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Important Formulas of Cyclic Quadrilateral

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List of 23 Important Formulas of Cyclic Quadrilateral

Important Formulas of Cyclic Quadrilateral

Angles of Cyclic Quadrilateral

1) Angle A of Cyclic Quadrilateral

Open Calculator

fx $$\angle A = \arccos\left(\frac{S_a^2 + S_d^2 - S_b^2 - S_c^2}{2 \cdot ((S_a \cdot S_d) + (S_b \cdot S_c))}\right)$$

ex $$94.70165^\circ = \arccos\left(\frac{(10\text{m})^2 + (5\text{m})^2 - (9\text{m})^2 - (8\text{m})^2}{2 \cdot ((10\text{m} \cdot 5\text{m}) + (9\text{m} \cdot 8\text{m}))}\right)$$

2) Angle B of Cyclic Quadrilateral

Open Calculator

fx $$\angle B = \pi - \angle D$$

ex $$70^\circ = \pi - 110^\circ$$

3) Angle between Diagonals of Cyclic Quadrilateral

Open Calculator

fx $$\angle_{\text{Diagonals}} = 2 \cdot \arctan\left(\sqrt{\frac{(s - S_b) \cdot (s - S_d)}{(s - S_a) \cdot (s - S_c)}}\right)$$

ex $$103.4148^\circ = 2 \cdot \arctan\left(\sqrt{\frac{(16\text{m} - 9\text{m}) \cdot (16\text{m} - 5\text{m})}{(16\text{m} - 10\text{m}) \cdot (16\text{m} - 8\text{m})}}\right)$$

4) Angle C of Cyclic Quadrilateral

Open Calculator

fx $$\angle C = \pi - \angle A$$

ex $$85^\circ = \pi - 95^\circ$$

5) Angle D of Cyclic Quadrilateral

Open Calculator

fx $$\angle D = \arccos\left(\frac{S_d^2 + S_c^2 - S_a^2 - S_b^2}{2 \cdot ((S_d \cdot S_c) + (S_b \cdot S_a))}\right)$$

ex $$110.7227^\circ = \arccos\left(\frac{(5\text{m})^2 + (8\text{m})^2 - (10\text{m})^2 - (9\text{m})^2}{2 \cdot ((5\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 10\text{m}))}\right)$$

Area of Cyclic Quadrilateral

6) Area of Cyclic Quadrilateral given Angle A

Open Calculator

fx $$A = \frac{1}{2} \cdot ((S_a \cdot S_d) + (S_b \cdot S_c)) \cdot \sin(\angle A)$$

ex $$60.76788\text{m}^2 = \frac{1}{2} \cdot ((10\text{m} \cdot 5\text{m}) + (9\text{m} \cdot 8\text{m})) \cdot \sin(95^\circ)$$

7) Area of Cyclic Quadrilateral given Angle B

Open Calculator

fx $$A = \frac{1}{2} \cdot ((S_a \cdot S_b) + (S_c \cdot S_d)) \cdot \sin(\angle B)$$

ex $$61.08002\text{m}^2 = \frac{1}{2} \cdot ((10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})) \cdot \sin(70^\circ)$$

8) Area of Cyclic Quadrilateral given Angle between Diagonals

Open Calculator

fx $$A = \frac{1}{2} \cdot ((S_a \cdot S_c) + (S_b \cdot S_d)) \cdot \sin(\angle_{\text{Diagonals}})$$

ex $$60.37036\text{m}^2 = \frac{1}{2} \cdot ((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})) \cdot \sin(105^\circ)$$

9) Area of Cyclic Quadrilateral given Circumradius

Open Calculator

fx $$A = \frac{\sqrt{((S_a \cdot S_b) + (S_c \cdot S_d)) \cdot ((S_a \cdot S_c) + (S_b \cdot S_d)) \cdot ((S_a \cdot S_d) + (S_c \cdot S_b))}}{4 \cdot r_c}$$

ex $$58.6672\text{m}^2 = \frac{\sqrt{((10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 5\text{m}) + (8\text{m} \cdot 9\text{m}))}}{4 \cdot 6\text{m}}$$

10) Area of Cyclic Quadrilateral given Semiperimeter

Open Calculator

fx $$A = \sqrt{(s - S_a) \cdot (s - S_b) \cdot (s - S_c) \cdot (s - S_d)}$$

ex $$60.79474\text{m}^2 = \sqrt{(16\text{m} - 10\text{m}) \cdot (16\text{m} - 9\text{m}) \cdot (16\text{m} - 8\text{m}) \cdot (16\text{m} - 5\text{m})}$$

Diagonals of Cyclic Quadrilateral

11) Diagonal 1 of Cyclic Quadrilateral

Open Calculator

fx $$d_1 = \sqrt{\frac{((S_a \cdot S_c) + (S_b \cdot S_d)) \cdot ((S_a \cdot S_d) + (S_b \cdot S_c))}{(S_a \cdot S_b) + (S_c \cdot S_d)}}$$

ex $$10.83087\text{m} = \sqrt{\frac{((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 5\text{m}) + (9\text{m} \cdot 8\text{m}))}{(10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})}}$$

12) Diagonal 1 of Cyclic Quadrilateral using Ptolemy's Second Theorem

Open Calculator

fx $$d_1 = \left(\frac{(S_a \cdot S_d) + (S_b \cdot S_c)}{(S_a \cdot S_b) + (S_c \cdot S_d)}\right) \cdot d_2$$

ex $$11.26154\text{m} = \left(\frac{(10\text{m} \cdot 5\text{m}) + (9\text{m} \cdot 8\text{m})}{(10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})}\right) \cdot 12\text{m}$$

13) Diagonal 1 of Cyclic Quadrilateral using Ptolemy's Theorem

Open Calculator

fx $$d_1 = \frac{(S_a \cdot S_c) + (S_b \cdot S_d)}{d_2}$$

ex $$10.41667\text{m} = \frac{(10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})}{12\text{m}}$$

14) Diagonal 2 of Cyclic Quadrilateral

Open Calculator

fx $$d_2 = \sqrt{\frac{((S_a \cdot S_b) + (S_c \cdot S_d)) \cdot ((S_a \cdot S_c) + (S_b \cdot S_d))}{(S_a \cdot S_d) + (S_c \cdot S_b)}}$$

ex $$11.54109\text{m} = \sqrt{\frac{((10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m}))}{(10\text{m} \cdot 5\text{m}) + (8\text{m} \cdot 9\text{m})}}$$

Other Formulas of Cyclic Quadrilateral

15) Circumradius of Cyclic Quadrilateral

Open Calculator

$$r_c = \frac{1}{4} \cdot \left(\sqrt{\frac{((S_a \cdot S_b) + (S_c \cdot S_d)) \cdot ((S_a \cdot S_c) + (S_b \cdot S_d)) \cdot ((S_a \cdot S_d) + (S_b \cdot S_c))}{(s - S_a) \cdot (s - S_b) \cdot (s - S_c) \cdot (s - S_d)}} \right)$$

ex

$$5.790027\text{m} = \frac{1}{4} \cdot \left(\sqrt{\frac{((10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 5\text{m}) + (9\text{m} \cdot 8\text{m}))}{(16\text{m} - 10\text{m}) \cdot (16\text{m} - 9\text{m}) \cdot (16\text{m} - 8\text{m}) \cdot (16\text{m} - 5\text{m})}} \right)$$

16) Circumradius of Cyclic Quadrilateral given Area

Open Calculator

$$r_c = \frac{\sqrt{((S_a \cdot S_b) + (S_c \cdot S_d)) \cdot ((S_a \cdot S_c) + (S_b \cdot S_d)) \cdot ((S_a \cdot S_d) + (S_c \cdot S_b))}}{4 \cdot A}$$

ex

$$5.86672\text{m} = \frac{\sqrt{((10\text{m} \cdot 9\text{m}) + (8\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 8\text{m}) + (9\text{m} \cdot 5\text{m})) \cdot ((10\text{m} \cdot 5\text{m}) + (8\text{m} \cdot 9\text{m}))}}{4 \cdot 60\text{m}^2}$$

17) Perimeter of Cyclic Quadrilateral

Open Calculator

$$P = S_a + S_b + S_c + S_d$$

ex

$$32\text{m} = 10\text{m} + 9\text{m} + 8\text{m} + 5\text{m}$$

18) Semiperimeter of Cyclic Quadrilateral

Open Calculator

$$s = \frac{P}{2}$$

ex

$$16\text{m} = \frac{32\text{m}}{2}$$

Sides of Cyclic Quadrilateral

19) Side A of Cyclic Quadrilateral given both Diagonals

Open Calculator

$$S_a = \frac{(d_1 \cdot d_2) - (S_b \cdot S_d)}{S_c}$$

ex

$$10.875\text{m} = \frac{(11\text{m} \cdot 12\text{m}) - (9\text{m} \cdot 5\text{m})}{8\text{m}}$$

20) Side A of Cyclic Quadrilateral given other Sides and Perimeter

Open Calculator

fx $$S_a = P - (S_b + S_d + S_c)$$

ex $$10\text{m} = 32\text{m} - (9\text{m} + 5\text{m} + 8\text{m})$$

21) Side B of Cyclic Quadrilateral given both Diagonals

Open Calculator

fx $$S_b = \frac{(d_1 \cdot d_2) - (S_a \cdot S_c)}{S_d}$$

ex $$10.4\text{m} = \frac{(11\text{m} \cdot 12\text{m}) - (10\text{m} \cdot 8\text{m})}{5\text{m}}$$

22) Side C of Cyclic Quadrilateral given both Diagonals

Open Calculator

fx $$S_c = \frac{(d_1 \cdot d_2) - (S_b \cdot S_d)}{S_a}$$

ex $$8.7\text{m} = \frac{(11\text{m} \cdot 12\text{m}) - (9\text{m} \cdot 5\text{m})}{10\text{m}}$$

23) Side D of Cyclic Quadrilateral given both Diagonals

Open Calculator

fx $$S_d = \frac{(d_1 \cdot d_2) - (S_a \cdot S_c)}{S_b}$$

ex $$5.777778\text{m} = \frac{(11\text{m} \cdot 12\text{m}) - (10\text{m} \cdot 8\text{m})}{9\text{m}}$$

Variables Used

- $\angle_{Diagonals}$ Angle Between Diagonals of Cyclic Quadrilateral *(Degree)*
- $\angle A$ Angle A of Cyclic Quadrilateral *(Degree)*
- $\angle B$ Angle B of Cyclic Quadrilateral *(Degree)*
- $\angle C$ Angle C of Cyclic Quadrilateral *(Degree)*
- $\angle D$ Angle D of Cyclic Quadrilateral *(Degree)*
- A Area of Cyclic Quadrilateral *(Square Meter)*
- d_1 Diagonal 1 of Cyclic Quadrilateral *(Meter)*
- d_2 Diagonal 2 of Cyclic Quadrilateral *(Meter)*
- P Perimeter of Cyclic Quadrilateral *(Meter)*
- r_c Circumradius of Cyclic Quadrilateral *(Meter)*
- s Semiperimeter of Cyclic Quadrilateral *(Meter)*
- S_a Side A of Cyclic Quadrilateral *(Meter)*
- S_b Side B of Cyclic Quadrilateral *(Meter)*
- S_c Side C of Cyclic Quadrilateral *(Meter)*
- S_d Side D of Cyclic Quadrilateral *(Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Function: **arccos**, arccos(Number)
  Inverse trigonometric cosine function
- Function: **arctan**, arctan(Number)
  Inverse trigonometric tangent function
- Function: **cos**, cos(Angle)
  Trigonometric cosine function
- Function: **ctan**, ctan(Angle)
  Trigonometric cotangent function
- Function: **sin**, sin(Angle)
  Trigonometric sine function
- Function: **sqrt**, sqrt(Number)
  Square root function
- Function: **tan**, tan(Angle)
  Trigonometric tangent function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion

Check other formula lists

- Annulus Formulas
- Antiparallelogram Formulas
- Arrow Hexagon Formulas
- Astroid Formulas
- Bulge Formulas
- Cardioid Formulas
- Circular Arc Quadrangle Formulas
- Concave Pentagon Formulas
- Concave Quadrilateral Formulas
- Concave Regular Hexagon Formulas
- Concave Regular Pentagon Formulas
- Crossed Rectangle Formulas
- Cut Rectangle Formulas
- Cyclic Quadrilateral Formulas
- Cycloid Formulas
- Decagon Formulas
- Dodecagon Formulas
- Double Cycloid Formulas
- Fourstar Formulas
- Frame Formulas
- Golden Rectangle Formulas
- Grid Formulas
- H Shape Formulas
- Half Yin-Yang Formulas
- Heart Shape Formulas
- Hendecagon Formulas
- Heptagon Formulas
- Hexadecagon Formulas
- Hexagon Formulas
- Hexagram Formulas
- House Shape Formulas
- Hyperbola Formulas
- Hypocycloid Formulas
- Isosceles Trapezoid Formulas
- Koch Curve Formulas
- L Shape Formulas
- Line Formulas
- Lune Formulas
- N-gon Formulas
- Nonagon Formulas
- Octagon Formulas
- Octagram Formulas
- Open Frame Formulas
- Parallelogram Formulas
- Pentagon Formulas
- Pentagram Formulas
- Polygram Formulas
- Quadrilateral Formulas
- Quarter Circle Formulas
- Rectangle Formulas
- Rectangular Hexagon Formulas
- Regular Polygon Formulas
- Reuleaux Triangle Formulas
- Rhombus Formulas
- Right Trapezoid Formulas
- Round Corner Formulas
- Salinon Formulas
- Semicircle Formulas
- Sharp Kink Formulas
- Square Formulas
- Star of Lakshmi Formulas
- Stretched Hexagon Formulas
- T Shape Formulas
- Tangential Quadrilateral Formulas
- Trapezoid Formulas
- Tricorn Formulas
- Tri-equilateral Trapezoid Formulas
- Truncated Square Formulas
- Unicursal Hexagram Formulas
- X Shape Formulas

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