Answers to Worksheet 1

1. a.) \(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\)

b.) \(s = \frac{-5}{2}, \ t = \frac{3}{2}\)

2. \(F = \left\langle \frac{-5\sqrt{3}}{2} + 4\sqrt{2}, \frac{5}{2} + 4\sqrt{2}\right\rangle, \ |F| \approx 8.2640\) pounds, direction: \(\theta \approx 81^\circ\), where \(\theta\) is measured from the positive \(x\)-axis.

3. Ground speed is approximately 246.04 km/hr; Direction is approximately \(N72^\circ E\).

4. Vector projection: \(\text{proj}_a b = \left\langle \frac{35}{13}, \frac{-7}{13}\right\rangle\)

Scalar projection: \(\text{comp}_a b = -\frac{14}{\sqrt{26}}\).

5. \(W \approx 234.92\) foot pounds.

6. \(\theta \approx 31^\circ\)

7. \(d = \frac{3}{\sqrt{5}}\)