

nombre: henry caleb Sánchez calvo

materia: GEOMETRIA ANALITICA

docente: juan José ojeda

Bachillerato técnico en enfermería

1.- Hallar el área, perímetro y semiperímetro del polígono si las coordenadas de sus vértices son: A (-8,3) B (-1,5) C (7,-1) y D (-2,-6).

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X	Y
A = -8	3
B = -1	5
C = 7	-1
D = -2	-6
A = -8	3

$$x_1 y_2 - x_2 y_1 + (-1)(-1) + (-1)(-6) + (-2)(-1) + (-2)(3) = 1 + 6 + 2 + 6 = 15$$

$$A = \frac{1}{2} (15) = 7.5$$

$$AB = \sqrt{(-1+8)^2 + (5-3)^2} = \sqrt{49+4} = \sqrt{53} \approx 7.28$$

$$BC = \sqrt{(7+1)^2 + (-1-5)^2} = \sqrt{64+36} = \sqrt{100} = 10$$

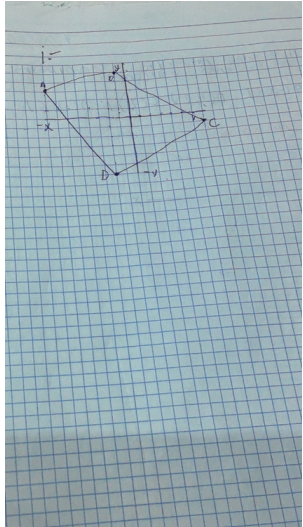
$$CD = \sqrt{(-2-7)^2 + (-6+1)^2} = \sqrt{81+25} = \sqrt{106} \approx 10.3$$

$$DA = \sqrt{(-8+2)^2 + (3+6)^2} = \sqrt{36+81} = \sqrt{117} \approx 10.82$$

$$P = AB + BC + CD + DA \approx 7.28 + 10 + 10.3 + 10.82 = 38.4$$

$$S = \frac{P}{2} = \frac{38.4}{2} = 19.2$$

(Área = 7.5)
(P = 38.4)
(SP = 19.2)



2.- Demuestra que las rectas que unen los puntos medios de los lados de un triángulo cuyos vértices son: A (-1,5) B (-4,-6) C (-8,-2) dividen a dicho triángulo en cuatro triángulos de áreas iguales.

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Punto medio

$$M_{AB} = \left(\frac{-1+(-4)}{2}, \frac{5+(-6)}{2} \right) = \left(-\frac{5}{2}, -\frac{1}{2} \right)$$

$$M_{BC} = \left(\frac{-4+(-8)}{2}, \frac{-6+(-2)}{2} \right) = (-6, -4)$$

$$M_{CA} = \left(\frac{-8+(-1)}{2}, \frac{-2+5}{2} \right) = \left(-\frac{9}{2}, \frac{3}{2} \right)$$

$$ABC = \frac{1}{2} (-1)(-6+2) + (-4)(-2-5) + (-8)(5+6) = (1)(2) - 11(-4) + (-8)(11) = 2 - 44 - 88 = -130$$

$$A = \frac{1}{2} (-130) = -65$$

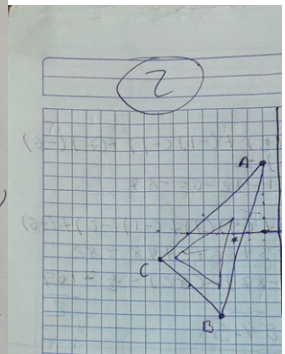
med. gr 1

$$A = \frac{1}{2} x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)$$

$$A = \frac{1}{2} \left(-\frac{5}{2}(-4 - \frac{3}{2}) + (-6)(\frac{3}{2} + \frac{1}{2}) + (-\frac{9}{2})(-\frac{1}{2} + 4) \right)$$

$$= \frac{1}{2} \left(\frac{55}{2} - 12 - \frac{63}{2} \right) = \frac{1}{2} \left(\frac{55 - 24 - 63}{2} \right) = \frac{1}{2} \left(-\frac{32}{2} \right) = -8$$

(Área = 65)
(Área = 8)



3.- El área de un triángulo es 3 unidades cuadradas; dos de sus vértices son los puntos A (3,1) y B (1,-3); el tercer vértice C este situado en el eje Y. Determina las coordenadas del vértice C.

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$$A = \frac{1}{2} (x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2))$$

$$3 = \frac{1}{2} (3(-3 - y_C) + 1(y_C - 1) + 0(1 - (-3)))$$

$$3 = \frac{1}{2} (-9 - 3y_C + y_C - 1)$$

$$3 = \frac{1}{2} (-10 - 2y_C)$$

$$6 = -10 - 2y_C$$

$$-10 - 2y_C = 6$$

$$-2y_C = 16$$

$$y_C = -8$$

$$C(0, -8)$$

4.- Hallar el área del triángulo cuyos vértices son A (0,0), B (1,2) y C (3,-4); compruebe el resultado por la formula de Heron para el área del triángulo en función de sus lados.

Formula $A = \frac{1}{2} x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)$

$$A = \frac{1}{2} (0(2 - (-4)) + 1(-4 - 0) + 3(0 - 2))$$

$$= \frac{1}{2} (-4 - 6) = \frac{1}{2} (-10) = 5$$

$$AB = \sqrt{(1-0)^2 + (2-0)^2} = \sqrt{1+4} = \sqrt{5}$$

$$BC = \sqrt{(3-1)^2 + (-4-2)^2} = \sqrt{4+36} = \sqrt{40}$$

$$CA = \sqrt{(0-3)^2 + (0-(-4))^2} = \sqrt{9+16} = \sqrt{25} = 5$$

$$a = \sqrt{5}$$

$$b = \sqrt{40} = 2\sqrt{10}$$

$$c = 5$$

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

$$s = \frac{a+b+c}{2} = \frac{\sqrt{5} + 2\sqrt{10} + 5}{2}$$

$$A = \sqrt{s(s-a)(s-b)(s-c)} = 5$$

$D(-4, 2)$ $C(7, 7)$ $B(-1, 0)$

$AB = \sqrt{(4 - (-1))^2 + (3 - 0)^2} = \sqrt{5^2 + 3^2} = \sqrt{25 + 9} = \sqrt{34} \approx 5.831$

$BC = \sqrt{(-1 - 7)^2 + (0 - 7)^2} = \sqrt{8^2 + 7^2} = \sqrt{64 + 49} = \sqrt{113} \approx 10.630$

$CD = \sqrt{(7 - (-4))^2 + (7 - 2)^2} = \sqrt{11^2 + 5^2} = \sqrt{121 + 25} = \sqrt{146} \approx 12.083$

$DA = \sqrt{(-4 - 4)^2 + (2 - 3)^2} = \sqrt{8^2 + 1^2} = \sqrt{64 + 1} = \sqrt{65} \approx 8.062$

$P = AB + BC + CD + DA = 5.831 + 10.630 + 12.083 + 8.062 = 36.606$

$P = 36.606$

$S = \frac{P}{2} = \frac{36.606}{2} = 18.303$

$P_{\text{pos}} = 18.303$

$18.303 \times 4 = 73.212$

$73.212 - 3 = 70.212$

$70.212 \times 3 = 210.636$

$210.636 - 12 = 198.636$

$198.636 \times 4 = 794.544$

$794.544 - 14 = 780.544$

$780.544 \times 3 = 2341.632$

$2341.632 - 14 = 2327.632$

$2327.632 \times 4 = 9310.528$

$9310.528 - 14 = 9296.528$

$9296.528 \times 3 = 27889.584$

$27889.584 - 14 = 27875.584$

$27875.584 \times 4 = 111502.336$

$111502.336 - 14 = 111488.336$

$111488.336 \times 3 = 334465.008$

$334465.008 - 14 = 334451.008$

$334451.008 \times 4 = 1337804.032$

$1337804.032 - 14 = 1337790.032$

$1337790.032 \times 3 = 4013370.096$

$4013370.096 - 14 = 4013356.096$

$4013356.096 \times 4 = 16053424.384$

$16053424.384 - 14 = 16053410.384$

$16053410.384 \times 3 = 48160231.152$

$48160231.152 - 14 = 48160217.152$

$48160217.152 \times 4 = 192640868.608$

$192640868.608 - 14 = 192640854.608$

$192640854.608 \times 3 = 577922563.824$

$577922563.824 - 14 = 577922549.824$

$577922549.824 \times 4 = 2311690199.296$

$2311690199.296 - 14 = 2311690185.296$

$2311690185.296 \times 3 = 6935070555.888$

$6935070555.888 - 14 = 6935070541.888$

$6935070541.888 \times 4 = 27740282167.552$

$27740282167.552 - 14 = 27740282153.552$

$27740282153.552 \times 3 = 83220846460.656$

$83220846460.656 - 14 = 83220846446.656$

$83220846446.656 \times 4 = 332883385786.624$

$332883385786.624 - 14 = 332883385772.624$

$332883385772.624 \times 3 = 998650157317.872$

$998650157317.872 - 14 = 998650157303.872$

$998650157303.872 \times 4 = 3994600629215.488$

$3994600629215.488 - 14 = 3994600629201.488$

$3994600629201.488 \times 3 = 11983801887604.464$

$11983801887604.464 - 14 = 11983801887590.464$

$11983801887590.464 \times 4 = 47935207550361.856$

$47935207550361.856 - 14 = 47935207550347.856$

$47935207550347.856 \times 3 = 143805622651043.568$

$143805622651043.568 - 14 = 143805622651029.568$

$143805622651029.568 \times 4 = 575222490604118.272$

$575222490604118.272 - 14 = 575222490604104.272$

$575222490604104.272 \times 3 = 1725667471812312.816$

$1725667471812312.816 - 14 = 1725667471812300.816$

$1725667471812300.816 \times 4 = 6902669887249203.264$

$6902669887249203.264 - 14 = 6902669887249189.264$

$6902669887249189.264 \times 3 = 20708009661747567.792$

$20708009661747567.792 - 14 = 20708009661747553.792$

$20708009661747553.792 \times 4 = 82832038646990215.168$

$82832038646990215.168 - 14 = 82832038646990201.168$

$82832038646990201.168 \times 3 = 248496115940970603.504$

$248496115940970603.504 - 14 = 248496115940970589.504$

$248496115940970589.504 \times 4 = 993984463763882358.016$

$993984463763882358.016 - 14 = 993984463763882344.016$

$993984463763882344.016 \times 3 = 2981953381291647032.048$

$2981953381291647032.048 - 14 = 2981953381291646998.048$

$2981953381291646998.048 \times 4 = 11927813525166587992.192$

$11927813525166587992.192 - 14 = 11927813525166587978.192$

$11927813525166587978.192 \times 3 = 35783440575499763934.576$

$35783440575499763934.576 - 14 = 35783440575499763920.576$

$35783440575499763920.576 \times 4 = 143133762301999055682.304$

$143133762301999055682.304 - 14 = 14313376230$

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$$AB = \sqrt{(1-0)^2 + (2-0)^2} = \sqrt{1+4} = \sqrt{5}$$
$$C = \sqrt{(3-1)^2 + (-4-0)^2} = \sqrt{4+16} = \sqrt{20} = 2\sqrt{5}$$
$$AC = \sqrt{(3-0)^2 + (-4-0)^2} = \sqrt{9+16} = \sqrt{25} = 5$$

Sc 41

$$S = \frac{AB + BC + AC}{2} = \frac{\sqrt{5} + 2\sqrt{5} + 5}{2}$$
$$Area = \frac{1}{2}(s-a)(s-b)(s-c)$$

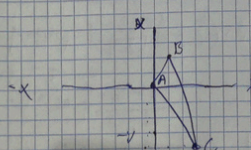
9. $\sqrt{5}$

$b = 2\sqrt{10}$

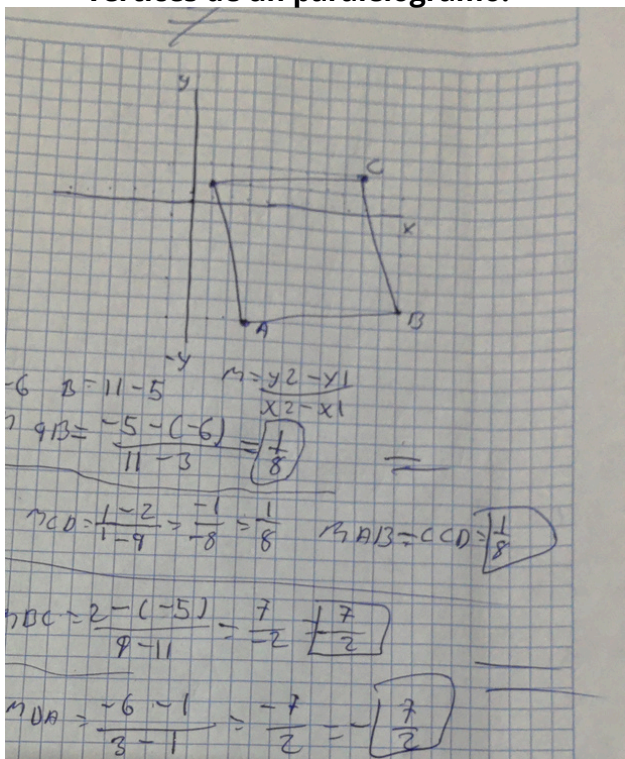
$c > 5$

$$\frac{1}{2} \cdot \sqrt{5} \cdot 7.8 \cdot (6.78 - 2.236) \cdot (6.78 - 6.324)$$
$$\frac{1}{2} \cdot \sqrt{5} \cdot 7.8 \cdot 4.544 \cdot 0.456 \cdot 0.456$$
$$= \sqrt{25} = 15$$

$R = 5$



7.- Demuestra por medio de la pendiente que los puntos A (3,-6) B (11,-5) C (9,2) y D (1,1) son los vértices de un paralelogramo.



8.- $x^2 - y = 0$
 $= 0$

9.- $4x^2 + 5y^2 - 20$

10.- $x^2 - y^2 = 16$

Handwritten solution for problem 8:

8.- $x^2 - y = 0$

9.- $\frac{x^2}{5} + \frac{y^2}{4} = 1$

10.- $x^2 - y^2 = 16$

For 8: $x^2 - y = 0 \rightarrow x^2 = y \rightarrow x = \pm\sqrt{y}$

For 9: $\frac{x^2}{5} + \frac{y^2}{4} = 1$

For 10: $x^2 - y^2 = 16 \rightarrow x = \pm\sqrt{y^2 + 16}$