1. [6 pts] The average teen sleeps for $7\frac{1}{2}$ hours out of every 24. Express the ratio of hours slept to hours awake in lowest terms. Show work.

\[ \frac{2 \cdot 7\frac{1}{2}}{15} : \frac{2 \cdot 2}{3} \]

\[ \frac{15 : 33}{3 : 3} \]

\[ 5 : 11 \]

2. [10 pts] Use either the unit-rate or scaling approach to solve the problem below. Clearly explain your work verbally, and tell which of the two approaches you used:

It took Kelly 10 minutes to walk 6 laps. At this rate, how long will it take her to walk 15 laps?

**Scaling:**

\[ 6 \times (2.5) = 15 \]

She will walk 2.5 times as far, so it should take 2.5 times as long: \[ \boxed{35 \text{ minutes}} \]

**Unit-rate:**

She can walk 1 lap in \( \frac{10}{6} \) minutes, or 1.\( \frac{2}{3} \) minutes.

\[ 15 \times (1.\frac{2}{3}) = \boxed{35 \text{ minutes}} \]

3. [10 pts] The ratio of men to women in the classroom is 2 to 3. If there are 30 people in the room, how many men must enter to change the ratio to 2 to 1? Show clear work, but you need not explain.

<table>
<thead>
<tr>
<th>old ratio</th>
<th>actual #s</th>
<th>new ratio</th>
<th>actual #s</th>
</tr>
</thead>
<tbody>
<tr>
<td>men</td>
<td>2</td>
<td>2</td>
<td>[ x = 12 ]</td>
</tr>
<tr>
<td>women</td>
<td>3</td>
<td>[ y = 18 ]</td>
<td>1</td>
</tr>
<tr>
<td>total</td>
<td>5</td>
<td>3</td>
<td>30</td>
</tr>
</tbody>
</table>

\[ \frac{2}{x} = \frac{x}{30} \]

\[ 60 = 5x \]

\[ x = 12 \]

24 men must enter.