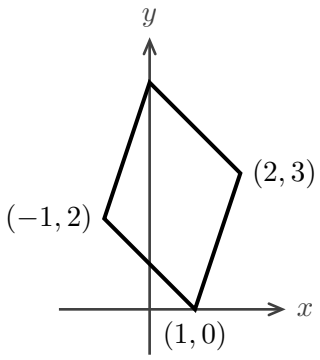
Areas and Determinants

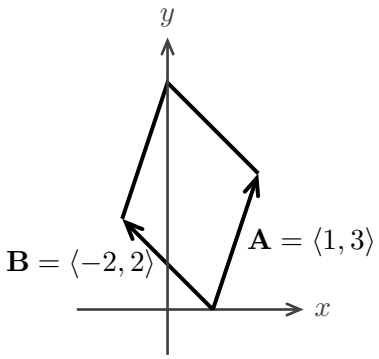
1. Compute $\begin{vmatrix} 6 & 5 \\ 1 & 2 \end{vmatrix}$.

Answer: $\begin{vmatrix} 6 & 5 \\ 1 & 2 \end{vmatrix} = 6 \cdot 2 - 5 \cdot 1 = 7.$

2. Compute the area of the parallelogram shown.



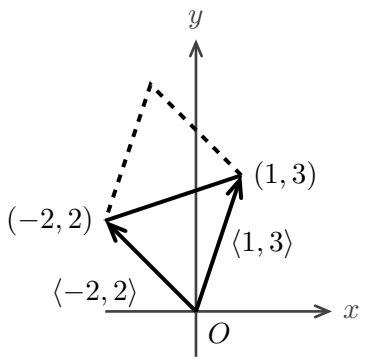
Answer: The area is given by the determinant of the vectors determining the parallelogram.



Area $= |\det(\mathbf{A}, \mathbf{B})| = \left|\det \begin{pmatrix} 1 & 3 \\ -2 & 2 \end{pmatrix}\right| = 2 + 6 = 8.$

3. Find the area of the triangle with vertices $(0, 0)$, $(-2, 2)$ and $(1, 3)$.

Answer: The triangle is half a parallelogram. So the area is $\frac{1}{2}\left|\det \begin{pmatrix} 1 & 3 \\ -2 & 2 \end{pmatrix}\right| = 2.$ error



18.02SC Multivariable Calculus
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