The first midterm is 8:30 pm-10:00 pm on Tuesday, Feb 20. The locations are:

<table>
<thead>
<tr>
<th>Location</th>
<th>Sections</th>
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<tbody>
<tr>
<td>Old Chemistry 116</td>
<td>1,2,5</td>
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<tr>
<td>Harriman hall 137</td>
<td>3,4,6</td>
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<td>Old Engineering 143</td>
<td>7,8</td>
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1. Find the equation of the line passing through the points $(-1,3)$ and $(4,2)$.
2. Where do the lines $y = 2x - 1$ and $y = 3x + 10$ intersect?
3. Solve this equation for $t$ in terms of $a$ and $b$: $2at + 3t + 1 = b$.
4. Simplify the following expression as much as possible: $a^3(ab)^2/(bc^3)$.
5. Simplify the following expression as much as possible: $\log_3(27x^2)$.
6. What is the natural domain of definition of $f(x) = \sqrt{x + \frac{1}{x}}$?
7. Find all $x$ which satisfy $\frac{1}{3}|x - 2| < 1$. Give the answer as an interval.
8. On what intervals (if any) is the polynomial $p(x) = x^2 - 5x + 6$ negative?
9. Suppose $\theta$ one of the acute angles of a right triangle and assume $\sin(\theta) = \frac{1}{3}$. What is $\cos(\theta)$?
10. Find each of the following limits or explain why it does not exist.
    (a) $\lim_{x \to 0} \frac{x+1}{x^2}$.
    (b) $\lim_{x \to 1} \frac{x+1}{x-1}$.
    (c) $\lim_{x \to \infty} \frac{x+1}{x^2 - 1}$.
    (d) $\lim_{x \to 0} \frac{|x|}{x}$.
    (e) $\lim_{x \to 0} \frac{x^2}{2x}$.
    (f) $\lim_{x \to \infty} x^2 - 4$.
    (g) $\lim_{x \to 0} x^2 \cos(1/x^2)$.
    (h) $\lim_{x \to \infty} x \cos x$.
    (i) $\lim_{x \to 1} (x - 1)^{-2}$.
11. For what value(s) of $a$ does $\lim_{x \to 1} \frac{x^2 - ax - 1}{x - 1}$ exist?
12. Sketch a function $f$ on the interval $[0,5]$ which has the following properties.
    (a) $f$ is increasing on $(0,2)$ and $(3,5)$.
    (b) $f$ is decreasing on $(2,3)$.
    (c) $f$ is continuous everywhere on $[0,5]$ except the points $\{2,3,4\}$ where it is discontinuous.
    (d) $f$ has limits everywhere except the points $\{2,4\}$.
    (e) $f$ is continuous from the right at $x = 4$.
    (f) $f$ never attains a maximum value on $[0,5]$.
13. State the intermediate value theorem.
14. State the squeeze theorem.
15. Suppose $f$ is increasing on an interval $(a,b)$ and has a limit at a point $c \in (a,b)$. Must $f$ be continuous at this point $c$?