\[
\begin{align*}
G_y &= 10 \text{ kN/m}^2 \\
T_{xy} &= 6 \text{ kN/m}^2 \\
20 \text{ kN/m}^2 &= \sigma_x \\
V &= 20, +6 \\
\sigma_{p1} &= ? \\
\sigma_{p2} &= ? \\
T_{\text{max in plane}} &= ? \\
T_{\text{max anywhere}} &= ? \\
\tau_{30^\circ} &= \frac{\sigma_{30^\circ}}{2} \\
\frac{\sigma_x + \sigma_y}{2} &= \frac{20 + 10}{2} = 15 \text{ kN/m}^2 \\
V &= (20, 6) \\
20 - 15 &= 5 \\
R &= \pm \sqrt{5^2 + 6^2} = 7.81 \text{ kN/m}^2 \\
\sigma_{p1 \text{ in plane}} &= \sigma_{p1 \text{ anywhere}} = 15 + 7.81 = 22.81 \text{ kN/m}^2 \\
\sigma_{p2} &= +15 - 7.81 = 7.19 \text{ kN/m}^2
\end{align*}
\]
Solve for the stress in the beam shown.

Even seat @ A
Odd seat @ B
Mohr's Circles

\[ \text{Rad} = \frac{\sqrt{w_x^2 + w_y^2}}{2} \]

\[ w_x > w_y > 0 \]

\[ \left( \frac{w_x + w_y}{2} + \text{Rad} \right) \]

\[ w_{max} = + \text{Rad} \]

\[ v_{max} = v_{cen} + \text{Rad} \]

\[ \left( \frac{-w_x - w_y}{2} \right) \]

\[ v_{cen} = \frac{z}{2} \]

\[ \text{Rad} = \frac{1}{2} \sqrt{\left( \frac{w_x + w_y}{2} \right)^2 + w_{xy}^2} \]

\[ v_{min} = - \text{Rad} \]

\[ \left( \frac{w_x + w_y}{2} - \text{Rad} \right) \]

\[ v_{min} = - \text{Rad} \]

\[ \text{Shrining Stres} \]

[Diagram of Mohr's Circle with annotations and calculations.]
Mohr's Circle

2θ₁ = \sin \frac{-1}{\text{rad}} T_{xy}

Mohr's Circle
Sign Convention
- Tensile Normal stresses are positive
- Shearing stresses that would rotate the element clockwise are positive.
Absolute Maximum Shearing Stress

Plane Stress

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The largest absolute value is called the absolute maximum shearing stress.