Instructions:

- Sit in assigned seat; failure to sit in assigned seat results in a 0 for the exam.
- Put name and section on your exam.
- Put seating label on your equation sheet.
- Do not open the test until you are told to do so.
- Write your final answers in the boxes provided.
- If you finish with less than 5 minutes remaining, please stay seated until the exam is over.
- Stop work immediately when time is over; working after time is over results in an automatic point deduction.
- Turn in your equation sheet with your examination.
- Pass exams to the aisle; stay seated until all exams are collected.

Guidelines:

- Assume 3 significant figures for all given numbers unless otherwise stated.
- Show all of your work – no work, no credit.
- Include units for all answers.
- Include directions for all vectors.

<table>
<thead>
<tr>
<th>Time</th>
<th>A102</th>
<th>B102</th>
<th>C102</th>
<th>D102</th>
<th>E102</th>
<th>F102</th>
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<td>8:10</td>
<td>Rachel</td>
<td>Michael J.</td>
<td>Stefy</td>
<td>Christopher</td>
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1. (2 pts) The vector diagram shown is in equilibrium. If we changed the coordinate system to that shown (x-axis aligned with T1), would T1:
   A. Increase
   B. Stay the same
   C. Decrease

2. (2 pts) Margie throws a ball straight up. Which of the following is true about its velocity, \(v\), and its acceleration, \(a\), at the highest point in its path?
   A. both \(v = 0\) and \(a = 0\)
   B. \(v \neq 0\), but \(a = 0\)
   C. \(v = 0\), but \(a \neq 0\)
   D. both \(v \neq 0\) and \(a \neq 0\)
   E. not really sure

3. (2 pts) A statue of LazyDog has a volume of 512 in\(^3\). The volume of a 1/8 inch = 1 inch scale model of the dog is:
   A. 512 in\(^3\)
   B. 64 in\(^3\)
   C. 8 in\(^3\)
   D. 1 in\(^3\)
   E. 0.125 in\(^3\)

4. (2 pts) A particle starts from position \((8i + 5j)\)ft with an initial velocity of \((3i - 4j)\)ft/s and constant acceleration of \((-i+2j)\)ft/s\(^2\). When does the object reach its maximum x position?
   A. when \(v_x = 0\)
   B. when \(v_y = 0\)
   C. when \(v = 0\)

5. (8 pts) Determine the number of square gurleychains in an area of 0.3 homesteads.
   1 gurleychain = 33 ft
   1 acre = 43560 ft\(^2\)
   1 homestead = 160 acres
6. (14 pts) Mike walks from point A to point B. He then walks 300 ft due north to point C. After that he walks 400 ft due east to point D, and then 200 ft due north to return to his starting point, point A. Determine the distance and direction Mike walked from point A to point B.

7. (14 pts) This system of four forces is in equilibrium. What is the magnitude of B?
8. (14 pts) Lisa drives 40 miles at an average speed of 60 mph, then at 50 mph for 24 minutes, and then 32 miles in 36 minutes. What is her average speed for the entire trip?

9. (14 pts) Tom is driving his fire truck down the road at an unknown speed. A call comes in, he turns on the siren, accelerates from his current speed at a rate of 0.7 m/s² for 16 seconds, and reaches a speed of 30 m/s. How far did Tom travel from when he turned on the siren until he reached 30 m/s?
10. (14 pts) Heather is driving down the road at 95 ft/s. She slows down at a constant rate of 2.5 ft/s\(^2\) for 12 seconds, then slows down at a rate of 3 ft/s\(^2\) until she is at a speed of 25 ft/s, and then comes to a stop in 6 seconds. Determine the total distance she traveled while stopping.

11. (14 pts) Jack starts at position \((8\hat{i} - 14\hat{j})\) ft with an initial velocity of \((-3\hat{i} + 5\hat{j})\) ft/sec and a constant acceleration of \((2\hat{i} + 4\hat{j})\) ft/s\(^2\). Determine the \(y\) position of Jack when he is at his maximum \(x\) position.