

Rules for Shear and Moment Diagrams

1. The slope of the shear diagram at any point is equal to (-) the load intensity at the same point.

$$\frac{dV}{dx} = -w$$

2. The change in shear between two points on the shear diagram is equal to (-) the area under the loading diagram between the same two points.

$$\Delta V_{AB} = V_B - V_A = - \int_{x_A}^{x_B} w dx$$

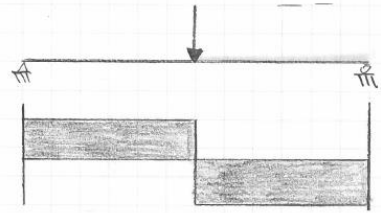
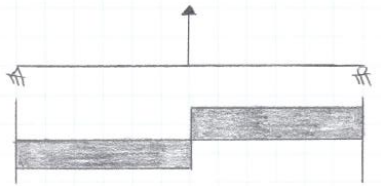
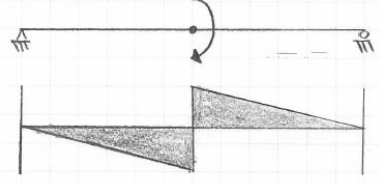
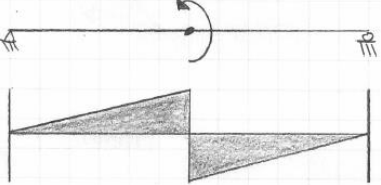
3. The slope of the moment diagram at any point is equal to the shear the same point

$$\frac{dM}{dx} = V$$

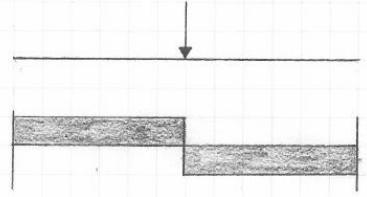
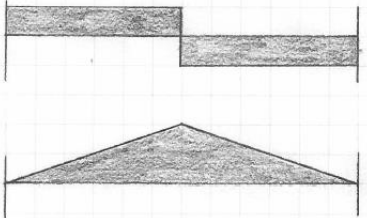
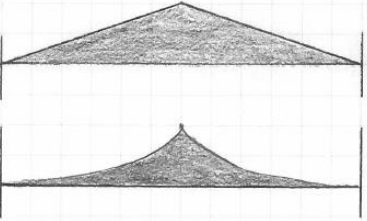
4. The change in moment between two points on the moment diagram is equal to the area under the shear diagram between the same two points.

$$\Delta M_{AB} = M_B - M_A = \int_{x_A}^{x_B} V dx$$

Always Go Left to Right

<p>1. Downward external force moves the V diagram downward.</p>	 <p>The diagram shows a horizontal beam supported by a pin on the left and a roller on the right. A downward-pointing arrow is positioned above the beam. Below the beam, a shaded rectangular area represents the shear force diagram. The top half of this area is above the horizontal axis, and the bottom half is below it, indicating a downward shift of the entire diagram.</p>
<p>2. Upward external force moves the V diagram upward.</p>	 <p>The diagram shows a horizontal beam supported by a pin on the left and a roller on the right. An upward-pointing arrow is positioned above the beam. Below the beam, a shaded rectangular area represents the shear force diagram. The top half of this area is above the horizontal axis, and the bottom half is below it, indicating an upward shift of the entire diagram.</p>
<p>3. Clockwise external moment moves the M diagram upward.</p>	 <p>The diagram shows a horizontal beam supported by a pin on the left and a roller on the right. A curved arrow indicating a clockwise moment is positioned above the beam. Below the beam, a shaded triangular area represents the moment diagram. The top half of the triangle is above the horizontal axis, and the bottom half is below it, indicating an upward shift of the entire diagram.</p>
<p>4. Counter clockwise external moment moves the M diagram downward.</p>	 <p>The diagram shows a horizontal beam supported by a pin on the left and a roller on the right. A curved arrow indicating a counter-clockwise moment is positioned above the beam. Below the beam, a shaded triangular area represents the moment diagram. The top half of the triangle is above the horizontal axis, and the bottom half is below it, indicating a downward shift of the entire diagram.</p>

Guidelines for the Shape of Shear and Moment Diagrams

<p>1. <i>Lines lead to Rectangles.</i></p>	
<p>2. <i>Rectangles lead to Triangles.</i></p>	
<p>3. <i>Triangles lead to Second-order Parabolas.</i></p>	
<p>4. <i>Second-order Parabolas Lead to Third-order Parabolas.</i></p>	