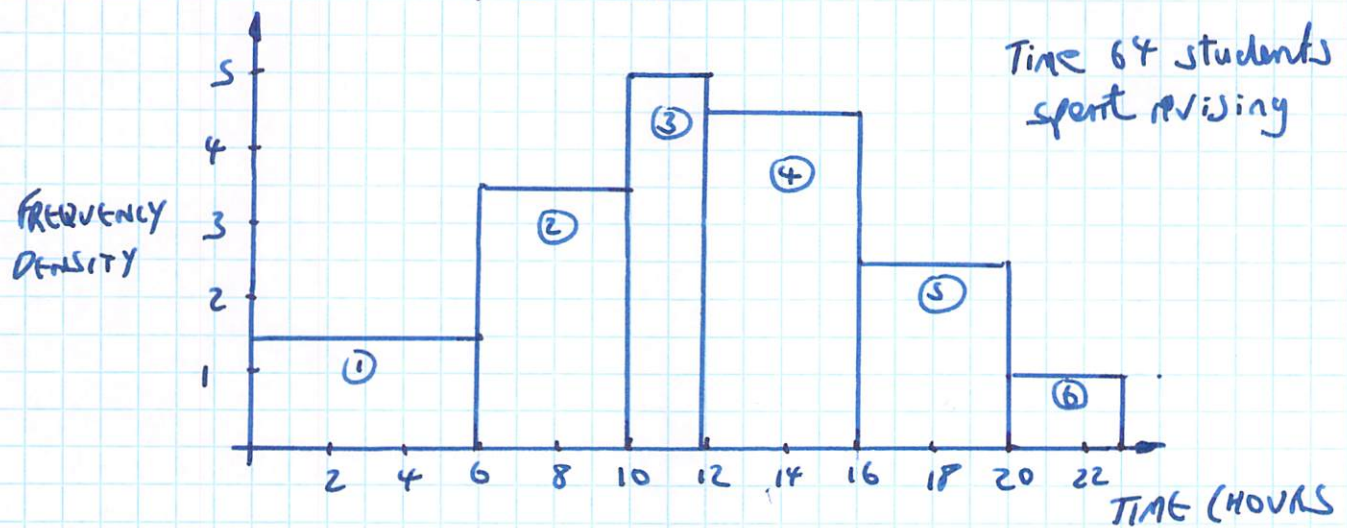


HISTOGRAMS



A histogram is a bar chart for continuous data and may have bars of different width.
If the bars are of different widths then the vertical axis is frequency density NOT frequency.

So the area of the bars represents the frequency.

So block ① is $1\frac{1}{2} \times 6 = 9$
 block ② is $3\frac{1}{2} \times 4 = 14$
 block ③ is $5 \times 2 = 10$
 block ④ is $4\frac{1}{2} \times 4 = 18$
 block ⑤ is $2\frac{1}{2} \times 4 = 10$
 block ⑥ is $1 \times 3 = 3$
 64

The actual total is always given so this calculation is a check that you fully understand the histogram.

Often a table is given to complete

Time freq. midpoint Product

0 < t ≤ 6	9	3	27
6 < t ≤ 10	14	8	112
10 < t ≤ 12	10	11	110
12 < t ≤ 16	18	14	252
16 < t ≤ 20	10	18	180
20 < t ≤ 22	3	21½	64½
			745½

Estimate mean $\frac{745.5}{64}$
 = 11.6 hr.

Very occasionally you might be asked to estimate the location of the lower quartile and upper quartile.

Now the 3 quartiles will divide the area in 4 equal parts in this case 16, 32, 48 are the boundaries. We don't apply the "plus one" rule.

16 will occur in block ②.
 Let it occur at point a.

So $9 + 3\frac{1}{2}a = 16$

So $a = 2$

which we add to the higher value block ①

$6 + 2 = 8$ hours L.Q.

48 will occur in block ④
 Let it occur at point c

So $33 + 4\frac{1}{2}c = 48$

$c = 3\frac{1}{3}$

which we add to higher value block ③

$12 + 3\frac{1}{3} = 15\frac{1}{3}$ hours U.Q.

Finally median splits area in two.
 Let it occur at point b.

$23 + 5b = 32$

$b = 1.8$

So median occurs at $\frac{32-23}{5}$

$= 1.8$

So median is $10 + 1.8 = 11.8$ hours.

{ Mean < Median indicates a }
 negative skew - skew to left.
 This is NOT in GCSE syllabus