A random sample of 200 students was asked how long it took them to complete their homework the previous night. The time was recorded and summarised in the table below.

<table>
<thead>
<tr>
<th>Time, $t$ (minutes)</th>
<th>25 $\leq t &lt; 30$</th>
<th>30 $\leq t &lt; 35$</th>
<th>35 $\leq t &lt; 40$</th>
<th>40 $\leq t &lt; 50$</th>
<th>50 $\leq t &lt; 80$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>55</td>
<td>39</td>
<td>68</td>
<td>32</td>
<td>6</td>
</tr>
</tbody>
</table>

a) Draw a histogram to represent the data.

b) Estimate how many students took between 36 and 45 minutes to complete their homework.

b) The area of the shaded region gives the estimate.

$A) 4 \times 13.6 = 54.4$

$B) 5 \times 3.2 = 16$

$\Rightarrow \text{No of students } 36 \leq x \leq 45 = 70.4$
Special Cases

1. Gap between classes
   a. $t'(\text{min})$  0 - 10  11 - 20  21 - 30
   In this case it is appropriate to split the differences evenly between classes.
   i.e. $t'(\text{min})$  0 ≤ $t$ < 10.5  10.5 ≤ $t$ < 20.5  20.5 ≤ $t$ < 30

b. Age (years)  0-10  11-20  21-30
   With ages, you are one age right up until the point that you reach the next age, but the following treatment is appropriate.
   i.e. age (years)  0 ≤ $t$ < 11  11 ≤ $t$ < 21  21 ≤ $t$ < 31

2. Open-ended classes
   e.g. 0-10, 10-20, 20-
   In such a case, knowing about the data helps you apply an appropriate treatment.
   e.g. If data is class size, 30 is a good upper bound.
   If age of students in college, maybe 25.
   If no info is known, make the first class double the width of the previous class.