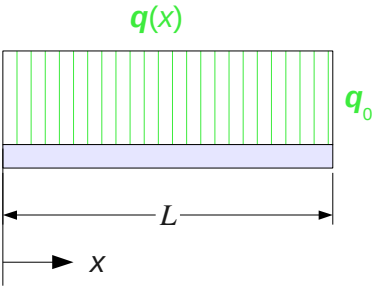
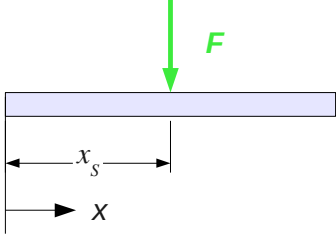
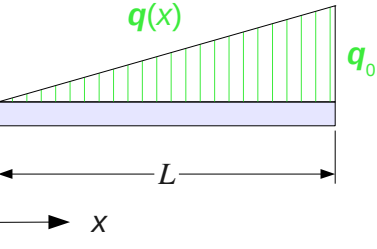
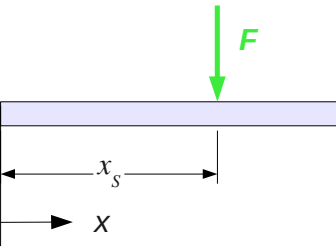
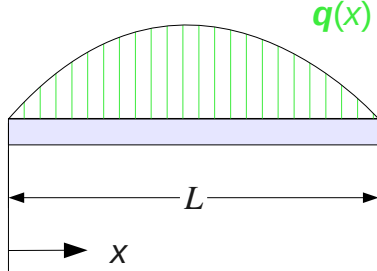
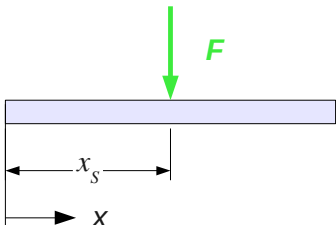
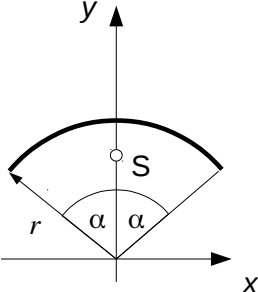


## Kräftemittelpunkt und Schwerpunkt

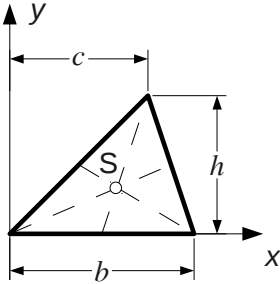
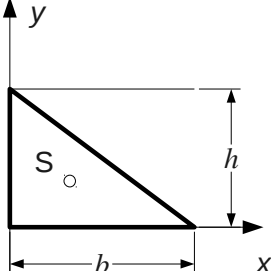
### Streckenlasten

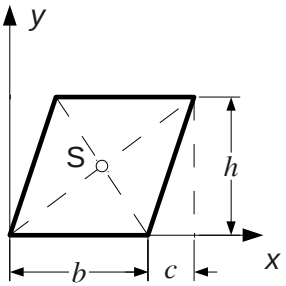
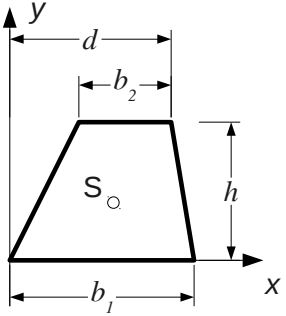
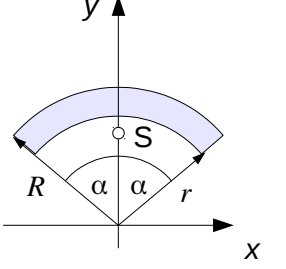
 <p style="text-align: center;"><math>q(x) = q_0</math></p>	 <p style="text-align: center;"><math>F = q_0 L, \quad x_s = \frac{L}{2}</math></p>
 <p style="text-align: center;"><math>q(x) = q_0 \frac{x}{L}</math></p>	 <p style="text-align: center;"><math>F = \frac{1}{2} q_0 L, \quad x_s = \frac{2}{3} L</math></p>
 <p style="text-align: center;"><math>q(x) = 4 q_0 \frac{x}{L} \left(1 - \frac{x}{L}\right)</math></p>	 <p style="text-align: center;"><math>F = \frac{2}{3} q_0 L, \quad x_s = \frac{L}{2}</math></p>

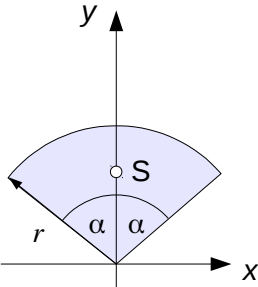
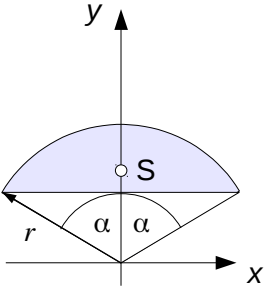
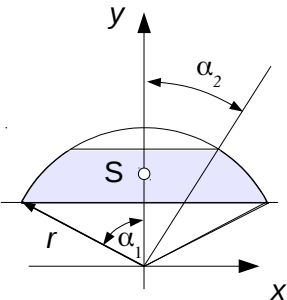
## Linienschwerpunkt

<p>Kreisbogen:</p> 	<p>Länge: <math>L = 2 r \alpha</math></p> <p>Schwerpunkt: <math>x_s = 0, y_s = r \frac{\sin(\alpha)}{\alpha}</math></p> <p>Der Winkel <math>\alpha</math> muss im Bogenmaß eingesetzt werden.</p>
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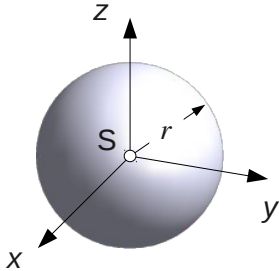
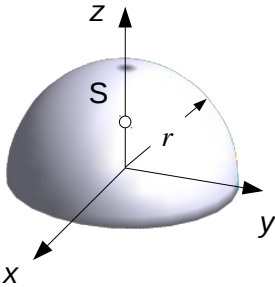
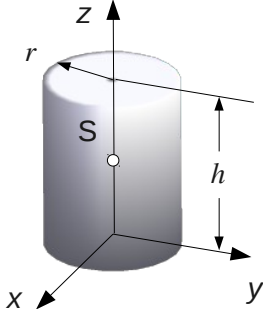
## Flächenschwerpunkt

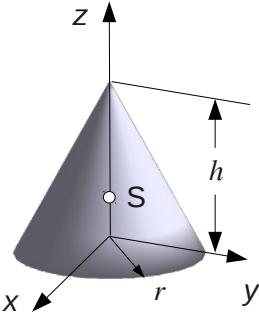
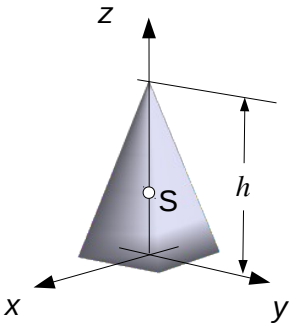
<p>Dreieck:</p> 	<p>Fläche: <math>A = \frac{1}{2} b h</math></p> <p>Schwerpunkt: <math>x_s = \frac{b+c}{3}, y_s = \frac{h}{3}</math></p>
<p>Rechtwinkliges Dreieck:</p> 	<p>Fläche: <math>A = \frac{1}{2} b h</math></p> <p>Schwerpunkt: <math>x_s = \frac{b}{3}, y_s = \frac{h}{3}</math></p>

<p>Parallelogramm:</p> 	<p>Fläche: <math>A = b h</math></p> <p>Schwerpunkt: <math>x_s = \frac{b+c}{2}, y_s = \frac{h}{2}</math></p>
<p>Trapez:</p> 	<p>Fläche: <math>A = \frac{1}{2}(b_1 + b_2) h</math></p> <p>Schwerpunkt: <math>x_s = \frac{b_1^2 - b_2^2 + d(b_1 + 2b_2)}{3(b_1 + b_2)}</math></p> <p><math>y_s = \frac{h(b_1 + 2b_2)}{3(b_1 + b_2)}</math></p>
<p>Ringsegment:</p> 	<p>Fläche: <math>A = (R^2 - r^2) \alpha</math></p> <p>Schwerpunkt: <math>x_s = 0</math></p> <p><math>y_s = \frac{2(R^3 - r^3) \sin(\alpha)}{3(R^2 - r^2) \alpha}</math></p> <p>Der Winkel <math>\alpha</math> muss im Bogenmaß eingesetzt werden.</p>

<p>Kreissegment:</p> 	<p>Fläche: <math>A = r^2 \alpha</math></p> <p>Schwerpunkt: <math>x_s = 0</math></p> $y_s = \frac{2r \sin(\alpha)}{3\alpha}$ <p>Der Winkel <math>\alpha</math> muss im Bogenmaß eingesetzt werden.</p> <p>Halbkreis: <math>\alpha = \frac{\pi}{2} \rightarrow y_s = \frac{4r}{3\pi}, A = \frac{\pi}{2} r^2</math></p>
<p>Kreisabschnitt:</p> 	<p>Fläche: <math>A = \frac{r^2}{2} (2\alpha - \sin(2\alpha))</math></p> <p>Schwerpunkt: <math>x_s = 0</math></p> $y_s = \frac{4r \sin^3(\alpha)}{3(2\alpha - \sin(2\alpha))}$ <p>Der Winkel <math>\alpha</math> muss im Bogenmaß eingesetzt werden.</p>
<p>Kreis Kalotte:</p> 	<p>Fläche: <math>A = \frac{r^2}{2} (2\alpha_1 - 2\alpha_2 - \sin(2\alpha_1) + \sin(2\alpha_2))</math></p> <p>Schwerpunkt: <math>x_s = 0</math></p> $y_s = \frac{4}{3} r \frac{\sin^3(\alpha_1) - \sin^3(\alpha_2)}{2\alpha_1 - 2\alpha_2 - \sin(2\alpha_1) + \sin(2\alpha_2)}$ <p>Die Winkel müssen im Bogenmaß eingesetzt werden.</p>

**Volumenschwerpunkt**

<p>Kugel:</p> 	<p>Volumen: <math>V = \frac{4}{3} \pi r^3</math></p> <p>Schwerpunkt: <math>x_S = 0, y_S = 0, z_S = 0</math></p>
<p>Halbkugel:</p> 	<p>Volumen: <math>V = \frac{2}{3} \pi r^3</math></p> <p>Schwerpunkt: <math>x_S = 0, y_S = 0, z_S = \frac{3}{8} r</math></p>
<p>Zylinder:</p> 	<p>Volumen: <math>V = \pi r^2 h</math></p> <p>Schwerpunkt: <math>x_S = 0, y_S = 0, z_S = \frac{h}{2}</math></p>

<p>Kegel:</p> 	<p>Volumen: <math>V = \frac{1}{3} \pi r^2 h</math></p> <p>Schwerpunkt: <math>x_S = 0, y_S = 0, z_S = \frac{h}{4}</math></p>
<p>Pyramide:</p> 	<p>Volumen: <math>V = \frac{1}{3} A h</math></p> <p>Schwerpunkt: <math>x_S = x_{AS}, y_S = y_{AS}, z_S = \frac{h}{4}</math></p> <p>A: Grundfläche  <math>x_{AS}</math> und <math>y_{AS}</math>: Koordinaten des Schwerpunkts der Grundfläche</p>