30) 

\[ 1 + \sin \theta = 1 + \cos \theta \Rightarrow \theta = \frac{\pi}{4}, \frac{5\pi}{4} \]

\[
A = \frac{1}{2} \int_0^{\frac{\pi}{4}} (1 + \sin \theta)^2 \, d\theta + \frac{1}{2} \int_{\frac{\pi}{4}}^{\frac{5\pi}{4}} (1 + \cos \theta)^2 \, d\theta + \\
\frac{1}{2} \int_{\frac{5\pi}{4}}^{\frac{2\pi}{5}} (1 + \sin \theta)^2 \, d\theta = \cdots = \frac{3\pi}{2} - 2\sqrt{2}
\]

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16) \( B - A = \langle 1 - 4, 0 - 3 \rangle = \langle -3, 3 \rangle \)

24) \( \langle 2 - 5, 3 - (-1) \rangle = \langle -3, 4 \rangle \Rightarrow \vec{u} = \left\langle \frac{-3}{5}, \frac{4}{5} \right\rangle \)

26) \( \vec{v} = 2\vec{i} - \vec{j} \Rightarrow \|\vec{v}\| = \sqrt{4 + 1} = \sqrt{5} \)

Multiply by \( \frac{4}{\sqrt{5}} \) to get a magnitude of 4.

\[
\vec{w} = \frac{4}{\sqrt{5}} \cdot 2\vec{i} - \frac{4}{\sqrt{5}} \vec{j} = \frac{8}{\sqrt{5}} \vec{i} - \frac{4}{\sqrt{5}} \vec{j}
\]

34) 

\[ \vec{g} = \langle 0, -180 \rangle \Rightarrow \vec{g} + \vec{w} = \langle -20, -20 \rangle \Rightarrow \vec{w} = \langle -20, -20 \rangle - \langle 0, -180 \rangle = \langle -20, 160 \rangle \]

38)
\( \vec{w} = \langle -30, 60 \rangle \) \hspace{1cm} \| \vec{v} \| = 600 \text{ mph, } \vec{v} = \langle x, y \rangle \\
\vec{v} + \vec{w} = \langle x, 0 \rangle, \ x < 0 \) (due west) \\
y + 60 = 0 \Rightarrow y = -60; \hspace{0.5cm} \| \vec{v} \| = 600 \Rightarrow \sqrt{x^2 + y^2} = 600 \Rightarrow \\
x = -180\sqrt{11} \hspace{0.5cm} \tan^{-1} \frac{60}{180\sqrt{11}} = 5.7^\circ \text{ south of west}

42) \\
\vec{v}_{\text{paper}} = \langle -48, 12 \rangle \hspace{1cm} \frac{40 \text{ ft}}{48 \text{ ft/ sec}} = \frac{5}{6} \text{ sec} \\
\frac{5}{6} \cdot 12 = 10 \text{ feet up the road}