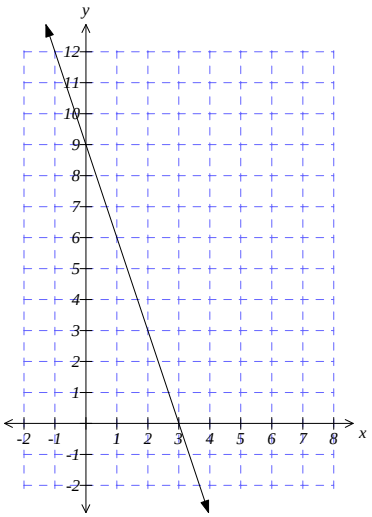
Section I : Mark your answer on the multiple choice sheet attached. (10 marks)

1. The line shown at right has gradient:



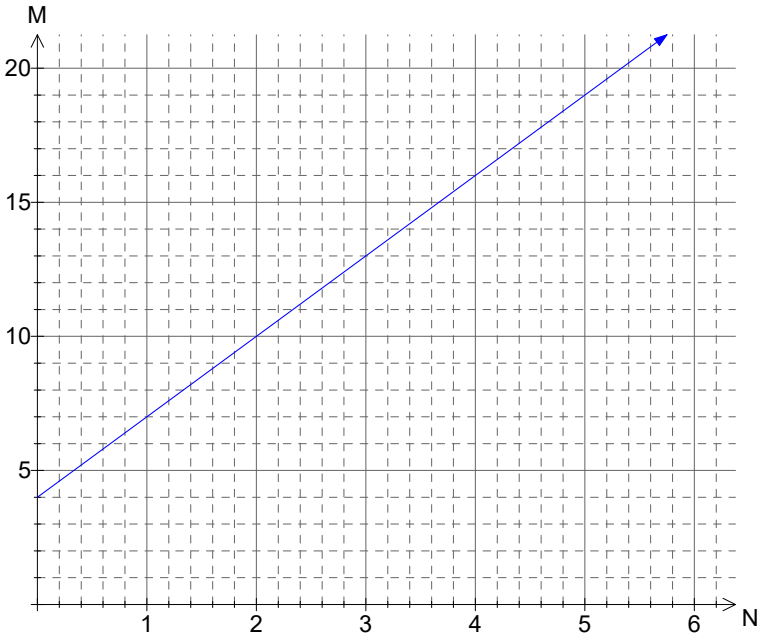
(A) 9

(B) 3

(C) -3

(D) $-\frac{1}{3}$

2. The graph below shows the straight line relationship between two variables M and N. What is equation of the line?



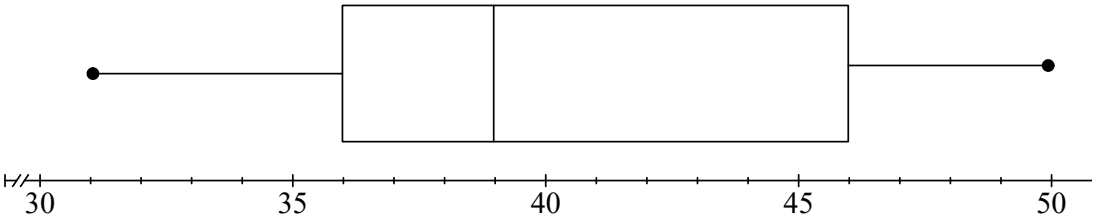
(A) M = 3N + 4

(B) M = 0.6N + 4

(C) M = 4N + 0.6

(D) M = 4N + 3

3. The box and whisker plot shows the results of a test out of fifty. What information **cannot** be found from the plot?



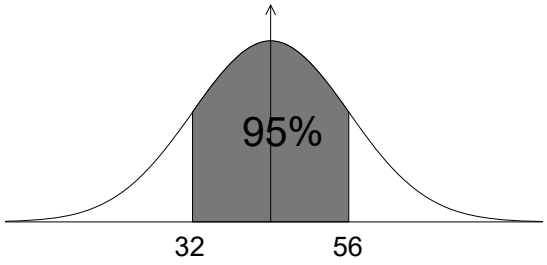
(A) The median mark.

(B) The interquartile range of the marks.

(C) The range of the marks.

(D) The mean mark.

4. Which of the following summaries is true for the normal distribution in this graph?



(A) mean = 32, $\sigma = 24$

(B) mean = 44, $\sigma = 6$

(C) mean = 44, $\sigma = 12$

(D) mean = 56, $\sigma = 12$

5. In the half yearly examination Harry sat for six papers and the mean of his marks was 45 with a standard deviation of 10. In the yearly examination he improved by 10 marks on every paper, compared to the half yearly. What would be the effect of this on the mean and standard deviation of his yearly marks compared to the half yearly?

(A) The mean and standard deviation will both be the same.

(B) The mean will be the same and the standard deviation will increase.

(C) The mean will increase and the standard deviation will be the same.

(D) The mean and standard deviation will both increase.

6. The back to back stem and leaf plot below shows the number of downloads per day of two bands "Antz" and "Psycho" from a certain site over a two week period. Which statement is true when comparing the data?

Antz	Stem	Psycho
7 4 2	0	8
9 8 7 5 3 1	1	2 5 5
6 6 4 0	2	2 4 5 6 7 8 9
2	3	0 5 8

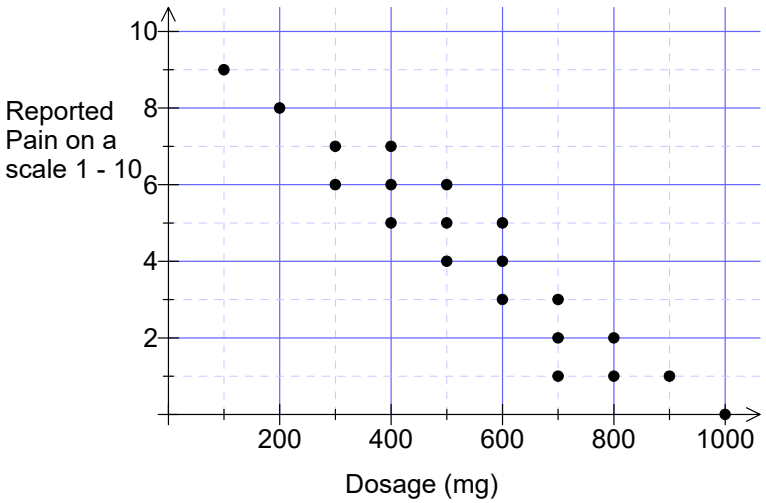
(A) Antz had a higher mode than Psycho.

(B) Psycho had a higher mode than Antz.

(C) Antz had the higher range than Psycho.

(D) Psycho had the higher range than Antz.

7. A scatter plot of pain (as reported by patients) compared to the dosage of a drug is shown below.



How could you describe the correlation between the pain and the dosage?

(A) A strong positive correlation.

(B) A strong negative correlation

(C) A weak positive correlation.

(D) Zero correlation.

8. The back to back stem-and-leaf plots have the same median.

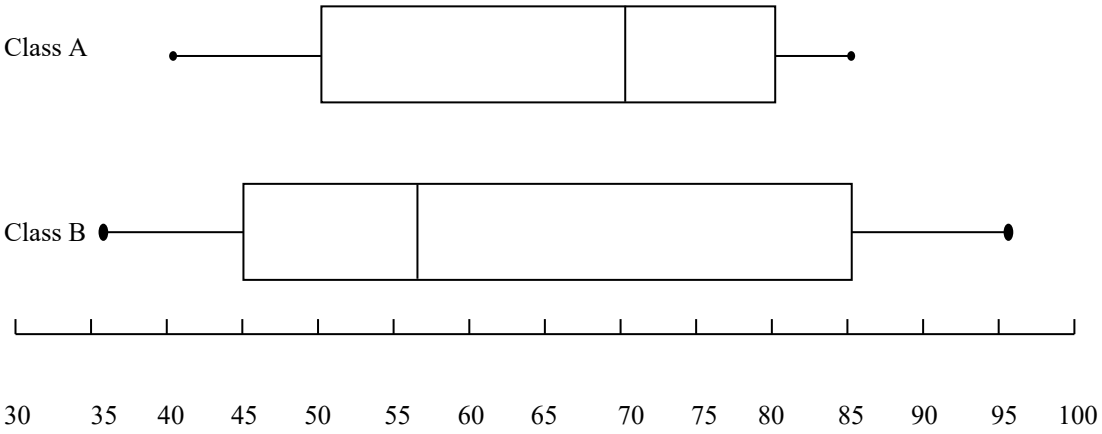
1 1	4	3 4
7 4 4 3 2	5	1 3 5
7 5 4 3 1	6	1 1 3 ☐
9 9 7 2	7	2 2 3 4
3 2 1	8	1 2 3

The value of ☐ is:

(A) 4 (B) 64

(C) 5 (D) 65

9. The box and whisker plots shown below compare the marks of students in two classes. Which of the following statements is correct?

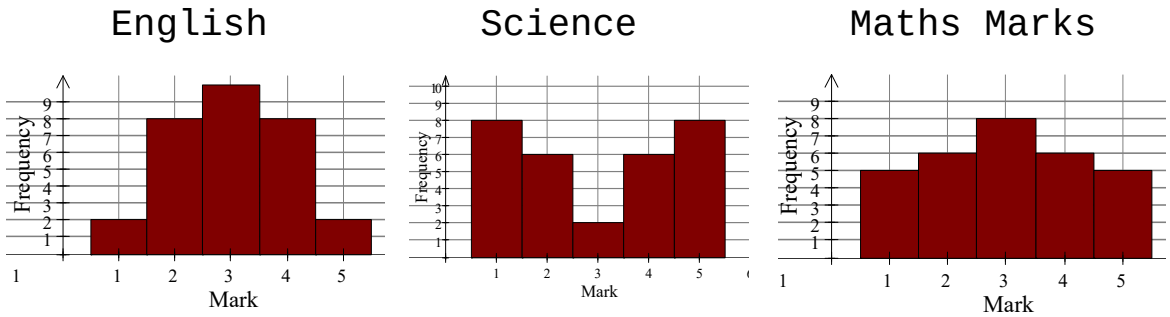


Which of the following is correct?

(A) The median of Class B is greatest. (B) Class A is positively skewed

(B) The range of Class B is smallest. (D) Class A is negatively skewed

10. The following graphs show the distribution of test marks from the same Year 7 class in English, Mathematics and Science.



The subject whose results have the greatest standard deviation is

(A) English (B) Mathematics (C) Science (D) All of them are the same.

Section II : Write your answers on the lined paper provided.

Question 11 *(16 marks)* **Marks**

(a) For the following set of data 3, 7, 4, 9, 3, 5:

Find (i) Mode **1**

(ii) Median **1**

(iii) Mean (2 decimal places) **1**

(iv) Standard deviation (2 decimal places) **1**

(v) Range **1**

(b) Find the median of this set of scores **1**

Score	Frequency
3	2
4	4
5	5
6	9
7	10

(c) For this steam and leaf plot

3	0 1 3 3 5
4	2 4 5 6 8 8
5	9
6	4 5 6
7	3 3
8	2

Find (i) Lower Quartile (Q1) **1**

(ii) Upper Quartile (Q3) **1**

(iii) Interquartile range **1**

Question 11 continued **Marks**

(d) The following data has been plotted for you on a graph attached to the end of this paper.

x	2	5	7	8	10	11	14	16	20	24
y	12	14	17	25	28	30	30	31	35	32

(i) On the sheet provided draw a three-median regression line. **State the coordinates of your three median points and clearly show each step of the process.** **5**

(ii) Find the equation of the line obtained by the performing the three-median regression process. Showing clear working. **2**

Question 12 *(13 marks)* Start this question on a new page.

(a) In his Half Yearly Exam Sam's results are as follows:

Subject	Sam's mark	Class average	Standard deviation
English	90	80	10
History	75	60	10
Maths	80	65	15
Science	64	60	5

Which is Sam's best result and justify your answer? **2**

(b) For a normally distributed set of scores with a mean of 50 and a standard deviation of 10, what percentage of scores are less than 70? (Clearly show working.) **2**

(c) In a spelling test, the mean is 16 and the standard deviation is 4. **2**

(i) What is the *z*-score of the score of 10 in this test?

(ii) What does this *z*-score mean?

Question 12 Continued **Marks**

(d) Bill and Joe are rifle shooters and their scores for individual competitions over a season are listed below:

Bill	53	72	85	56	72	90	45	100	35	72
Joe	75	68	60	72	65	65	70	67	65	73

(The higher the score the better the result.)

You are Bill's and Joe's club captain and you must pick one of them to be included in a team to represent the club at the State Championship.

(i) How could you justify the selection of Bill? Show numerical values to justify your answer. **3**

(ii) How could you justify the selection of Joe? Show numerical values to justify your answer. **3**

(iii) Which statistical measure is of least use in helping you to determine the difference between the two shooters? **1**

Section I

1/ C 2/ A 3/ D 4/ B 5/ C

6/ A 7/ B 8/ ~~C~~ C 9/ D 10/ C

Section II

Q 11

a) 3, 3, 4, 5, 7, 9

i) Mode = 3 ii) Median = $4\frac{1}{2}$

iii) ~~7.22~~ 5.17 iv) ~~6~~ 2.19 v) 6

b)

X	F	CF
3	2	2
4	4	6
5	5	11
6	9	20
7	10	30

Median = 6

c) i) $Q_1 = 35$ ii) $Q_3 = 65$ iii) $65 - 35 = 30$

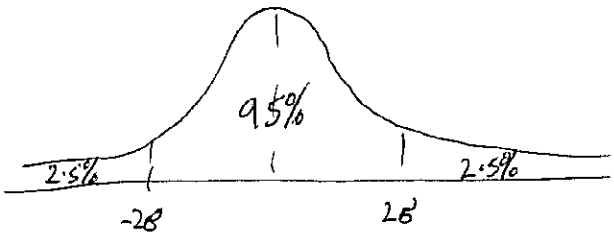
Q12

a)

	z-score
English	1
History	1.5
Maths	1
Science	0.8

History is the best it is more standard deviations above the mean than any other subject.

b) 70 is two standard deviations above the mean



∴ 97½% of scores are less than 70

c) i) $z = \frac{10-16}{4}$

$= -\frac{6}{4} = -1\frac{1}{2}$

ii) This means that 10 is one and a half standard deviations below the mean.

d)

	Mean	SD	Mode	Median	range	interquartile Range
Bill	68	19.6	72	75	65	32
Joe	68	4.31	65	67½	15	7

Bill 35 45 (53) 56 72 | 72 72 (85) 90 100

Joe 60 65 (65) 65 67 | 68 70 (72) 73 75

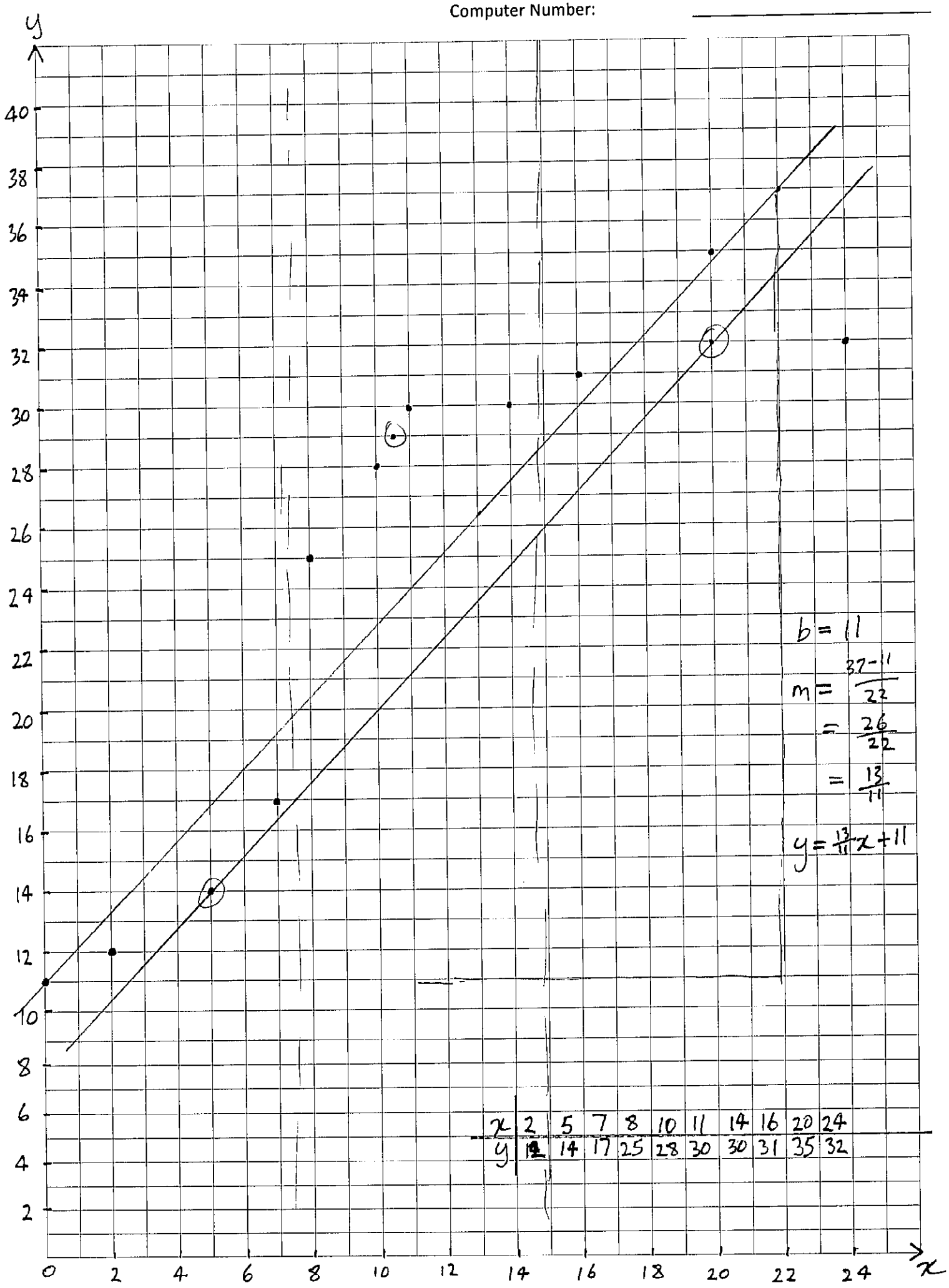
Q12 cont

d) i) Bill could be select because on a good day he ~~Be~~ can score higher
His median is higher
His mode is higher
and his maximum score is higher.

ii) Joe could be selected because he is very consistant and his mean is the same as Bill
He has a much smaller standard deviation.
He has a much smaller range and interquartile rangle.

iii) The mean is the same ~~for~~ both shooters, so is of no use to determine the difference between them.

Computer Number: _____



x	2	5	7	8	10	11	14	16	20	24
y	12	14	17	25	28	30	30	31	35	32