1. (3 pts) UT soccer player Allie Sirna kicks a soccer ball straight up in the air. Use positive as upward with the ground as the origin. Circle the correct relationships for the instant the ball is at its maximum height.

<table>
<thead>
<tr>
<th>Position</th>
<th>Velocity</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 0</td>
<td>&gt; 0</td>
<td>&gt; 0</td>
</tr>
<tr>
<td>= 0</td>
<td>= 0</td>
<td>= 0</td>
</tr>
<tr>
<td>&lt; 0</td>
<td>&lt; 0</td>
<td>&lt; 0</td>
</tr>
</tbody>
</table>

2. (3 pts) An object has a negative velocity and negative acceleration. Circle the correct statement.

- The object’s speed is decreasing
- The object’s speed is not changing
- The object’s speed is increasing
- None of the above

3. (3 pts) Circle the correct equation based on the vector diagram.

\[ a = u + c + b \]
\[ a = u - c - b \]
\[ a = b - c + u \]
\[ a = c - u - b \]

4. (3 pts) Circle the correct equation for the y-component of this vector.

- +18 \sin(25) \text{ ft}
- +18 \cos(25) \text{ ft}
- +18 \tan(25) \text{ ft}
- -18 \sin(25) \text{ ft}
- -18 \cos(25) \text{ ft}
- -18 \sin(25) \text{ ft}
5. (8 pts)
Justin Worley runs forward 15 yards in 3 seconds, backward 4 yards in 2 seconds, and then forward 20 yd in 6 seconds. Determine his average speed and velocity.

\[
\text{Speed} = \\
\text{Velocity} =
\]

6. (8 pts)
The volume of Neyland Stadium is 850,000 cubic yards. One Jones is equivalent to 70,000 cm\(^3\). Determine the volume of a 1:100 scale model of the stadium in Jones.

7. (12 pts)
Determine the magnitude of the vector \( \mathbf{\vec{a}} + \mathbf{\vec{b}} - \mathbf{\vec{c}} \).

\[
\mathbf{\vec{a}} = (-2i + 5j) \text{ ft} \\
\mathbf{\vec{b}} = (i - 4j) \text{ ft} \\
\mathbf{\vec{c}} = (-3j) \text{ ft}
\]

8. (12 pts)
A boat heads 75m at 26\(^\circ\) south of west, then turns and heads 60m at 10\(^\circ\) west of north. What is the magnitude and direction of the displacement of the boat?

\[
\mathbf{\vec{s}} = \text{ (75 cos(26\(^\circ\)) - 60 cos(10\(^\circ\)) i - (75 sin(26\(^\circ\)) - 60 sin(10\(^\circ\)) j) m}
\]
9. (12 pts) A bug starts crawling at location \((8i - 3j)\) mm with a velocity of \((-2i + 5j)\) mm/s and is subjected to a constant acceleration of \((4i - 7j)\) mm/s\(^2\). Determine the bug's velocity (using \(i, j\) notation) when it is at its minimum x position.

10. (12 pts) A car starts from rest, accelerates at a constant rate of 6.2 m/s\(^2\) for 4.0 seconds, travels 50 meters at a constant velocity, and then slows to a stop at a constant rate of 18 m/s\(^2\). What is the total distance travelled?

11. (12 pts) A student standing on a bridge throws a tennis ball upwards. The ball is in the air 2.3 seconds before it hits the ground 30 feet below the bridge. What was the ball’s maximum height above the ground?

12. (12 pts) A car’s motion is described by these graphs. Determine the position of the car at t=14 seconds.