UNIT E4 *Measures of Variation* Data Sheets

Data Sheets

E4.1, Sheet 1 Cumulative Frequency 1

E4.1, Sheet 2 Cumulative Frequency Curve 1

E4.2a Cumulative Frequency 2

E4.2b Cumulative Frequency Curve 2

E4.3 Box and Whisker Plots

E4.4 Standard Deviation

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Data Sheet E4.1, Sheet 1 *Cumulative Frequency 1*

The table shows the age distribution (in complete years) of the population of Nigeria in 1991.

Age	$0 \le x < 15$	$15 \le x < 30$	$30 \le x < 45$	$45 \le x < 60$	$60 \le x < 75$	$75 \le x < 100$
% of Pop.	32	29	20	12	6	1
Cumulative %						

Find the cumulative frequencies and draw a cumulative frequency graph for the data.

Estimate: (a) the median (Q_2),

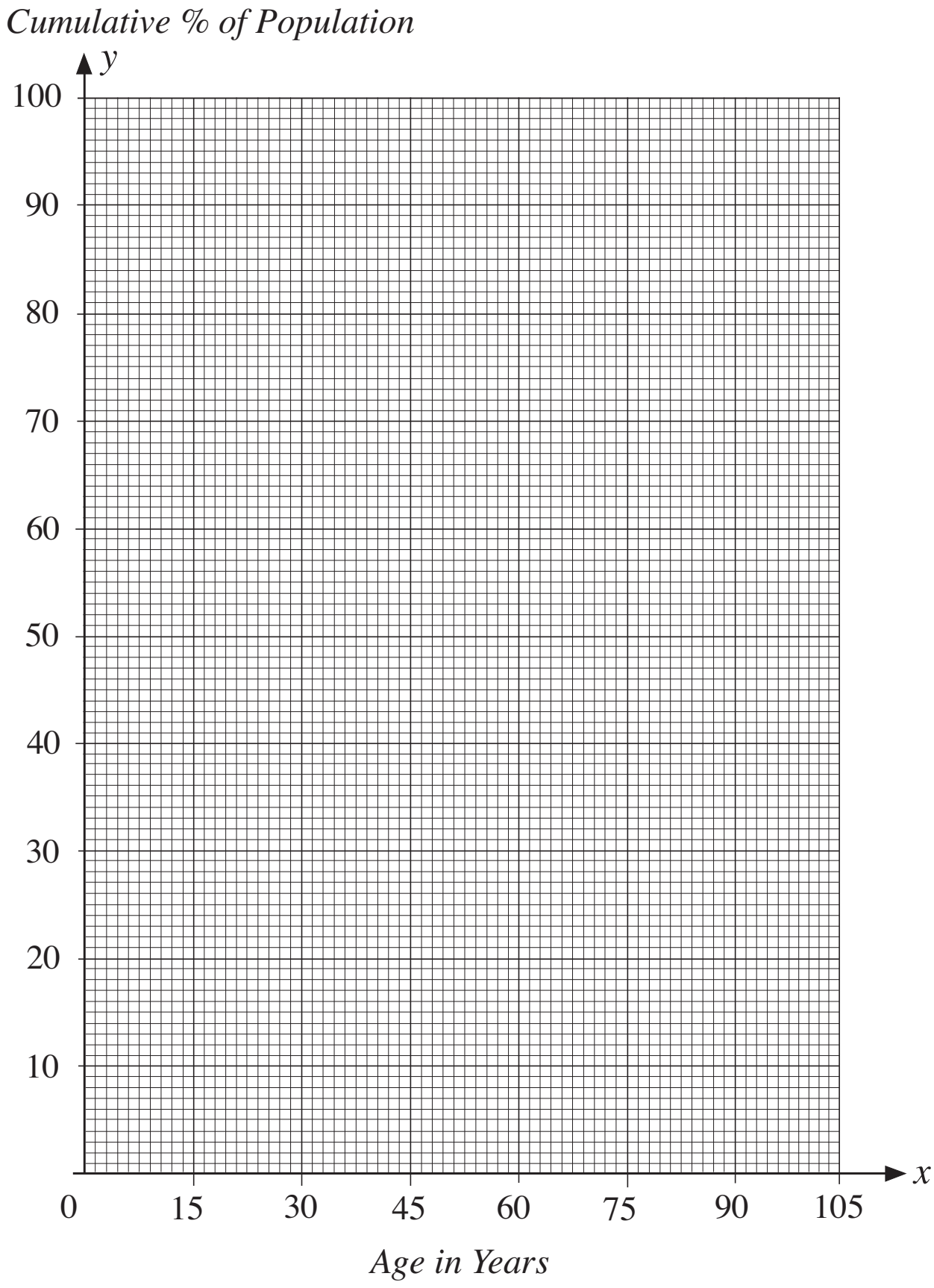
(b) the lower quartile (Q_1) and the upper quartile (Q_3),

(c) the inter-quartile range.

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Data Sheet E4.1, Sheet 2

Cumulative Frequency Curve 1



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Data Sheet E4.2a

Cumulative Frequency 2

The table shows the distribution of marks on a test for 70 students.

Mark	Frequency	Cumulative Frequency
1 - 10	2	2
11 - 20	5	7
21 - 30	9	16
31 - 40	14	
41 - 50	16	
51 - 60	12	
61 - 70	8	
71 - 80	4	70

(a) Complete the cumulative frequency table above.

(b) Draw a cumulative frequency curve on the axes on Data Sheet E4.2b.

(c) The pass mark for the test is 47.

Use your graph to determine the number of students who passed the test. ☐ students

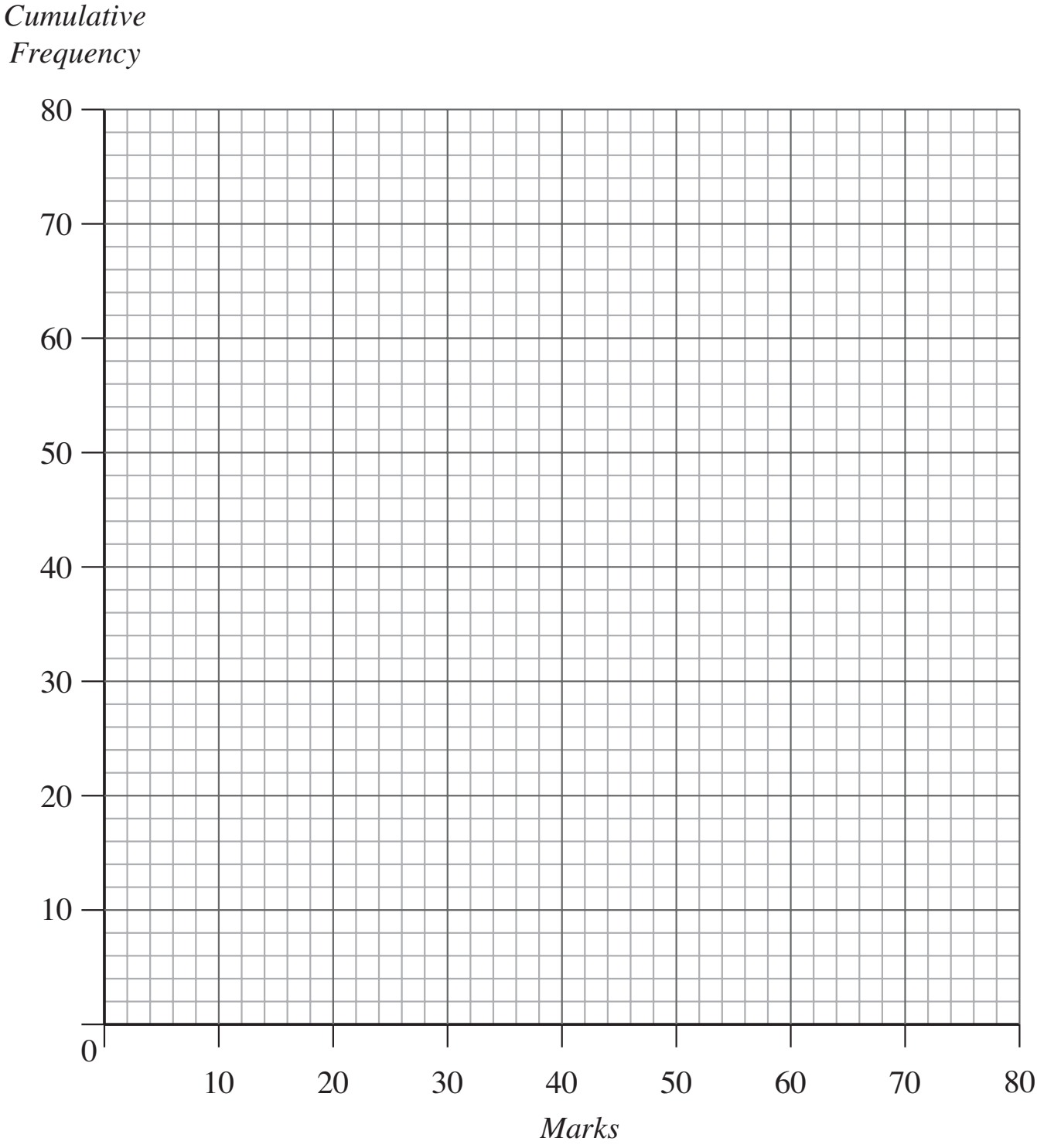
(d) What is the probability that a student chosen at random, had a mark of less than or equal to 30 ?

p = ☐

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Data Sheet E4.2b *Cumulative Frequency Curve 2*

Cumulative frequency curve for data given on Data Sheet E4.2a.



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Data Sheet E4.3 *Box and Whisker Plots*

The goals scored in the first 11 football matches played by a *National Premier League* team were:

1 0 4 2 2 3 1 2 5 0 1

These data can be represented using a *box and whisker* plot.

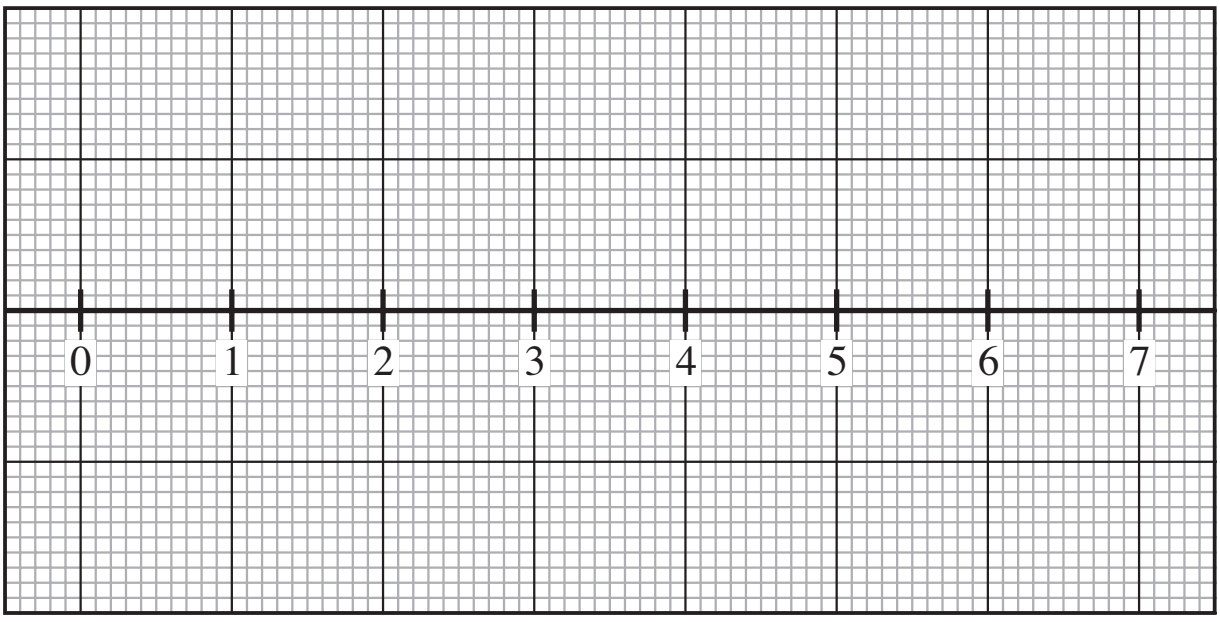
1. Reorder the data, starting with the smallest. ☐

2. Identify: smallest value ☐ largest value ☐

   lower quartile ☐ upper quartile ☐

   median ☐

3. Construct a *box and whisker* plot above the scale below.



Construct a box and whisker plot below the scale for a team scoring:

3 5 2 1 3 2 2 4 6 2 1

Compare the two sets of data.

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Data Sheet E4.4 *Standard Deviation*

The STANDARD DEVIATION (*s.d.*) of a set of data is a measure of the *spread* of the data about the mean and is defined by

$$s.d. = \sqrt{\frac{1}{n}\sum_{i=1}^{n}\left(x_i - \bar{x}\right)^2}$$

Consider the following sets of data.

(a) What is the mean (m) of each set?

$m =$ ☐ $S_1 = \{6,\ 7,\ 8,\ 9,\ 10\}$ $s.d. =$ ☐

$m =$ ☐ $S_2 = \{4,\ 5,\ 8,\ 11,\ 12\}$ $s.d. =$ ☐

$m =$ ☐ $S_3 = \{1,\ 2,\ 8,\ 14,\ 15\}$ $s.d. =$ ☐

The *standard deviation* can be calculated as follows:

x_i	$x_i - \bar{x}$	$\left(x_i - \bar{x}\right)^2$
	TOTAL	

$s.d. =$ $\sqrt{\dfrac{\square}{\square}}$

$=$ ☐

(b) Compare the standard deviations for S_1, S_2 and S_3.

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