite angles)

∠b = 130° (Vertically opposite angles)

Since, the sum of angles in a trapezoid is 360°.

x + y + a + b = 360°

x + y + 40° + 130° = 360°

x + y = 190°

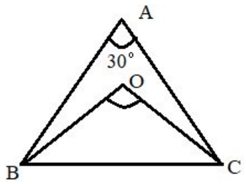
Average of angles x and y = $\frac{109^0}{2}$= 95°.

27. O is the in center of ΔABC and ∠A = 30° then ∠BOC is

- **A.** 100°
- **B.** 105°
- **C.** 110°
- **D.** 90°

Answer: B

Explanation:



∠B + ∠C = 180° - 30° = 150°

∠OBC + ∠OCB = $\frac{150°}{2}$

∠BOC = 180° - 75° = 105°

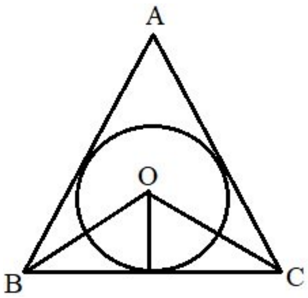
28. In a ΔABC, in center is O and ∠BOC = 110°, then the measure of ∠BAC is

- **A.** 20°
- **B.** 40°
- **C.** 55°
- **D.** 110°

Answer: B

Explanation:

∠BOC = 90° + $\frac{A}{2}$



110° = 90° + $\frac{A}{2}$

$\frac{A}{2}$ = 110 - 90 = 20

A = 2 * 20 = 40°

29. Let G be the centroid of the equilateral triangle ABC of perimeter 24 cm. Then the length of AG is ________.

- **A.** 2 √3 cm
- **B.** 3 √3 cm
- **C.** 4 √3 cm
- **D.** 8 √3 cm

Answer: D

Explanation:

The perimeter of the equilateral triangle ABC= 24 cm

Note:

Centroid divide each median in 2:1 ratio

Therefore, AG:GD= 2:1

Initially, AD should be found so that AG can be calculated.

An equilateral triangle is a triangle in which all three sides are equal.

From the above figure,

BC= $\frac{24}{3}$= 8 cm

AB=BC=CA=8cm

BD is half of BC

BD= $\frac{8}{2}$ =4 cm

AD= √AB2 - BD2

= √64-16

= 4√3

wkt,

AG:GD= 2:1

So, AG is the 2 parts of AD

AG= $(\frac{4\sqrt{3}}{3}) * 2$

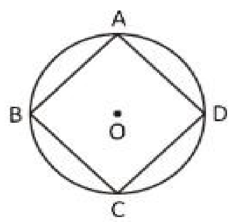
AG= $\frac{8}{\sqrt{3}}$

30. If ABCD be a cyclic quadrilateral in which ∠A = 4x° , ∠B = 7x° , ∠C = 5y° , ∠D = y° , then x : y is

- **A.** 4 : 3
- **B.** 3 : 4
- **C.** 5 : 4
- **D.** 4 : 5

Answer: D

Explanation:



The sum of opposite angles of a noncyclic quadrilateral is 180°.

∠A + ∠C = 180°

4x + 5y = 180°.... (1)

Similarly, ∠B + ∠C = 180°

7x + y = 180°..... (2)

By solving (1) and (2), we get

x = $\frac{720}{31}$

y = $\frac{540}{31}$

Therefore, x : y = $\frac{720}{31}$: $\frac{540}{31}$

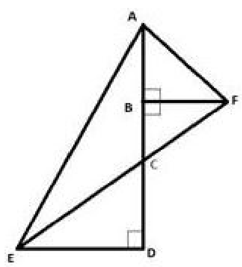
x: y = 4: 3.

30. In the diagram given below, CD = BF = 10 units and ∠CED = ∠BAF = 30° .What would be the area of â^†AED?

- **A.** 100(√2 + 3)
- **B.** $\frac{100}{(\sqrt{3}+4)}$
- **C.** $\frac{50}{(\sqrt{3}+4)}$
- **D.** 50(√3 + 4)

Answer: D

Explanation:



Given: CD = BF = 10 units;

∠CED = ∠BAF = 30°

In â^†ECD,

tan 60° = $\frac{ED}{CD}$

√3 = $\frac{ED}{10}$

ED = 10√3

In â^†ABF,

tan60° = $\frac{AB}{BF}$

√3 = $\frac{AB}{10}$

AB = 10√3

In â^†BFC,

tan60° = $\frac{BF}{BC}$

√3 = $\frac{10}{BC}$

BC = $\frac{10}{\sqrt{3}}$

Area of â^†AED = ½ (AD x ED)

= ($\frac{1}{2}$) x (AB + BC + CD) x 10√3

= ($\frac{1}{2}$) x 10√3 x (10√3 + $\frac{10}{\sqrt{3}}$ + 10)

= 50√3 (√3 + $\frac{1}{\sqrt{3}}$ + 1)

= 50√3 $\frac{(3 + 1 + \sqrt{3})}{\sqrt{3}}$

= 50(4 + √3)

31. In a â^†ABC, ∠A + ∠B = 65° and ∠B + ∠C = 140°. Then, ∠B is equal to

- **A.** 25°
- **B.** 35°
- **C.** 40°
- **D.** 45°

Answer: A

Explanation:

Given, ∠A + ∠B = 65°

∠B + ∠C = 140°

(∠A + ∠B) + (∠B + ∠C) = (65° + 140°) = 205°

(∠A + ∠B + ∠C) + ∠B = 205°

180° + ∠B = 205°

∠B = 205° - 180° = 25°

32. Find the center of the circle whose equation is x^2 + y^2 -10x + 12y -10 = 0

- **A.** (5, -6)
- **B.** (5,6)
- **C.** (-5, -6)
- **D.** (10, 12)

Answer: B

Explanation:

For general format of circle: ax2+by2+cx+dy+e= 0

The center-radius form of the circle equation is in the format(x–h)2+ (y–k)2=r2, with the center being at the point (h, k) and the radius being "r".

Given eqn is: x^2 + y^2 -10 xs + 12y -10 = 0

=> x^2 + y^2 -10x + 12y = 10

Group the x-stuff together. And then y-stuff together.

=>(x^2 - 10x) + (y^2 + 12y) = 10

Take the x-term coefficient, multiply it by one-half, square it, and then add this to both sides of the equation, as shown. Do the same with then-term coefficient.

=> (x^2 - 10x + 25) + (y^2 + 12y + 36) = 10 + 25 + 36

=> (x – 5)^2 + (y + 6)^2 = 71

=> (x – 5)^2 + [y – (-6)]^2 = 71

On comparing it with center-radius form of the circle equation: (x–h) 2+ (y–k) 2=r2

=> The center is at (h, k) = (5, -6)

33. Vertical angles that are opposite to each other are also

- **A.** not equal
- **B.** opposite
- **C.** scalene
- **D.** equal

Answer: B

34. Two lines that make an angle are called

- **A.** scalene
- **B.** rays
- **C.** segment
- **D.** vertex

Answer: B

35. Surface area of hollow cylinder with radius 'r' and height 'h' is measured by

- **A.** $2\pi r - h$
- **B.** $2\pi r + h$
- **C.** πrh
- **D.** $2\pi rh$

Answer: A

36. A polygon having 10 sides is called

- **A.** decagon
- **B.** heptagon
- **C.** quadrilateral
- **D.** hexagon

Answer: D

37. A polygon having 8 sides is called

- **A.** hexagon
- **B.** nonagon
- **C.** decagon

D. octagon

Answer: D

38. A polygon having 4 sides is called

A. hexagon
B. nonagon
C. heptagon
D. quadrilateral

Answer: D

39. Sum of all angles around a main point equals to

A. 360°
B. 180°
C. 270°
D. 90°

Answer: A

40. A line which connects any two points on a circle is known as

A. perimeter
B. diameter
C. chord
D. radius

Answer: C

41. Angles that are opposite to each other are called

A. vertical angles
B. complementary angles
C. reflective angles
D. supplementary angles

Answer: A

42. Angles that sum up to 90° are known as

A. vertical angles
B. complementary angles
C. reflective angles
D. supplementary angles

Answer: B

43. A triangle that has 2 equal sides and 2 equal angles is known as

- **A.** isosceles triangle
- **B.** equilateral triangle
- **C.** scalene triangle
- **D.** right angle

Answer: A

44. A line from center to circumference of a circle is known as

- **A.** diameter
- **B.** radius
- **C.** area
- **D.** midpoint

Answer: B

45. A polygon having 5 sides is called

- **A.** pentagon
- **B.** hexagon
- **C.** nonagon
- **D.** decagon

Answer: A

46. In terms of radius, a diameter is equals to

- **A.** 2 + r
- **B.** 2r
- **C.** r/2
- **D.** 2/r

Answer: B

47. Angles that sum up to 180° are known as

- **A.** complementary angles
- **B.** reflective angles
- **C.** supplementary angles
- **D.** vertical angles

Answer: C

48. Circumference of circle is calculated by

- **A.** $2\pi r$
- **B.** $2\pi/r$
- **C.** $\pi r/2$
- **D.** πr

Answer: A

49. If radius of a circle is increased by 30% then its area is increased by

- **A.** 40%
- **B.** 69%
- **C.** 70%
- **D.** 50%

Answer: B

50. Area of circle is calculated by

- **A.** π/r^2
- **B.** πr^2
- **C.** $\pi^2 r$
- **D.** r^2/π

Answer: B

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