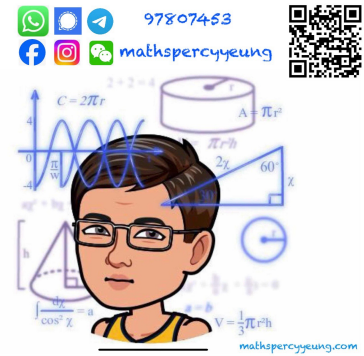# Chapter 6 *Measures of Central Tendency*

Multiple Choice Section

1. Find the mean of the following data.

   0, 13, 6, 12, 30, 5

   A. 11

   B. 11.2

   C. 13.2

   D. 66

2. The mean of 5, 7, 10, 11 and n is 10. Find the value of n.

   A. 7

   B. 10

   C. 17

   D. 27

3. The mean of 5 numbers is 9 and the mean of another 5 numbers is 10. Find the mean of these 10 numbers.

   A. 5

   B. 9.5

   C. 10

   D. 19

4. Given a set of data 4, 4, 5, 5, 5, 6, 6, 13, if a new datum "6" is inserted, find the difference between the new mean and the original mean.
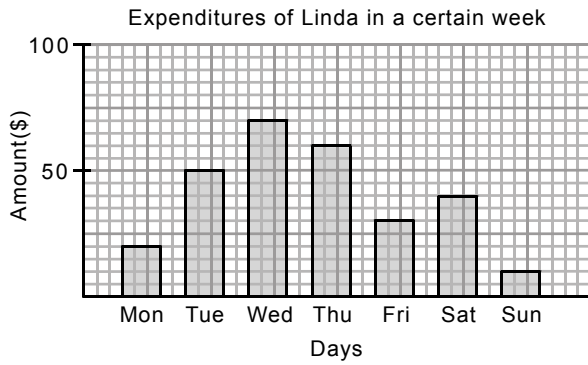
   A. 0

   B. 1

   C. 5

   D. 6

5. Find the mean of x, x and $x + 6$.

   A. x

B. $x + 1$

C. $x + 2$

D. $x + 6$

6. The following bar chart shows the expenditures of Linda in a certain week. Find the mean daily expenditure of Linda in that week.

Expenditures of Linda in a certain week

A. $35

B. $40

C. $50

D. $60

7. The mean of a, b and c is 45 and the mean of a, b, c, d and e is 55. Find the value of $d + e$.

A. 50

B. 70

C. 140

D. It cannot be found.

8. The following table shows the highest temperatures of last 20 days. Find the mean temperature.

Temperature (°C)(x)	Frequency (f)
20	3
21	5
22	6
23	2
24	4

A. 21°C

B. 21.95°C

C. 22°C

D. 23°C

9. The table below shows the distribution of the weight of the students in F.5A. Find the mean weight of the students.

Weight (kg)(x)	50	51	52	53	54	55	56
Frequency (f)	6	7	5	10	1	8	3

A. 52.375 kg

B. 52.725 kg

C. 53 kg

D. 54 kg

10. The table below shows the marks of a group of students in a Mathematics test. Find the mean mark.

Mark	Frequency
0 – 9	6
10 – 19	2
20 – 29	1
30 – 39	3
40 – 49	8

A. 25

B. 27

C. 27.5

D. 28

11. Find the median of the following data.

0, 4, 6, 10, 14, 16, 20

A. 9

B. 10

C. 12

D. 14

12. The following table shows the ages of the members of a certain choir. Find their median age.

Age	10	11	12	13	14	15	16
Number of members	5	9	14	2	8	7	4

   A. 11

   B. 12

   C. 12.5

   D. 13

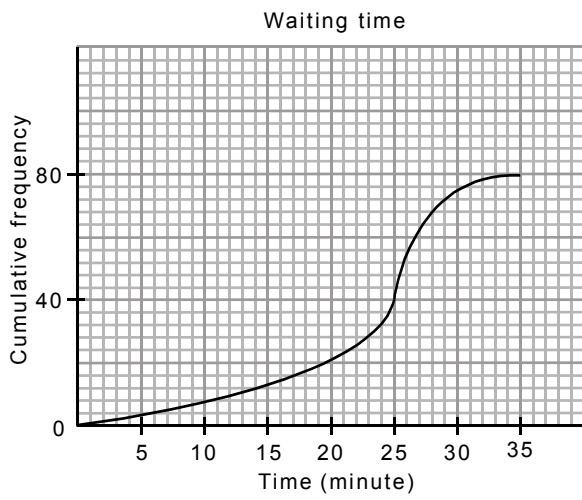**13.** Find the median of the following data.

$x, x + 7, x + 9, x + 10$

   A. x

   B. $x + 7$

   C. $x + 8$

   D. $x + 9$

14. The median of 3, 4, 5, x and $x + 2$ is 4, where x is an integer. Which of the following is a possible value of x?

   A. 1

   B. 3

   C. 5

   D. 7

15. The figure shows the waiting time of 80 passengers at a bus stop. Find the median waiting time of these 80 passengers.

Waiting time

A. 16 min

B. 25 min

C. 35 min

D. 80 min

16. Find the mode of the following data.

1, 2, 3, 4, 4, 5, 6, 7

A. 2

B. 4

C. 5

D. 7

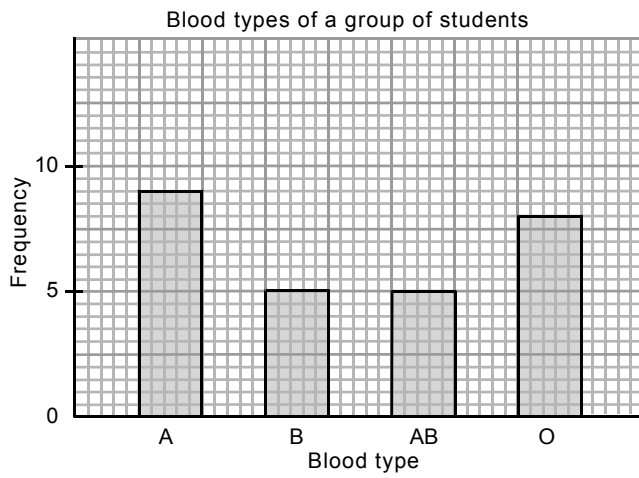17. The following table shows the test marks of a group of students. Find the mode of the test marks.

Mark	Number of students
0	6
1	7
2	9
3	20
4	31
5	5
6	8

A. 4

B. 6

C. 20

D. 31

18. The table below shows the blood types of a group of students. Find the mode of the blood types.

Blood types of a group of students

A. 5

B. 9

C. Blood type A

D. Blood type B

19. Find the mode of the following data.

$x, x, x + 1, x + 3, x + 3, x + 3, x + 3$

A. x

B. $2x$

C. $x + 1$

D. $x + 3$

20. The following table shows the distribution of the ages of 40 students. Find the mode of the ages.

Age	Cumulative frequency
10	1
11	11
12	24
13	27
14	33

15	37
16	40

A. 12

B. 13

C. 16

D. 40

21. The following histogram shows the ages of a group of students. Given that the class interval of the first class is $4 - 6$, find the modal class of the ages.

Ages of a group of students
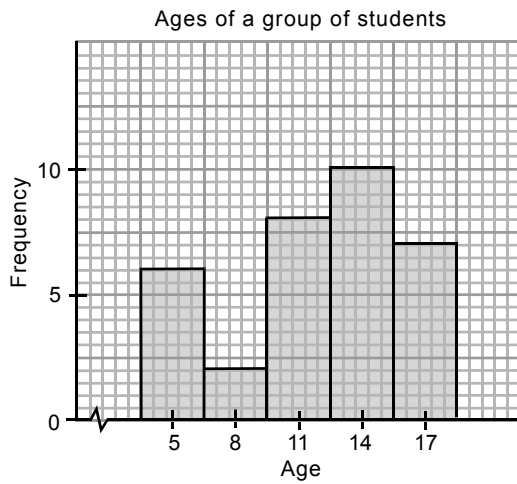
A. $11 - 14$

B. $13 - 15$

C. 13

D. 14

22. The following table shows the distribution of the marks of 30 students in an English Language quiz. Find the modal class of the quiz marks.

Mark	Cumulative frequency
30 – 39	6
40 – 49	10
50 – 59	14
60 – 69	28
70 – 79	30

A. 50 – 59

B. 60 – 69

C. 14

D. 28

23. Given a set of data 3, 5, 6, 6, 6, 7, 8, 8, 9, 9, 9, if 9 is added to each datum, what is the change in the mean?

A. Increased by 9

B. Decreased by 9

C. 9 times the original mean

D. $\dfrac{1}{9}$ time the original mean

24. Given a set of data 3, 6, 7, 7, 13, 15, 17, if 9 is added to each datum, what is the new median?

A. 7

B. 9

C. 10

D. 16

25. Given a set of data 3, 7, 7, 7, 8, 8, 9, if 1 is subtracted from each datum, what is the new mode?

A. 3

B. 5

C. 6

D. 7

26. If the mean of a, b^3, c and d^2 is 14, find the mean of $a - 6$, $b^3 - 6$, $c - 6$ and $d^2 - 6$.

A. 6

B. 7

C. 8

D. 14

27. Given a set of data 3, 7, 21, 4, 2, if each datum is multiplied by 3, what is the new mean?

A. 2

B.   3

C.   7.4

D.   22.2

28. Given a set of data 1, 3, 5, 7, 11, if each datum is multiplied by 3, what is the new median?

   A.   3

   B.   5

   C.   7

   D.   15

29. Given a set of data 4, 5, 8, 9, 9, if each datum is multiplied by 3, what is the new mode?

   A.   8

   B.   9

   C.   12

   D.   27

30. If the datum "3" is removed from the data 3, 9, 7, 17, 27, what is the change in the mean?

   A.   Increased

   B.   Decreased

   C.   Unchanged

   D.   It cannot be determined.

31. The following table shows the weighting factors of a Chinese Language test, English Language test and Mathematics test. Which subject is the most important?

Subject	Weighting factor
Chinese Language	5
English Language	4
Mathematics	2

   A.   Chinese Language

   B.   English Language

   C.   Mathematics

   D.   The same

32. The table below shows the marks and weighting factors of a Chinese Language test, English Language test and Mathematics test of Peggy. Find the weighted mean mark of Peggy.

Subject	Chinese Language	English Language	Mathematics
Mark	80	90	70
Weighting factor	30%	20%	50%

A. 75

B. 77

C. 80

D. 85

33. A company assesses the staff by considering their performances at the volume of business, adaptability and management skill. The table below shows the marks of 3 staff members. Who has the best performance?

Assessment item	Ben	Ken	Sam	Weighting factor
Volume of business	5	6	7	2
Adaptability	6	5	6	1
Management skill	7	7	5	1

A. Ben

B. Ken

C. Sam

D. The same

Section A(1)

1. Find the mean of each of the following sets of data.
   (a) 2, 5, 8, 13
   (b) 4, 32, 5, 90, 21, 6, 2, 11

2. Find the median of each of the following sets of data.
   (a) 4, 6, 8, 19, 30
   (b) 5, 8, 16, 20, 25, 32

3. Find the mode of each of the following sets of data.
   (a) 3, 4, 6, 6, 6, 7, 7, 8, 8, 10
   (b) 16, 12, 9, 14, 16, 12, 16, 18, 12, 14, 16

4. Find the median of each of the following sets of data.
   (a) 12, 9, 6, 18, 30, 6, 17
   (b) 10, 18, 7, 20, 35, 4, 22, 32

5. Find the mode of each of the following sets of data.
   (a) 22, 23, 23, 26, 28, 28, 30, 32
   (b) 8, 18, 5, 13, 18, 32, 18, 13, 29, 30, 13, 22

6. Given a set of data 2, 12, 6, 17, 9, 6, 20, 3,
   (a) find the mean.   (b) find the median.   (c) find the mode.

7. Given a set of data 5, 13, 31, 12, 13, 5, 12,
   (a) find the mean.   (b) find the median.   (c) find the mode.

8. The table below shows the distribution of the highest daily temperature in the past ten days. Find the mean highest daily temperature.

Highest daily temperature (°C)	Number of days
26	2

27	4
28	1
29	3

9. The table below shows the distribution of time spent by Sammi on watching TV in the past two weeks. Find the median time spent by Sammi on watching TV in the past two weeks.

Time spent on watching TV (hour)	Number of days
1	6
2	3
3	2
4	2
5	1

10. The cumulative frequency polygon below shows the marks of F.2A students in the Chinese History examination.

Marks of F.2A student in the Chinese History examination
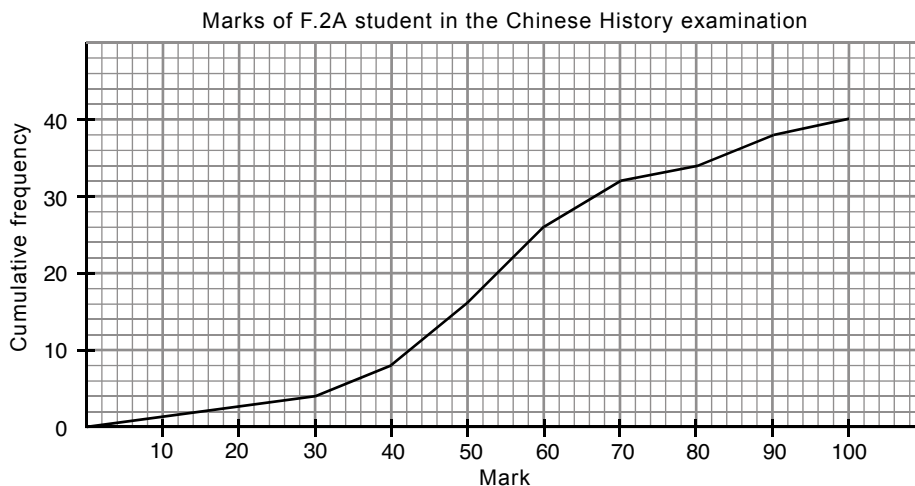
(a) How many students in F.2A attended the Chinese History examination?

(b) Find the median mark of F.2A students.

11. The table below shows the distribution of the heights of F.5C students. Find the modal class of the heights of F.5C students.

Height (cm)	Frequency
140 – 149	6
150 – 159	14
160 – 169	16
170 – 179	4

12. The table below shows the daily sleeping time of a group of teacher**s12**.

Sleeping time (hour)	Number of teachers
5	2
6	5
7	6
8	3

(a) How many teachers are there in this group?

(b) Find the mean sleeping time of the teachers.

(c) Find the median sleeping time of the teachers.

(d) Find the mode of sleeping time of the teachers.

13. The following table shows the scores and weighting factors of the Mathematics tests and examination of Jacky. Find the weighted mean mark.

	Test 1	Test 2	Test 3	Examination
Mark	80	75	85	70
Weighting factor	10%	10%	20%	60%

14. The following table shows the examination scores and weighting factors of Jenny in the first term. Find the weighted mean mark of Jenny.

Subject	Marks	Weighting factor
Chinese Language	60	2
English Language	50	3
Mathematics	80	2
History	75	2
Integrated Science	70	1

15. (a) Find the mean, the median and the mode of 2, 8, 10, 10, 12, 15.

  (b) Hence, find the mean, the median and the mode of 5, 11, 13, 13, 15, 18.

16. Given a set of data 2, 3, 5, 5, 7, 7, 7, 10,

  (a) find the mean, the median and the mode of this set of data.

  (b) if a new datum "0" is inserted, find the new mean, the new median and the new mode.

  (c) if the datum "7" is removed, find the new mean, the new median and the new mode.

Section A(2)

17. If the mean of 12, 8, x, 7 and 13 is 14, find the value of x.

18. There were 40 students in F.3A. The mean weight of the students was 52 kg. A new student, Joe, has joined this class. If Joe's weight is 58 kg and the weights of the original students remain unchanged, find the new mean weight of the students after Joe joined in. (Correct your answer to 3 significant figures.)

19. Let x be a positive integer. Given that the set of numbers is 6, x, 7, 9 and 12 are arranged in ascending order and the median of the five numbers is 7.

(a) Find the possible value of *x*.

(b) Using the result of **(a)**, find

    (i) the mean of the five numbers,

    (ii) the mode of the five numbers.

20. The following table shows the distribution of time spent on playing computer games daily by the boys in F.2D.

Time spent on playing computer games (min)	Class Mark (min)	Number of boys
30 – 59		2
60 – 89		3
90 – 119		9
120 – 149		4
150 – 179		2

(a) How many boys are there in F.2D?

(b) Complete the table above.

(c) Find the mean time spent on playing computer games of these boys.

21. The table below shows the distribution of the daily usage of telephone by the girls in F.3B.

Daily usage of telephone (min)	Class mark (min)	Number of girls
1 – 30		1
31 – 60		2
61 – 90		3
91 – 120		5
121 – 150		5
151 – 180		6

(a) Find the modal class of the daily usage of telephone by these girls.

(b) How many girls are there in the class?

(c) Complete the table above.

(d) Find the mean daily usage of telephone by these girls. (Correct your answer to 3 significant figures.)

22. In an English Language examination, the results of Kitty and Ken are shown as follows:

Paper	Mark		Weighting factor
	Kitty	Ken	
I	90	54	2
II	71	78	3
III	64	90	5

  (a) Find the mean marks of Kitty and Ken respectively. Who has a higher mean mark?

  (b) Find the weighted mean marks of Kitty and Ken respectively. Who has a better result?

23. Four polls have been held to determine who is the most popular female singer between Kelly and Sammi. Due to the longer polling time of the third and the forth polls, their weighting factors are higher. The weighted mean of the number of votes in all four polls determines the winner. The table below shows the respective numbers of votes for Kelly and Sammi in the polls and the weighting factors of each poll.

Poll	Number of votes		Weighting factor
	Kelly	Sammi	
First	760	700	1
Second	820	740	1
Third	630	770	2
Fourth	710	x	2

  (a) If Kelly and Sammi got the same weighted mean of the number of votes in all four polls, find the value of x.

  (b) If the weighting factor of the fourth poll is changed to 3 while the value of x in **(a)** remains unchanged, who is the most popular female singer?

24. The table below shows the results of Sam in an examination.

Subject	Mark
Chinese Language	42

English Language	40
Mathematics	48
History	49
Integrated Science	46
Music	93

(a) Find the mean mark of Sam in this examination.

(b) Let the passing mark for each subject be 50. Sam said, "My mean mark in this examination is passed, so my examination is also passed". Do you think it is reasonable for Sam to say so? Why?

(c) Among the mean, the median and the mode of the mark of Sam, which one can reflect the real situation?

25. The table below shows the distribution of the hourly wages of the employees in a hamburger shop.

Hourly wage	Number of employees
$15	8
$18	5
$80	2
$120	1

The manager of the hamburger shop says in the advertisement that the hourly wages of the employees is more than $30.

(a) Is the mean hourly wages of the employees more than $30?

(b) Does the mean hourly wages emphasized in the advertisement mislead the public?

(c) Among the mean, the median and the mode of the hourly wages of the employees, which one can reflect the real situation?

26. Let the mean of x, y and z be 20.

(a) Find the mean of $x + 2$, $y + 2$ and $z + 2$.

(b) Find the mean of $3x$, $3y$ and $3z$.

(c) Find the mean of $3x + 2$, $3y + 2$ and $3z + 2$.

27. Let the median of p, q, r, s and t be 10.

(a) Find the median of $p - 3$, $q - 3$, $r - 3$, $s - 3$ and $t - 3$.

(b) Find the median of $\dfrac{p}{2}$, $\dfrac{q}{2}$, $\dfrac{r}{2}$, $\dfrac{s}{2}$ and $\dfrac{t}{2}$.

(c) Find the median of $\dfrac{p}{2} - 3$, $\dfrac{q}{2} - 3$, $\dfrac{r}{2} - 3$, $\dfrac{s}{2} - 3$ and $\dfrac{t}{2} - 3$.

28. Let the mode of p, q, r, s and t be 8.
    (a) Find the mode of $p - 5$, $q - 5$, $r - 5$, $s - 5$ and $t - 5$.
    (b) Find the mode of $2p$, $2q$, $2r$, $2s$ and $2t$.
    (c) Find the mode of $2p - 5$, $2q - 5$, $2r - 5$, $2s - 5$ and $2t - 5$.

29. There are 40 students in F.3A. In a certain test, the results of most of the students are unsatisfactory, but Ben gets 92 marks. The teacher decides to adjust the test results by adding 8 marks to each student. It is given that the mean, the median and the mode of the test marks of the class are x, y and z respectively.
    (a) After the adjustment, what is the mark obtained by Ben?
    (b) Express the new mean, the new median and the new mode in terms of x, y and z.
    (c) One of the students is absent without reason, so the mark obtained by this student is 0. Therefore the mean mark of the class is lowered. If the mark obtained by this student is not taken into account,
    (i) find the mean mark of the rest of the students before the adjustment. (Express your answer in terms of x.)
    (ii) find the mean mark of the rest of the students after the adjustment. (Express your answer in terms of x.)

Section B

30. The following cumulative frequency polygon shows the marks of 200 F.3 students in an English Language examination.

Marks of 200 F.3 students in an English Language examination
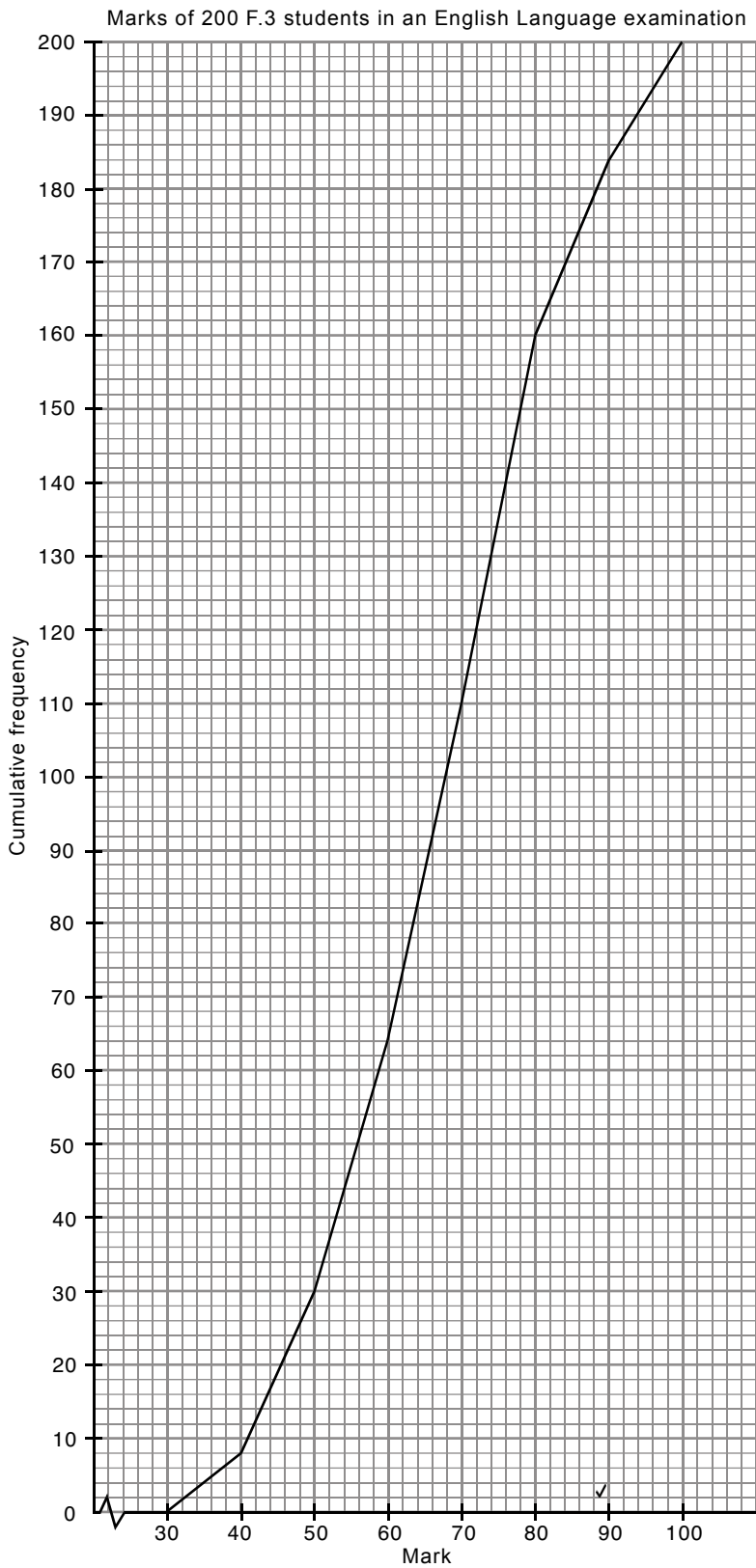
(a) Find the median mark of F.3 students.

(b) Complete the following table.

Examination mark (x)	Class mark	Frequency
$30 < x \le 40$	35	
$40 < x \le 50$		22

$50 < x \le 60$		
$60 < x \le 70$		
$70 < x \le 80$	75	
$80 < x \le 90$		24
$90 < x \le 100$		

(c) Find the modal class.

(d) Find the mean mark of F.3 students. (Correct your answer to 3 significant figures.)

(e) Let the full mark for the examination be 160. The student who obtains more than 80 marks gets a pass in the examination.

    (i) Find the percentage of pass of F.3 students.

    (ii) Since the percentage of pass is too low, the teachers decide to add 10 marks to each student.

        (1) Find the new mean, the new median and the new mode of the marks after the adjustment.

        (2) If the passing mark is not changed, find the percentage of pass after the adjustment.