

Remarks: See § 7.3, pages 504 to 513

Answer

a)

Member	Sign	$\Delta L$ (mm)
1	-	-6
2	-	$-6\sqrt{2}$
3	+	6
4	-	$-6\sqrt{2}$
5	+	6
6	-	-2

Assuming the direction of AB is fixed and removing the support at E:

Joint	$u_x$ (mm)	$u_y$ (mm)
A	0	0
B	0	-6
C	6	-12
D	-6	-18
E	8	16/3

b) The truss should be rotated  $0.666 \cdot 10^{-3}$  radians anti-clockwise ( $\frac{8 \cdot 10^{-3}}{12}$ )

Joint	$u_x$ (mm)	$u_y$ (mm)
A	0	0
B	-4	0
C	-8	-4
D	-4	-4
E	-8	16/3

c) Combined displacements:

Joint	$u_x$ (mm)	$u_y$ (mm)
A	0	0
B	-4	-6
C	-2	-16
D	-10	-22
E	0	0

The diagram illustrates the construction of a line perpendicular to a given line  $AE$ . The construction is performed on a grid with dashed lines representing the given line  $AE$  and its perpendicular bisector.

- Point A:** A point on the line  $AE$ .
- Point B':** A point on the line  $AE$ .
- Point C':** A point on the line perpendicular to  $AE$ .
- Point D':** A point on the line perpendicular to  $AE$ .
- Point E':** A point on the line  $AE$ .

The construction steps are numbered (1) through (6):

- (1) A vertical line is drawn through point  $A$ .
- (2) A line segment is drawn from point  $A$  to point  $B'$ .
- (3) A line segment is drawn from point  $B'$  to point  $C'$ .
- (4) A line segment is drawn from point  $C'$  to point  $D'$ .
- (5) A line segment is drawn from point  $D'$  to point  $E'$ .
- (6) A line segment is drawn from point  $E'$  to point  $A$ .

The final result is a line perpendicular to  $AE$ , passing through point  $C'$ .