IDE 110 Quiz 0

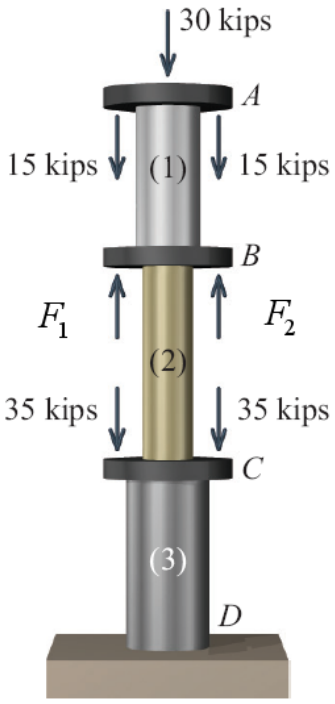
Name: _____

Section: _____
1A, 1B, or 1C

Select the best (closest) answer.

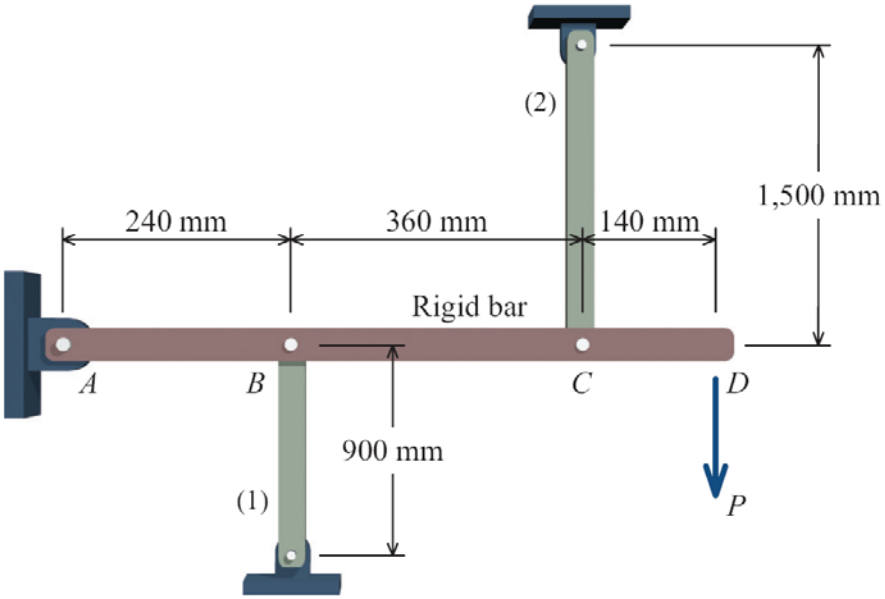
	a	b	c	d	e	value
1.	O	O	O	O	O	8
2.	O	O	O	O	O	8
3.	O	O	O	O	O	8
4.	O	O	O	O	O	8
5.	O	O	O	O	O	8
6.	O	O	O	O	O	8
7.	O	O	O	O	O	8
8.	O	O	O	O	O	8
9.	O	O	O	O	O	8
10.	O	O	O	O	O	8
11.	O	O	O	O	O	10
12.	O	O	O	O	O	10

1. Axial loads are applied with rigid bearing plates to the solid cylindrical rods shown. Determine the axial load in rod (2) if forces F_1 = 35 kips and F_2 = 35 kips.



a. 15 kips
b. 10 kips
c. 20 kips
d. -30 kips
e. 25 kips

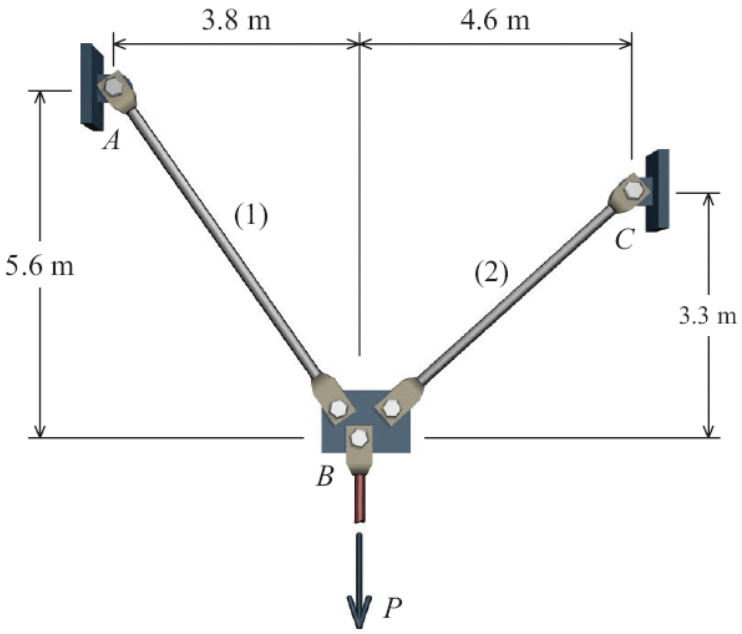
2. A rigid bar *ABCD* is supported by two bars as shown in the figure. If load *P* = 15 kN and the normal force in rod (1) is 5 kN (compression), determine the normal force in rod (2).



a. 12.3 kN
b. 14.2 kN
c. 16.5 kN
d. 13.7 kN
e. 17.1 kN

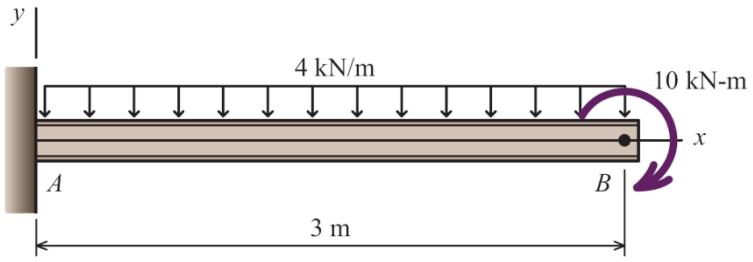
3. Two solid cylindrical rods support a load of P = 25 kN as shown. Determine the normal force in rod (2).

a. 22.5 kN
b. 18.9 kN
c. 25.3 kN
d. 11.2 kN
e. 14.0 kN



Determine the magnitude of the ground reactions at point *A* on the following beams.

4. Vertical force A_y:

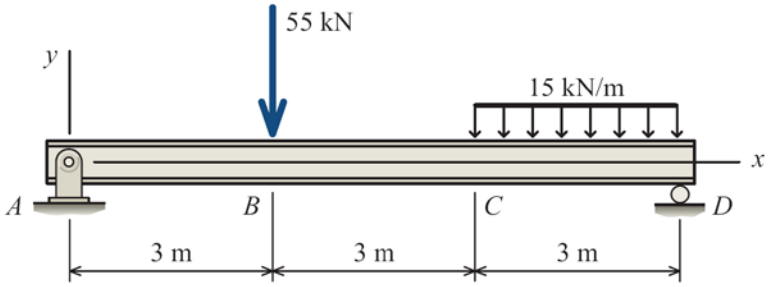


a. 9 kN
b. 13 kN
c. 10 kN
d. 11 kN
e. 12 kN

5. Moment M_A:

a. 32 kN-m
b. 23 kN-m
c. 28 kN-m
d. 25 kN-m
e. 19 kN-m

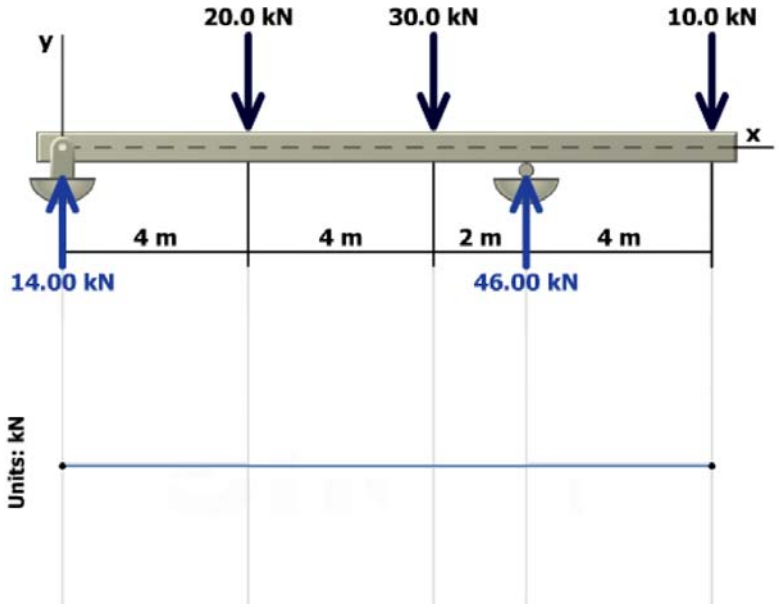
6. Vertical force A_y:



a. 27.5 kN
b. 63.8 kN
c. 36.9 kN
d. 44.2 kN
e. 59.1 kN

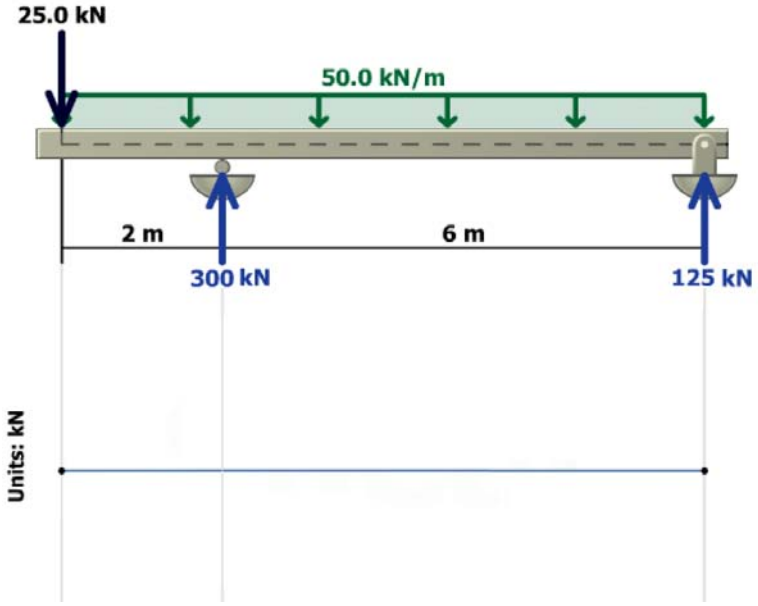
7. Use the graphical method to construct the shear-force diagram and identify the magnitude of the largest shear force (consider both positive and negative). The ground reactions are shown.

a. 18 kN
b. 36 kN
c. 47 kN
d. 26 kN
e. 55 kN



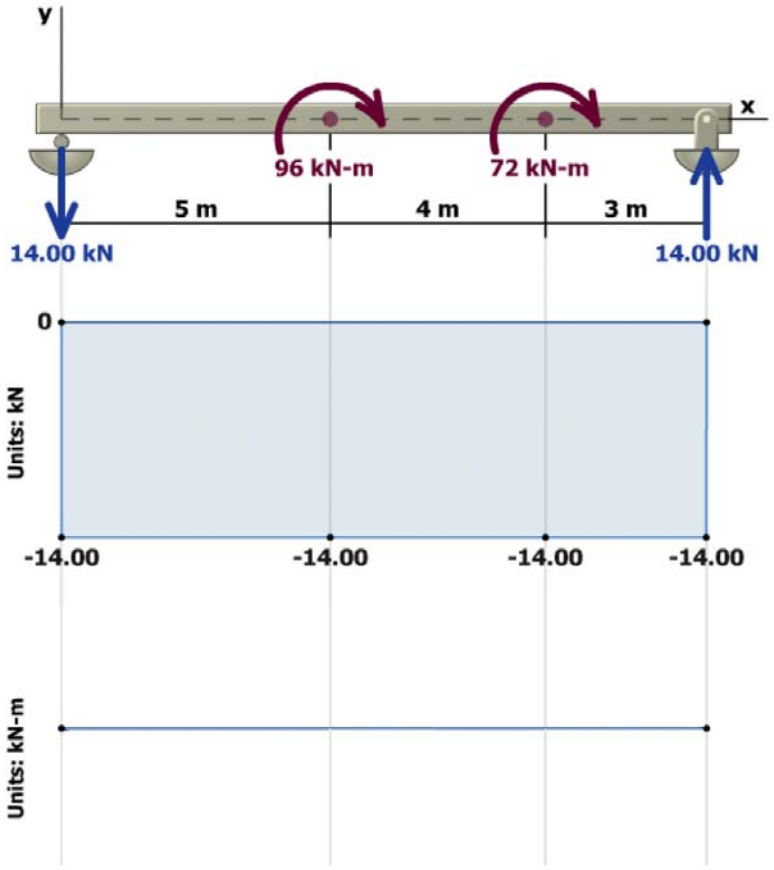
8. Use the graphical method to construct the shear-force diagram and identify the magnitude of the largest shear force (consider both positive and negative). The ground reactions are shown.

a. 192 kN
b. 183 kN
c. 205 kN
d. 213 kN
e. 175 kN



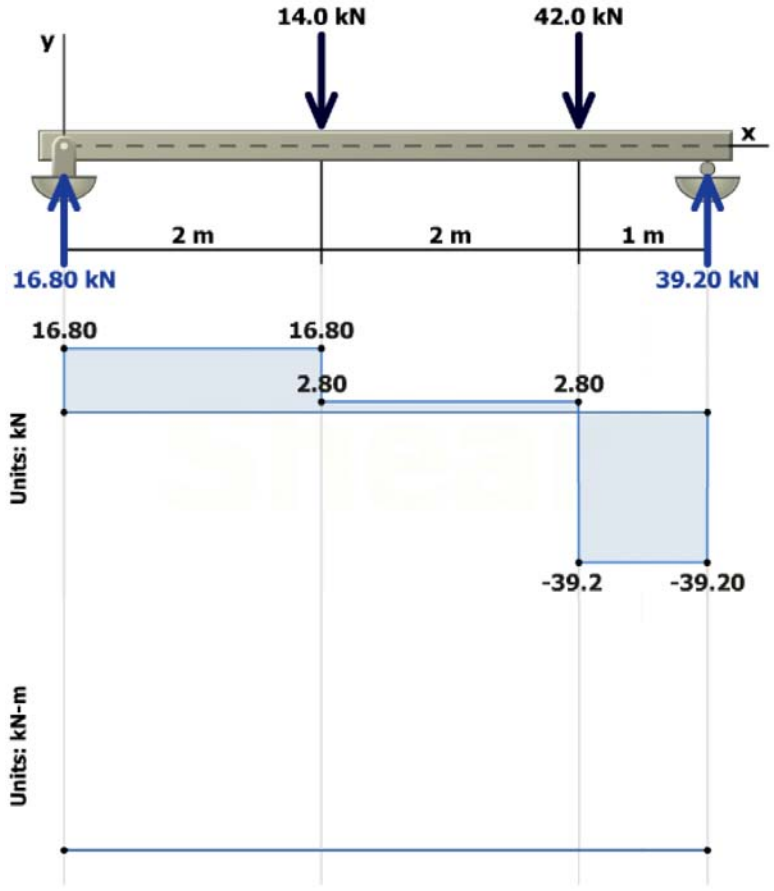
9. Use the graphical method to construct the bending-moment diagram and identify the magnitude of the largest moment (consider both positive and negative). The ground reactions and shear-force diagram are shown.

a. 65 kN-m
b. 90 kN-m
c. 85 kN-m
d. 70 kN-m
e. 75 kN-m



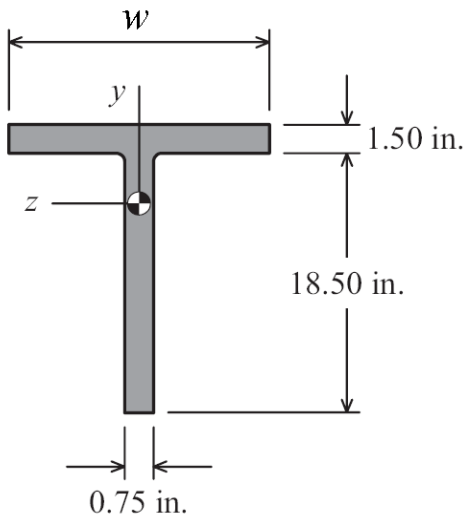
10. Use the graphical method to construct the bending-moment diagram and identify the magnitude of the largest moment (consider both positive and negative). The ground reactions and shear-force diagram are shown.

a. 33.5 kN-m
b. 42.0 kN-m
c. 52.3 kN-m
d. 58.9 kN-m
e. 39.2 kN-m



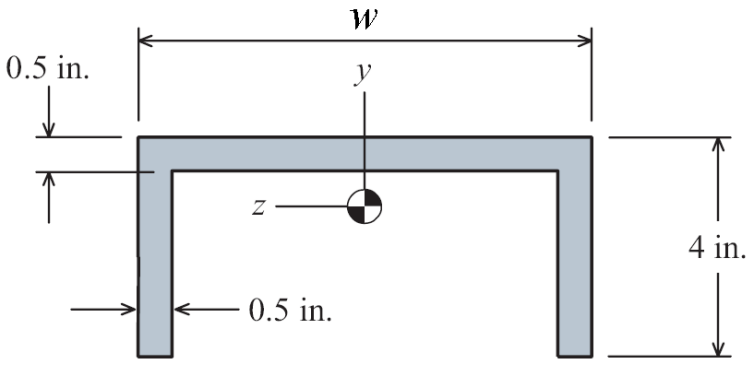
11. If w = 15 in., find the distance to the centroid from the bottom of the beam.

a. 15.4 in.
b. 15.9 in.
c. 15.1 in.
d. 15.7 in.
e. 14.8 in.



12. If w = 5 in., find the moment of inertia about the z axis. The centroid of the section is located 2.583 in. from the bottom of the beam.

a. 8.71 in.^{4}
b. 11.1 in.^{4}
c. 9.46 in.^{4}
d. 12.3 in.^{4}
e. 10.7 in.^{4}

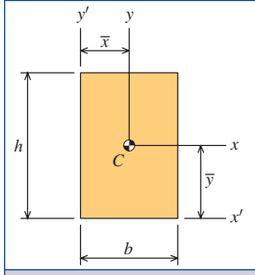


$$\bar{x} = \frac{\Sigma x_i A_i}{\Sigma A_i} \qquad \bar{y} = \frac{\Sigma y_i A_i}{\Sigma A_i}$$

$$I = \Sigma(I_c + d^2 A)$$

Table A.1 Properties of Plane Figures

1. Rectangle



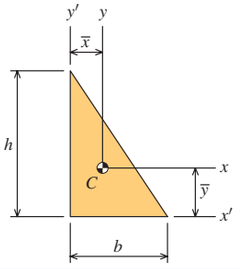
$$A = bh$$

$$\bar{y} = \frac{h}{2} \qquad I_x = \frac{bh^3}{12}$$

$$\bar{x} = \frac{b}{2} \qquad I_y = \frac{hb^3}{12}$$

$$I_{x'} = \frac{bh^3}{3} \qquad I_{y'} = \frac{hb^3}{3}$$

2. Right Triangle



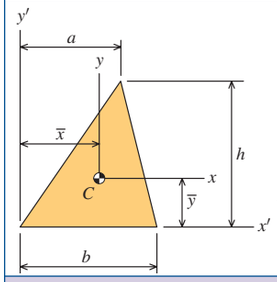
$$A = \frac{bh}{2}$$

$$\bar{y} = \frac{h}{3} \qquad I_x = \frac{bh^3}{36}$$

$$\bar{x} = \frac{b}{3} \qquad I_y = \frac{hb^3}{36}$$

$$I_{x'} = \frac{bh^3}{12} \qquad I_{y'} = \frac{hb^3}{12}$$

3. Triangle



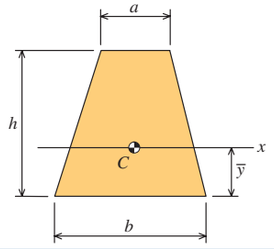
$$A = \frac{bh}{2}$$

$$\bar{y} = \frac{h}{3} \qquad I_x = \frac{bh^3}{36}$$

$$\bar{x} = \frac{(a+b)}{3} \qquad I_y = \frac{bh}{36}(a^2 - ab + b^2)$$

$$I_{x'} = \frac{bh^3}{12}$$

4. Trapezoid

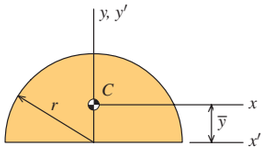


$$A = \frac{(a+b)h}{2}$$

$$\bar{y} = \frac{1}{3}\left(\frac{2a+b}{a+b}\right)h$$

$$I_x = \frac{h^3}{36(a+b)}(a^2 + 4ab + b^2)$$

5. Semicircle

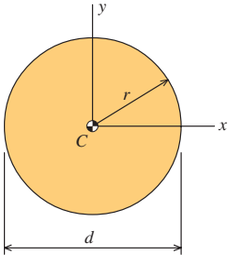


$$A = \frac{\pi r^2}{2}$$

$$\bar{y} = \frac{4r}{3\pi} \qquad I_x = \left(\frac{\pi}{8} - \frac{8}{9\pi}\right)r^4$$

$$I_{x'} = I_{y'} = \frac{\pi r^4}{8}$$

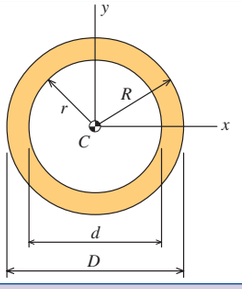
6. Circle



$$A = \pi r^2 = \frac{\pi d^2}{4}$$

$$I_x = I_y = \frac{\pi r^4}{4} = \frac{\pi d^4}{64}$$

7. Hollow Circle

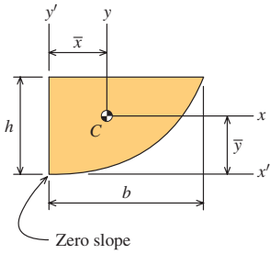


$$A = \pi(R^2 - r^2) = \frac{\pi}{4}(D^2 - d^2)$$

$$I_x = I_y = \frac{\pi}{4}(R^4 - r^4)$$

$$= \frac{\pi}{64}(D^4 - d^4)$$

8. Parabola

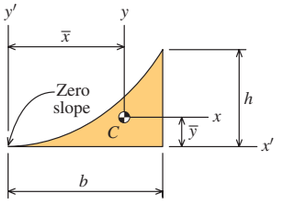


$$y' = \frac{h}{b^2}x'^2$$

$$A = \frac{2bh}{3}$$

$$\bar{x} = \frac{3b}{8} \qquad \bar{y} = \frac{3h}{5}$$

9. Parabolic Spandrel

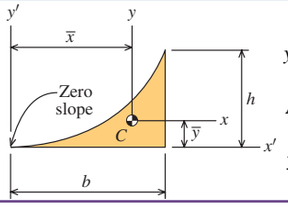


$$y' = \frac{h}{b^2}x'^2$$

$$A = \frac{bh}{3}$$

$$\bar{x} = \frac{3b}{4} \qquad \bar{y} = \frac{3h}{10}$$

10. General Spandrel



$$y' = \frac{h}{b^n}x'^n$$

$$A = \frac{bh}{n+1}$$

$$\bar{x} = \frac{n+1}{n+2}b \qquad \bar{y} = \frac{n+1}{4n+2}h$$