

I. TRANSLASI

Sebuah objek segi lima memiliki titik-titik yang tidak beraturan seperti berikut: A(2,2), B(1,4), C(3,7), D(5,5), E(4,2). Dengan transformasi vektor berikut $(5,2) \rightarrow (tx,ty)$. Maka lakukanlah translasi terhadap objek tersebut:

JAWAB :

Rumus :

$$\begin{cases} x' = x + tx \\ y' = y + ty \end{cases}$$

Titik A : $x_A' = 2 + 5$ $y_A' = 2 + 2$
 $= 7$ $= 4.$

maka $A' (7,4)$

Titik B : $x_B' = 1 + 5$ $y_B' = 4 + 2$
 $= 6$ $= 6.$

$B' (6,6)$

Titik C : $x_C' = 3 + 5$ $y_C' = 7 + 2$
 $= 8$ $= 9$

$C' (8,9)$

Titik D : $x_D' = 5 + 5$ $y_D' = 5 + 2$
 $= 10$ $= 7$

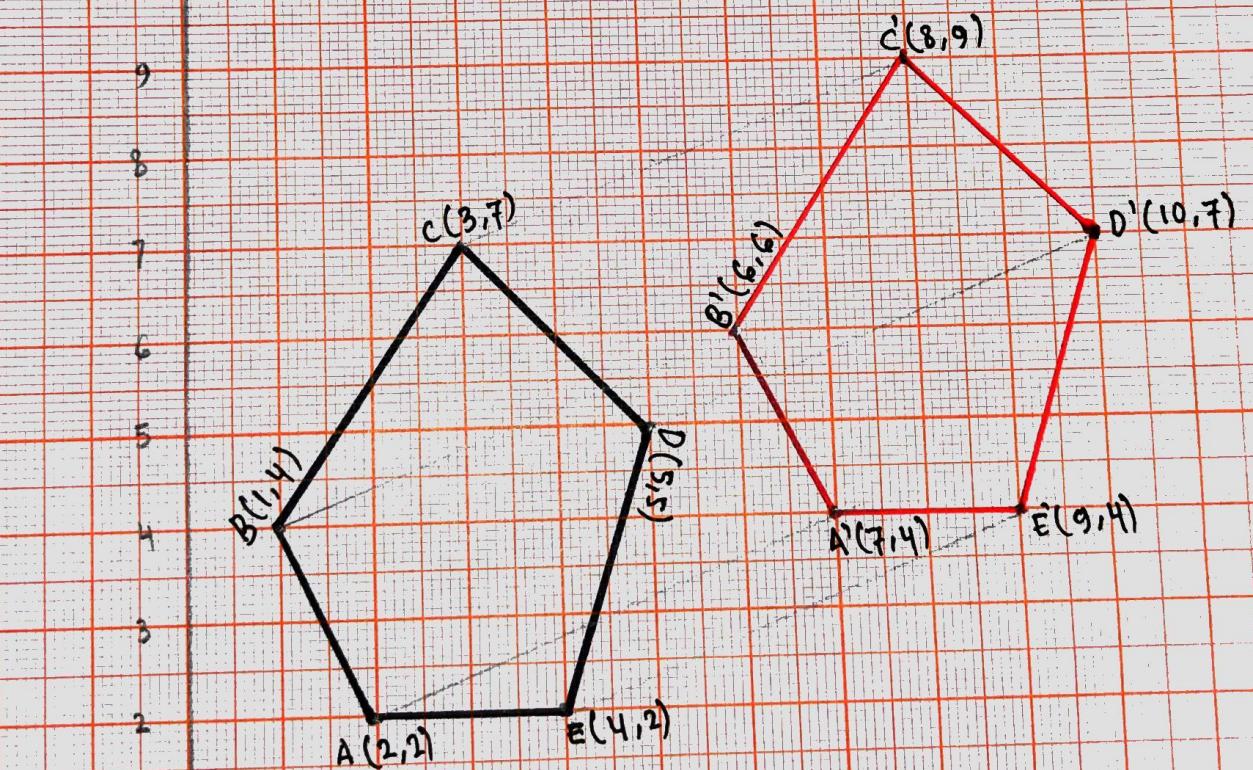
$D' (10,7)$

Titik E : $x_E' = 4 + 5$ $y_E' = 2 + 2$
 $= 9$ $= 4.$

$E' (9,4).$

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TRANSLASI



2. Scaling .

Diketahui titik-titik pembentuk segilima yaitu A(2,6)
B(6,6), C(6,4), D(4,2), E(2,4).
Dilakukan scaling dengan titik (2,2).

JAWAB. :

Rumus =
$$\begin{aligned}x' &= x * tx \\y' &= y * ty\end{aligned}$$

Titik A = $2 * 2$ $YA' = 6 * 2$
 $XA' = 4.$ $= 12.$

Maka $A' (4,12)$

Titik B = $XB' = 6 * 2.$ $YB' = 6 * 2$
 $= 12$ $= 12.$

$B' (12,12)$

Titik C = $XC' = 6 * 2$ $YC' = 4 * 2$
 $= 12$ $= 8.$

$C' (12,8)$

Titik D = $XD' = 4 * 2$ $YD' = 2 * 2$
 $= 8$ $= 4.$

$D' (8,4)$

Titik E = $XE' = 2 * 2$ $YE' = 4 * 2$
 $= 4$ $= 8.$

$E' (4,8)$

Kemudian titik-titik yang sudah discalling, dilakukan scaling kembali dengan titik (2,2).

Titik $A' \rightarrow XA'' = 4 * 2$
 $= 8$
 $\boxed{A'' (8,24)}$

$$YA'' = 12 * 2
= 24.$$

Titik $B' \rightarrow XB'' = 12 * 2$
 $= 24$
 $\boxed{B'' (24,24)}$

$$YB'' = 12 * 2
= 24.$$

Titik $C' \rightarrow XC'' = 12 * 2$
 $= 24.$
 $\boxed{C'' (24,16)}$

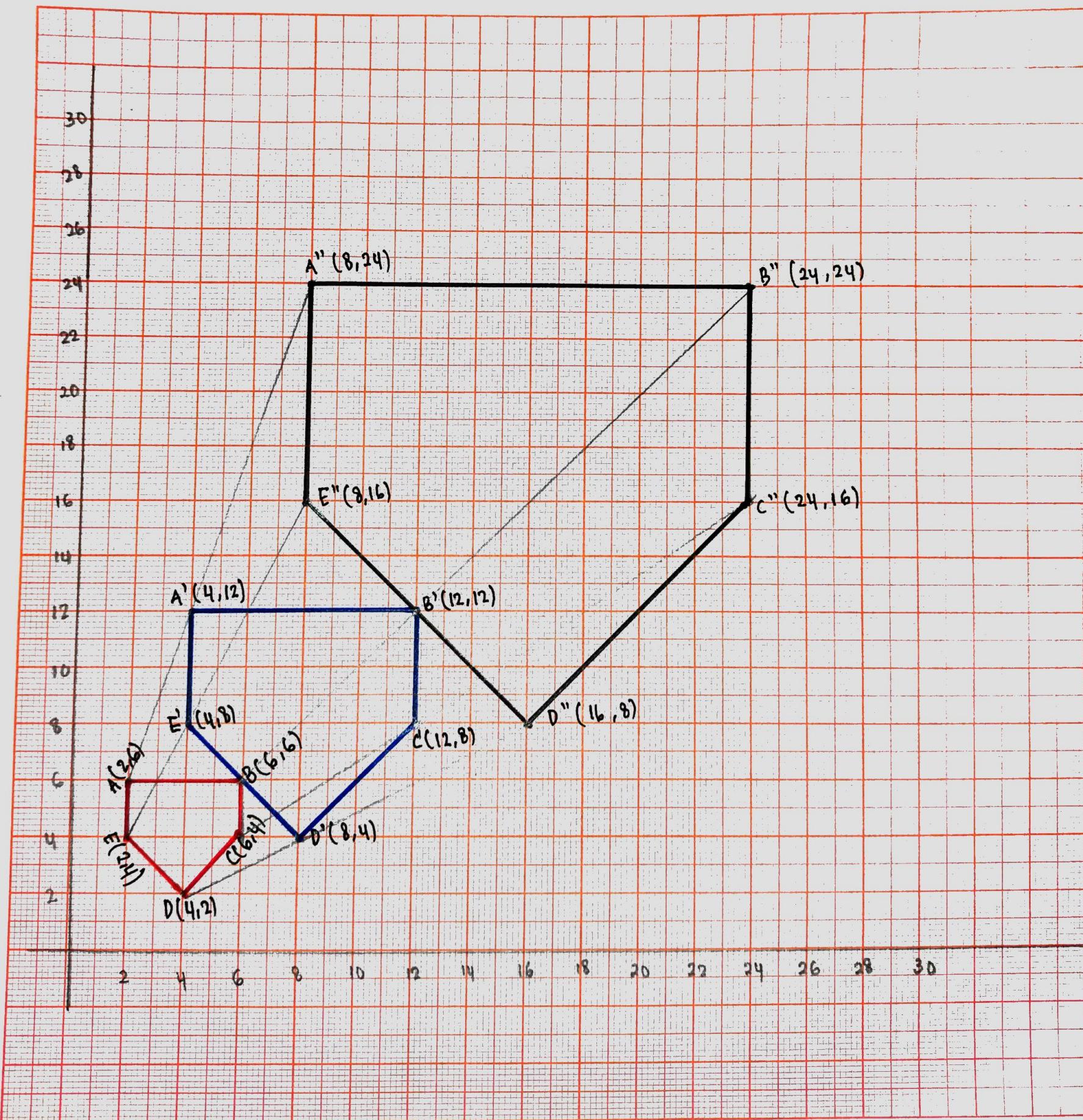
$$YC'' = 8 * 2
= 16$$

Titik $D' \rightarrow XD'' = 8 * 2$
 $= 16$
 $\boxed{D'' (16,8)}$

$$YD'' = 4 * 2
= 8.$$

Titik $E' \rightarrow XE'' = 8 * 2$
 $= 16$
 $\boxed{E'' (8,16)}$

$$YE'' = 8 * 2
= 16.$$



3. Rotasi

Titik-titik berikut membentuk objek segilima, yaitu :
 A(10,3), B(11,2), C(13,2), D(14,3), E(12,5).

Akan dirotasi dengan sudut 300° terhadap titik pusat koordinat cartesian $(2,3) \rightarrow (x_p, y_p)$.

Jawab : Rumus =

$$x'_n = x_p + (x_n - x_p) \cos \alpha - (y_n - y_p) \sin \alpha$$

$$y'_n = y_p + (x_n - x_p) \sin \alpha + (y_n - y_p) \cos \alpha$$

Titik A :

$$\begin{aligned} x'A &= x_p + (x_A - x_p) \cos 300^\circ - (y_A - y_p) \sin 300^\circ \\ &= 2 + (10-2)(0,5) - (3-3)(0,9) \\ &= 2 + 8(0,5) - 0 \\ &= 2 + 4 \\ &= 6. \end{aligned}$$

$$\begin{aligned} y'A &= y_p + (x_A - x_p) \sin 300^\circ + (y_A - y_p) \cos 300^\circ \\ &= 3 + (10-2)(0,9) + (3-3)(0,5) \\ &= 3 + 8(0,9) + 0 \\ &= 3 + 7,2 \\ &= 10,2 \end{aligned}$$

$A'(6, 10.2)$

Titik B :

$$\begin{aligned} x'B &= 2 + (11-2)(0,5) - (2-3)(0,9) \\ &= 2 + 9(0,5) - (-1)(0,9) \\ &= 7,4. \end{aligned}$$

$$\begin{aligned} y'B &= 3 + (11-2)(0,9) + (2-3)(0,5) \\ &= 3 + 9(0,9) + (-1)(0,5) \\ &= 10,6. \end{aligned}$$

$B'(7.4, 10.6)$.

Titik C :

$$\begin{aligned} x'C &= 2 + (13-2)(0,5) - (2-3)(0,9) \\ &= 2 + 11(0,5) - (-1)(0,9) \\ &= 8,4. \end{aligned}$$

$C'(8.4, 12.4)$.

$$\begin{aligned} y'C &= 3 + (13-2)(0,9) + (2-3)(0,5) \\ &= 3 + 11(0,9) + (-1)(0,5) \\ &= 12,4. \end{aligned}$$

Titik D :

$$\begin{aligned} x'D &= 2 + (14-2)(0,5) - (3-3)(0,9) \\ &= 2 + 12(0,5) - 0 \\ &= 8. \end{aligned}$$

$$\begin{aligned} y'D &= 3 + (14-2)(0,9) + (3-3)(0,5) \\ &= 3 + 12(0,9) + 0 \\ &= 13,8 \end{aligned}$$

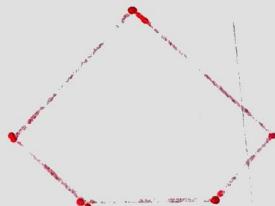
$D'(8, 13.8)$.

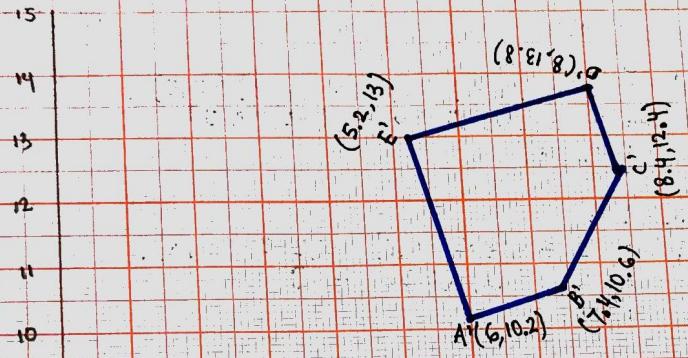
Titik E :

$$\begin{aligned} x'E &= 2 + (12-2)(0,5) - (5-3)(0,9) \\ &= 2 + 10(0,5) - (2)(0,9) \\ &= 5,2. \end{aligned}$$

$$\begin{aligned} y'E &= 3 + (12-2)(0,9) + (5-3)(0,5) \\ &= 3 + 10(0,9) + (2)(0,5) \\ &= 13 \end{aligned}$$

$E'(5.2, 13)$.





(Berotasi melawan arah jarum jam)

