RAZDALJA MED DVEMA TOČKAMA V RAVNINI

RAZDALJA MED TOČKAMA $A(x_1, y_1)$ IN $B(x_2, y_2)$:

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

1. Izračunaj razdaljo med točkama.

a) $A(3,-2)$ in $B(5,7)$

x_1 y_1 x_2 y_2

$$d(A,B) = \sqrt{(5-3)^2 + (7-(-2))^2} = \sqrt{2^2 + 9^2} = \sqrt{4+36} = \sqrt{40} = \underline{2\sqrt{10}}$$

b) $C(-4,-7)$ in $D(6,-8)$

x_1 y_1 x_2 y_2

$$d(C,D) = \sqrt{(6-(-4))^2 + (-8-(-7))^2} = \sqrt{10^2 + (-1)^2} = \sqrt{100+1} = \underline{\sqrt{101}}$$

c) $E(\sqrt{6}, 4)$ in $F(7, -\sqrt{6})$

x_1 y_1 x_2 y_2

$$d(E,F) = \sqrt{(7-\sqrt{6})^2 + (-\sqrt{6}-4)^2} = \sqrt{49 - 14\sqrt{6} + 6 + 6 + 8\sqrt{6} + 16} =$$

$$= \underline{\sqrt{77 - 6\sqrt{6}}}$$

d) $G(0{\cdot}9, -3{\cdot}4)$ in $H(4{\cdot}5, -0{\cdot}3)$

x_1 y_1 x_2 y_2

$$d(G,H) = \sqrt{(4,5-0,9)^2 + (-0,3-(-3,4))^2} = \sqrt{3,6^2 + 3,1^2} = \sqrt{22,57} = \underline{4,75}$$

2. Pokaži, da je trikotnik z oglišči $A(-16,0)$, $B(-2,6)$ in $C(-6,-4)$ pravokoten.

v pravokotnem trikotniku velja Pitagorov izrek: $c^2 = a^2 + b^2$

Izračunaš $d(A,B)$, $d(A,C)$ in $d(B,C)$

$A(-16,0)$, $B(-2,6)$

$$d(A,B) = \sqrt{(-2-(-16))^2 + (6-0)^2} = \sqrt{14^2 + 6^2} = \sqrt{232} = 2\sqrt{58}$$ - hipotenuza (najdaljša)

$A(-16,0)$, $C(-6,-4)$

$$d(A,C) = \sqrt{(-6+16)^2 + (-4+0)^2} = \sqrt{10^2 + (-4)^2} = \sqrt{116} = 2\sqrt{29}$$

$B(-2,6)$, $C(-6,-4)$

$$d(B,C) = \sqrt{(-6+2)^2 + (-4-6)^2} = \sqrt{(-4)^2 + (-10)^2} = \sqrt{116} = 2\sqrt{29}$$

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

$(2\sqrt{58})^2 = (2\sqrt{29})^2 + (2\sqrt{29})^2$

$232 = 116 + 116$ ✓ Je pravokoten.

3. Izračunaj obseg trikotnika z oglišči $A(-3,2)$, $B(5,17)$, $C(8,13)$.

izračunaš dolžine vseh stranic in jih sešteješ

$$\sigma = d(A,B) + d(A,C) + d(B,C)$$

$A(-3,2)$, $B(5,17)$

$$d(A,B) = \sqrt{(5+3)^2 + (17-2)^2} = \sqrt{8^2 + 15^2} = \sqrt{289} = 17$$

$A(-3,2)$, $C(8,13)$

$$d(A,C) = \sqrt{(8+3)^2 + (13-2)^2} = \sqrt{11^2 + 11^2} = \sqrt{242} = 11\sqrt{2}$$

$B(5,17)$, $C(8,13)$

$d(B,C) = \sqrt{(8-5)^2 + (13-17)^2} = \sqrt{3^2 + (-4)^2} = \sqrt{25} = 5$

$o = 17 + 11\sqrt{2} + 5 = \underline{\underline{22 + 11\sqrt{2}}}$

4. Na ordinatni osi poišči točko, ki je enako oddaljena od točk $A(3,1)$ in $B(-1,5)$.

na ordinatni (y) osi : $T(0,y)$

$d(A,T) = d(B,T)$

$d(A,T) = \sqrt{(0-3)^2 + (y-1)^2} = \sqrt{(-3)^2 + y^2 - 2y + 1} = \sqrt{y^2 - 2y + 10}$

$d(B,T) = \sqrt{(0+1)^2 + (y-5)^2} = \sqrt{1 + y^2 - 10y + 25} = \sqrt{y^2 - 10y + 26}$

] enačiš

$\sqrt{y^2 - 2y + 10} = \sqrt{y^2 - 10y + 26} \quad /^2$

$y^2 - 2y + 10 = y^2 - 10y + 26$

$8y = 16 \quad /:8$

$y = 2$

$\underline{\underline{T(0,2)}}$

5. Na abscisni osi poišči točko, ki je enako oddaljena od točk $A(\sqrt{3},-1)$ in $B(0,\sqrt{13})$.

na abscisni (x) osi : $T(x,0)$

$d(A,T) = d(B,T)$

$d(A,T) = \sqrt{(x-\sqrt{3})^2 + (0+1)^2} = \sqrt{x^2 - 2\sqrt{3}x + 3 + 1} = \sqrt{x^2 - 2\sqrt{3}x + 4}$

$d(B,T) = \sqrt{(x-0)^2 + (0-\sqrt{13})^2} = \sqrt{x^2 + (-\sqrt{13})^2} = \sqrt{x^2 + 13}$

] enačiš

$\sqrt{x^2 - 2\sqrt{3}x + 4} = \sqrt{x^2 + 13} \quad /^2$

$x^2 - 2\sqrt{3}x + 4 = x^2 + 13$

$-2\sqrt{3}x = 9$

$x = -\frac{3\sqrt{3}}{2}$

$T\left(-\frac{3\sqrt{3}}{2}, 0\right)$

znam za 5si

6. Točka $T(a+1, 2-a)$ je enako oddaljena od točk $A(-2,2)$ in $B(4,-1)$. Izračunaj a.

$A(-2,2), B(4,-1), T(a+1, 2-a)$

$d(A,T) = d(B,T)$

$d(A,T) = \sqrt{(a+1+2)^2 + (2-a-2)^2} = \sqrt{(a+3)^2 + (-a)^2} = \sqrt{a^2 + 6a + 9 + a^2} =$

$\sqrt{2a^2 + 6a + 9}$

$d(B,T) = \sqrt{(a+1-4)^2 + (2-a+1)^2} = \sqrt{(a-3)^2 + (3-a)^2} = \sqrt{a^2 - 6a + 9 + 9 - 6a + a^2} =$

$= \sqrt{2a^2 - 12a + 18}$

$\sqrt{2a^2 + 6a + 9} = \sqrt{2a^2 - 12a + 18} \quad /^2$

$2a^2 + 6a + 9 = 2a^2 - 12a + 18$

$18a = 9 \quad /:18$

$a = \frac{1}{2}$