New formulas in area

Ehab esmail ahmed

Bank el taslef Street, Tahta, Sohag, egypt

E-mail mathehab75@yahoo.com

Abstract

This formula develops old theories to facilitate the solution The use of geometric spaces is very important in our live. In ancient times it took many steps to resolve the area of the triangle, but in this research, it will be easy to solve the area of triangle with one side and .two angles only and this saves time , effort and thinking
In Old times, solving rhombus area took a number of difficult steps, but in this research it .will be easily solved.

Generally, rhombus area is calculated by half multiplied the lengths of the two diagonals, but in but in this research area is calculated in terms of one diagonal length and an angle only
Parallelogram area is equal to multiplication of the base length by the perpendicular , but the new method uses diagonal length and angles of the diagonal only
Area of the rectangle equal multiplication of length and width, Using the new method diagonal length and angles of the diagonal are used only
Uses

1- triangle area in a new method
2- parallelogram area a new method
3 – rectangle area in a new method
4 - rhombus area in a new method
5 - square area in a new method

Keyword

The area; Triangle; rhombus (diamond); Parallelogram; rectang

الملخص عربى

هذه الصيغ تطوير لنظريات قديمة لتسهيل الحل
استخدام المساحات الهندسية هام جدا فى حياتنا قديما كان يستخدم خطوات كثيرة لحل المساحة للمثلث ولكن هذا البحث يسهل حل المثلث ومثال ذلك مساحة المثلث بضلع واحد فقط وزاويتين وذلك يوفر الوقت والجهد والتفكير قديما يتم حل مساحة المعين بطريق صعبة ولكن فى هذا البحث يتم الحل بسهولة مساحة المعين نصف حاصل ضرب القطرين ولكن فى القانون الجديد المساحة بدلالة قطر وزاوية فقط مساحة متوازى الاضلاع تساوى القاعدة فى الارتفاع ولكن القانون الجديد بدلالة قطر وزاويتى القطر فقط مساحة المستطيل تساوى الطول فى العرض ولكن القانون الجديد بدلالة قطر وزاويتى القطر فقط وبذلك يسهل الاجابة فى ايجاد مساحة المثلث والمعين والمستطيل والمربع بطرق جديدة وهذا يفيد الطلاب فى هندسة مدنى كلية الهندسة

Introduction

Calculating the area of a triangle using the length of one side and two angles is better than using the old solution solving rhombus area took a number of difficult steps, but in .this research it will be easily solved

Generally, rhombus area is calculated by half multiplied the lengths of the two diagonals, but in but in this research area is calculated in terms of one diagonal length and an angle only
Parallelogram area is equal to multiplication of the base length by the perpendicular , but the new method uses diagonal length and angles of the diagonal only
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Idea of the research

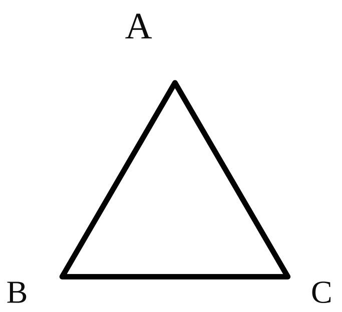
"The new methods"

The area of :

(1) Triangle (2) rhombus (diamond)

(3) Parallelogram (4) rectangle

The area of triangle



Figure(6.1)

proof

the area of the triangle

$= \frac{1}{2} \times (A\ B) \times (A\ C) \times \text{SIN}\ \hat{A}$

$0_0 0 \quad \frac{a\ c}{\text{SIN}\ b} = \frac{a\ b}{\text{SIN}\ c}$ → (1)

$0^0 0$ AC = (AB) × SIN (B) / SIN (C) → (2)

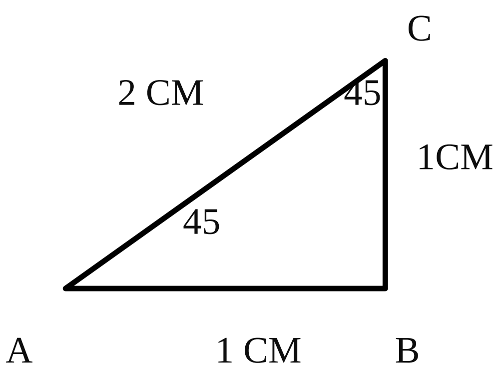
$0_0 0$ SIN C = SIN(180- (A + B))

= SIN (A + B) → (3)

from (1), (2), (3)

The area at triangle = $\frac{1}{2}\frac{(a\ b)^2 \times \sin(a)\sin(b)}{\sin(a+b)} 0_0 0$

Example (1)



Solution (1)

The Area of triangle abc $= \frac{1}{2}$ a b × b c × sin b

$= \frac{1}{2} \times 1 \times 1 \times 1 = \frac{1}{2}\ cm^2$

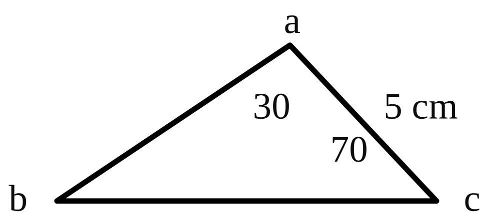
Solution (2) by new method

The Area of triangle abc $= \frac{1}{2}\frac{(a\ b)^2 \times \sin(a)\sin(b)}{\sin(a+b)}$

$= \frac{1}{2}\ \frac{(1)^2 \times \sin(45)\sin(90)}{\sin(45+90)}$

$= \frac{1}{2} \times \frac{1 \times 1 \times \frac{1}{\sqrt{2}} \times 1}{\frac{1}{\sqrt{2}}} = \frac{1}{2}$ cm^2

Example (1)



The Area of $\triangle$ abc $= \frac{\frac{1}{2} \times (5)^2 \times \sin(a) \times \sin(c)}{\sin(a + c)}$

$= \frac{\frac{1}{2} \times 25 \times \sin(30) \times \sin(70)}{\sin(100)}$ = 5.96 cm^2

The area of parallelogram

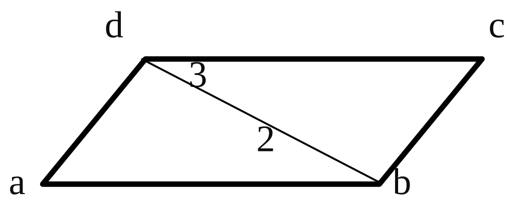


Figure (6.2)

The proof

The area of parallelogram a b c d

= 2 × area $\triangle$abd

$= 2 \times \frac{1}{2} \frac{(d\,b)^2 \times \sin(3)\sin(2)}{\sin(2 + 3)}$ → (1)

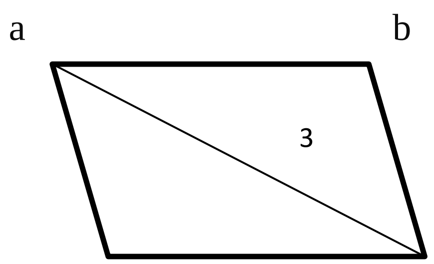
0_0^0 $\overline{ab}$ // $\overline{bc}$

$0^0 0$ m (3) = m (1) → (2)

from (1) , (2)

$0^0 0$ area a b c d = $\frac{(d\,b)^2 \times \sin(1)\sin(2)}{\sin(1 + 2)}$

example (1)



5 cm

40 30

d c

Area of ▱ a b c d = $\frac{(5)^2 \times \sin(30)\sin(40)}{\sin(70)}$

$= 8.55\ cm^2$

The area of rhombus (diamond)

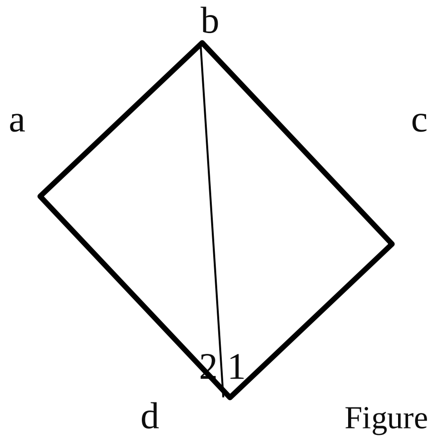


Figure (6.3)

Proof

$^{0}{}_{0}{}^{0}$ Area of a b c d = $\frac{(bd)^2 \times \sin(1)\sin(2)}{\sin(1+2)}$

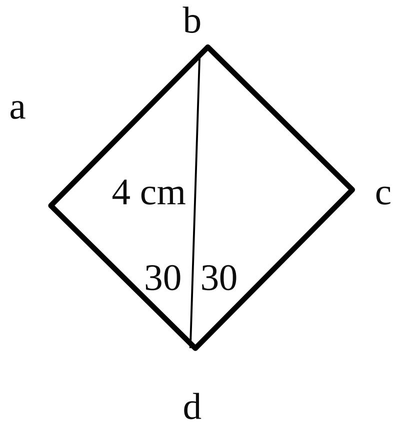
$^{0}{}_{0}{}^{0}$ m(1) = m(2) = m($\frac{d}{2}$)

from (1), (2)

$^{0}{}_{0}{}^{0}$ Area of ▱ a b c d = $\frac{(bd)^2 \times \sin^2(\frac{d}{2})}{\sin(d)}$

new method

example



Area of ▱ a b c d = $\frac{(bd)^2 \times \sin^2(\frac{d}{2})}{\sin(d)}$

$= \frac{(4)^2 \times \sin^2(30)}{\sin(60)} = \frac{16 \times \frac{1}{2} \times \frac{1}{2}}{\sqrt{3}/2} = \frac{8\sqrt{3}}{3}$ cm^2

(2.4)The area of rectangle

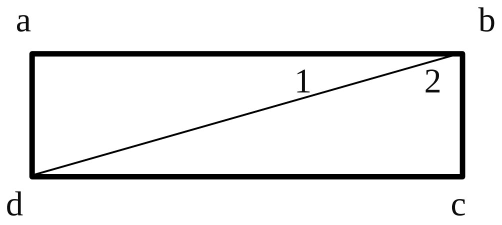


Figure (6.1)

Proof

$$\frac{(bd)^2 \times \sin(1)\sin(2)}{\sin(90)} = (bd)^2 \times \sin(2)\cos(2)$$

Because

sin(90) = 1

because 1+2 = 90 Sin (1) = cos(2)

References

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