CXC (CSEC) MATHEMATICS MAY 2011 BOOTCAMPS

WORKOUT 3C
Relations and Functions, Coordinate Geometry, Graphs, Statistics

PAPER 2 (Structured)

Relations and Functions

Jun 2008 # 9b	**Jun 2001 # 6a**	
Jun 2007 # 9a	**Jun 2000 # 5**	
Jun 2005 # 6b	**Jun 1999 # 5a**	
Jun 2003 # 10b	**Jan 2009 # 10a**	
Jun 2002 # 6	**Jan 2007 # 5a**	

Coordinate Geometry

Jun 2008 # 7	**Jun 2001 # 4b**	
Jun 2007 # 5c	**Jun 2000 # 7a**	
Jun 2005 # 3b	**Jun 1999 # 6a**	
Jun 2004 # 5a, 6	**Jan 2009 # 4**	
Jun 2002 # 10b, 11a	**Jan 2007 # 4b**	

Graphs

Jun 2006 # 5		
Jun 2003 # 5		
Jun 2001 # 6b		
Jun 1999 # 5b		
Jan 2008 # 7		

Statistics

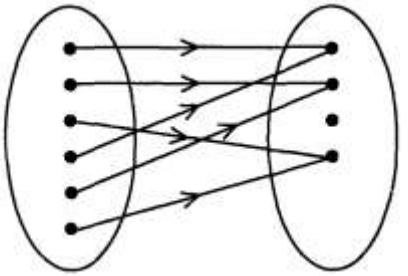
Jun 2008 # 3	**Jun 2003 # 7**	**Jan 2008 # 5**
Jun 2007 # 7	**Jun 2002 # 8**	**Jan 2007 # 6**
Jun 2006 # 7	**Jun 2001 # 8**	
Jun 2005 # 7	**Jun 1999 # 7**	
Jun 2004 # 3b	**Jan 2009 # 7**	

CXC (CSEC) MATHEMATICS MAY 2011 BOOTCAMPS

PAPER 1 – (Multiple Choice)

1. The range of $f : x \to x^3$ for the domain $\{-2, -1, 0, 1, 2\}$ is

(A) $\{0, 1, 8\}$
(B) $\{-2, -1, 0, 1, 2\}$
(C) $\{-6, -3, 0, 3, 6\}$
(D) $\{-8, -1, 0, 1, 8\}$

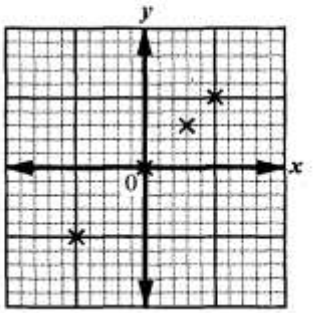


2. The relationship that BEST describes the mapping in the above diagram is

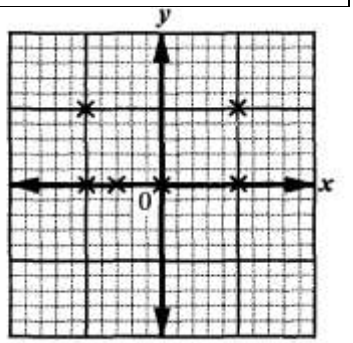
(A) one-to-one
(B) one-to-many
(C) many-to-one
(D) many-to-many

3. Which of the following represents the graph of a function?

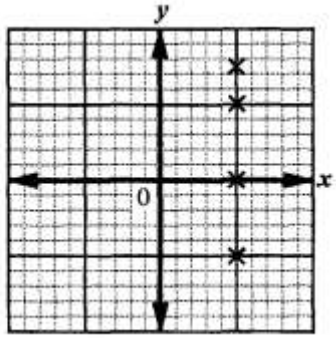
(A)



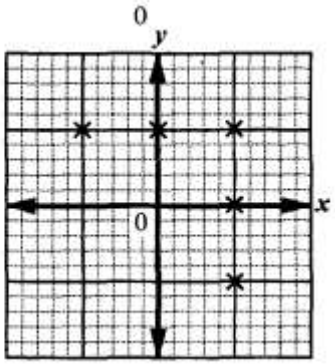
(B)



(C)



(D)



4. A bag contains 2 red, 4 yellow and 6 blue balls. The probability of drawing a **blue** ball from the bag at random is

(A) $\frac{1}{6}$

(B) $\frac{1}{3}$

(C) $\frac{1}{2}$

(D) $\frac{6}{11}$

5. If the mean of the four numbers 4, 8, x and 12 is 10, then x is

(A) 4
(B) 10
(C) 12
(D) 16

6. Which of the following represents the equation of a straight line?

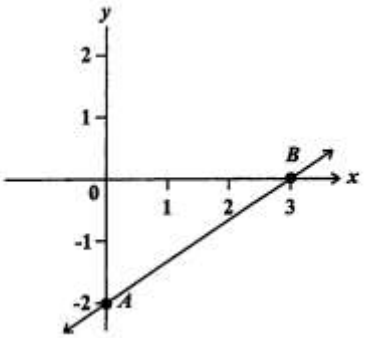
(A) $y = 2x + 3$

(B) $y = \frac{4}{x}$

(C) $y = x^2 - 4$

(D) $y = x^2 + 2x - 5$

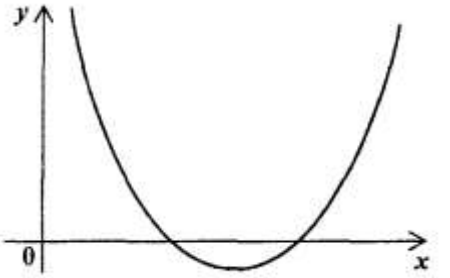
Item 7 refers to the graph below.



7. The straight line AB cuts the Y axis at

(A) (0, 3)
(B) (0, 2)
(C) (3, -2)
(D) (0, -2)

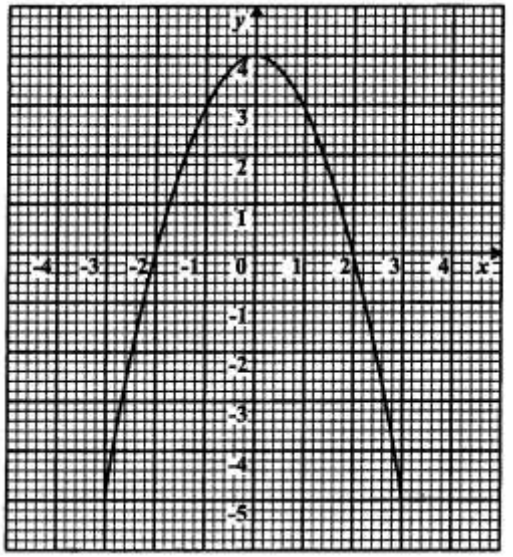
Item 8 refers to the following graph.



8. If a, b and c are constants and $a > o$, the equation of the graph could be

(A) $y = ax^2 + c$
(B) $y = c - ax^2$
(C) $y = c + bx - ax^2$
(D) $y = ax^2 + bx + c$

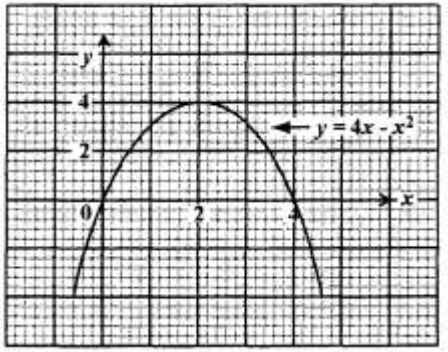
Item 9 refers to the graph below.



9. From the graph, the values of x when $y = -1$ are

(A) 1 and -1
(B) 2.2 and –2.2
(C) 2.5 and –2.5
(D) 2.8 and –2.8

Items 10-11 refer to the following graph.



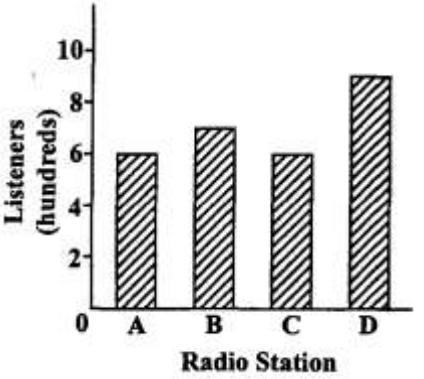
10. The maximum point of $y = 4x - x^2$ is

(A) (0, 0)
(B) (0, 4)
(C) (2, 4)
(D) (4, 2)

11. The values of x for which $y = 4x - x^2$ intersects $y = 0$ are

(A) $x = 0$ and $x = 4$
(B) $x = 0$ and $x = 2$
(C) $x = 0$ and $x = -4$
(D) $x = 2$ and $x = 4$

Items 12 – 13 refer to the diagram below showing the number of persons who listen to Radio Stations A, B, C and D during the week.



12. Which two stations **together** have MORE THAN 1500 listeners during the week?

(A) A and B
(B) A and D
(C) C and D
(D) B and D

13. Which station had as many listeners during the week as the mean number of listeners for the four stations during the week?

(A) Station A
(B) Station B
(C) Station C
(D) Station D

Item 14 refers to the scores below.

10	15	4	7
8	8	1	4

14. The median of the eight scores presented above is

(A) 4
(B) 7.25
(C) 7.50
(D) 8

Item 15 refers to the diagram below.

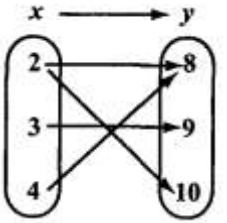
15. The pie chart shows the popular games played at a school of 720 students. How many play cricket?

(A) 35
(B) 120
(C) 252
(D) 300

16. The heights, in cm, of ten students are 150, 152, 155, 153, 170, 160, 156, 165, 158, 155. The range is

(A) 5
(B) 20
(C) 150
(D) 155

Item 17 refers to the arrow diagram below.



17. The arrow diagram above describes the relation

(A) x is a factor of y
(B) x is less than y
(C) x is a multiple of y
(D) x is greater then y

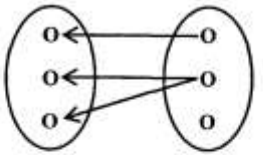
18. If $f(x) = x^2 - x - 1$, then $f(-5) =$

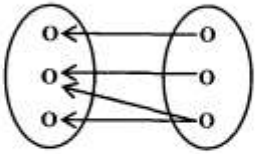
(A) -31
(B) 29
(C) 24
(D) 31

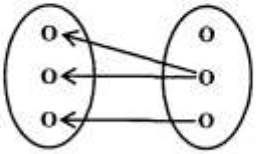
19. Which of the following sets is represented by the relation $f: x \rightarrow x^2 + 3$?

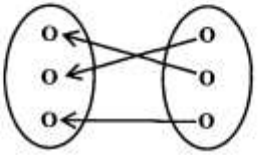
(A) $\{(0, 3), (1, 4), (2, 7), (3, 12)\}$
(B) $\{(0, 3), (1, 5), (2, 7), (3, 9)\}$
(C) $\{(0, 3), (1, 4), (2, 5), (3, 6)\}$
(D) $\{(0, 3), (1, 1), (2, 4), (3, 9)\}$

20. Which of the following diagrams illustrates a function?

(A) 

(B) 

(C) 

(D) 

Item 21 refers to the following table.

Length of Leaf (cm)	10–14	15–19	20–24	25–29
Frequency	3	8	12	7

21. The lengths of 30 cabbage leaves were measured, to the nearest cm, and the information grouped as shown in the table above.

The class boundaries are

(A) 3, 18, 12, 7
(B) 5, 5, 5, 5
(C) 10, 14, 15, 19, 20, 24, 25, 29
(D) 9.5, 14.5, 19.5, 24.5, 29.5

Item 22 refers to the following table.

Mark	Frequency	Mark × Frequency
1	2	2
2	3	6
3	5	15
4	4	16
5	x	y
Total		49

22. The table shows the frequency distribution of the marks a student obtained on a test. How often did the student score 5 marks?

(A) 2
(B) 5
(C) 10
(D) 49

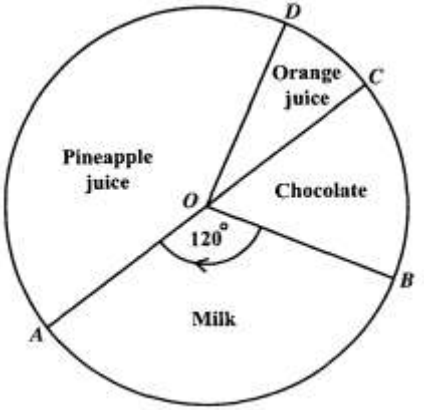
23. The marks obtained by ten students in a test marked out of 25 were:

14, 22, 15, 19, 19, 16, 24, 13, 20, 19

The range of marks was

(A) 11
(B) 13
(C) 18
(D) 19

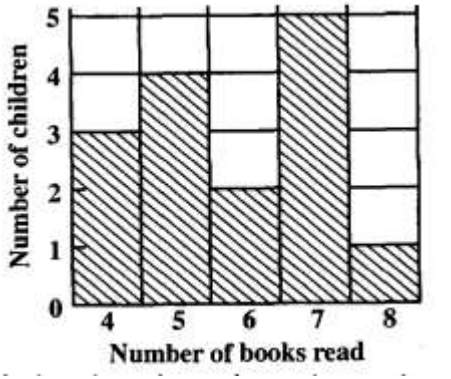
Item 24 refers to the pie-chart below.



24. The pie-chart above shows the preference in drinks of a group of students. If 12 students prefer chocolate, then the total number of students is

(A) 48
(B) 72
(C) 180
(D) 360

Item 25 refers to the following bar chart.



25. The bar chart above shows the number of books read by the children who took part in a survey.

How many children took part in the survey?

(A) 5
(B) 15
(C) 75
(D) 87

26. A boy throws a die twice. What is the probability that he will get a three followed by an even number?

(A) $\frac{1}{12}$

(B) $\frac{1}{4}$

(C) $\frac{5}{12}$

(D) $\frac{7}{12}$

27.

1	5	5	11	9	8	5

The median of the set of numbers above is

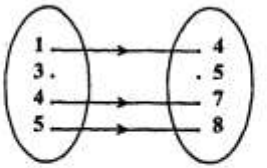
(A) 5
(B) 6
(C) 8
(D) 9

28. Which one of the following points lies on the line $y = 2x - 3$?

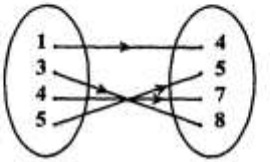
(A) (2, 3)
(B) (-2, -1)
(C) (4, 1)
(D) (0,-3)

29. Which arrow diagram below shows the relation "is 3 less than"?

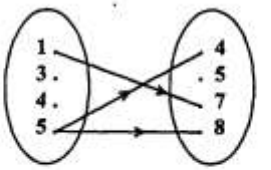
(A)



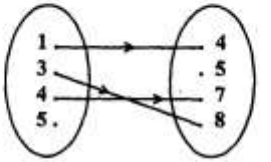
(B)



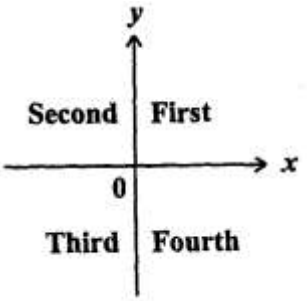
(C)



(D)



Item 30 refers to the diagram below shows that the coordinate axes divide the *xy* - plane into 4 quadrants.



30. A point (x, y) lies in the fourth quadrant if

(A) $x > 0$ and $y > 0$
(B) $x < 0$ and $y > 0$
(C) $x < 0$ and $y < 0$
(D) $x > 0$ and $y < 0$

31. The table below shows the frequency of scores obtained by students in a test.

Scores	2	3	5	6	8	10
Students	8	4	6	3	9	2

The range of scores is

(A) 2
(B) 7
(C) 8
(D) 10

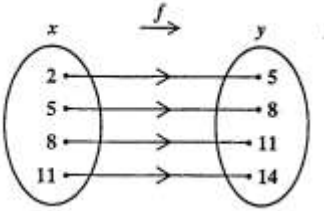
32. Here are 4 sets of numbers.

I. {1, 2, 6}
II. {2, 4, 6}
III. {1, 2, 5, 6, 7}
IV. {10, 11, 12, 13, 14}

For which set(s) of numbers are the mean and the median the same?

(A) I only
(B) II and IV only
(C) I, II and III only
(D) II, III and IV only

33.



The arrow diagram above shows a function. Which of the following BEST describes the function?

(A) $f(x) = x + 3$
(B) $f(x) = y - 3$
(C) $x = y + 3$
(D) $y = x$

34. What is the gradient of the straight line $2y = -3x - 8$?

(A) -3

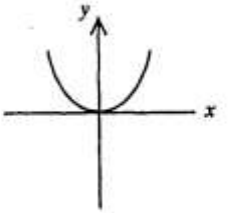
(B) $\frac{-3}{2}$

(C) 2

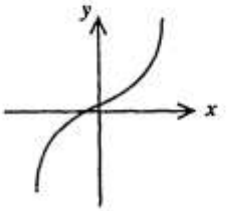
(D) 3

35. Which one of the following does NOT represent the graph of a function?

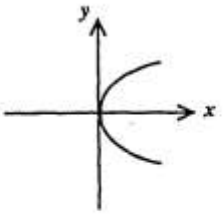
(A)



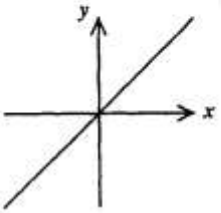
(B)



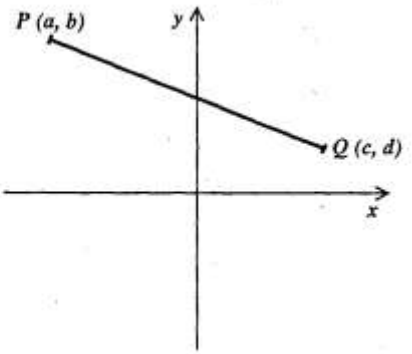
(C)



(D)



36.



The diagram above shows a line PQ. The gradient of the line PQ is given by

(A) $\frac{b-d}{c-a}$

(B) $\frac{c-a}{b-d}$

(C) $\frac{a-c}{b-d}$

(D) $\frac{b-d}{a-c}$

37. Given $f(x) = x^2 - 3x + 1$, then $f(-1)$ is

(A) -3
(B) 3
(C) 5
(D) 6

38. Each of the letters of the word 'CHANCE' is written on a slip of paper and one slip is randomly drawn. What is the probability of drawing a letter 'C'?

(A) $\frac{1}{6}$

(B) $\frac{1}{5}$

(C) $\frac{1}{3}$

(D) $\frac{2}{3}$

Item 39 refers to the following table.

Length of Leaf (cm)	10 - 14	15 – 19
Frequency	3	12

The lengths of 15 cabbage leaves were measured, to the nearest cm, and the information grouped as shown in the table above.

39. The beginning and end points of the class interval 10 - 14 are

(A) 9 and 14
(B) 9.5 and 14
(C) 9.5 and 14.5
(D) 10 and 15

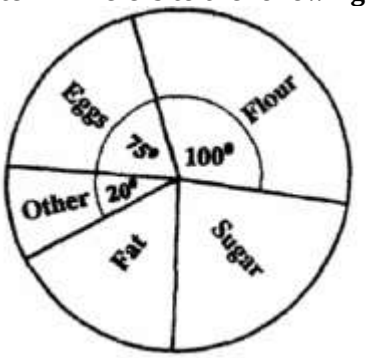
Item 40 refers to the following information.

2	5	9	18	18	27

40. The mode of the numbers is

(A) 7
(B) 16
(C) 18
(D) 25

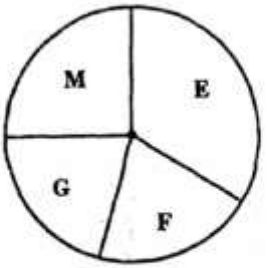
Item 41 refers to the following diagram.



41. The pie chart above (**not drawn to scale**) represents the masses of ingredients in a cake. The total mass is 288 g. What is the combined mass (in grams) of fat and sugar?

(A) 93
(B) 132
(C) 165
(D) 195

42. The pie chart (**drawn to scale**) shows how a student used 12 hours in studying English (E), Maths (M), French (F) and Geography (G).



The amount of time spent studying Mathematics is APPROXIMATELY

(A) 1 hr
(B) 2 hrs
(C) 3 hrs
(D) 4 hrs

43. Of 120 students writing an exam, 100 are expected to pass. The estimated probability of a student failing the exam is

(A) $\frac{1}{6}$

(B) $\frac{1}{5}$

(C) $\frac{1}{2}$

(D) $\frac{5}{6}$

44. When three coins are tossed simultaneously the possible outcomes are {HHH, HHT, HTH, HTT, THH, THT, TTH, TTT}, where H represents a Head and T represents a Tail. What is the probability of obtaining AT LEAST TWO heads?

(A) $\frac{1}{4}$

(B) $\frac{3}{8}$

(C) $\frac{1}{2}$

(D) $\frac{2}{3}$

Items 45 – 47 relate to the set of scores shown in the box below.

2	5	9	8	7	8

45. The modal score is

(A) 5
(B) 6
(C) 8
(D) 9

46. The median score is

(A) 7
(B) 7.5
(C) 8
(D) 8.5

47. The interquartile range is

(A) 3
(B) 4.5
(C) 5.5
(D) 7

Items 48- 49 refer to the following information.

A function f is defined as $f(x) = 3x - 1$.

48. What is the value of $f(-3)$?

(A) -12
(B) -10
(C) -6
(D) 12

49. If $f(x) = 11$, then the value of x is

(A) 4

(B) $\frac{10}{3}$

(C) 30

(D) 32

50. If $h(x) = \frac{3x-2}{5}$, then $h(5) =$

(A) $\frac{1}{5}$

(B) $\frac{6}{5}$

(C) $\frac{9}{5}$

(D) $\frac{13}{5}$

51. The gradient of the straight line $2y + 3x = -8$ is

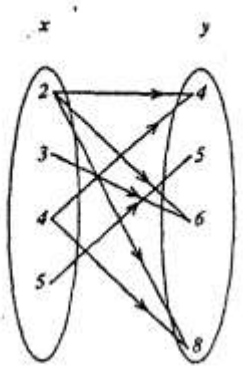
(A) -3

(B) $\frac{-3}{2}$

(C) 2

(D) 3

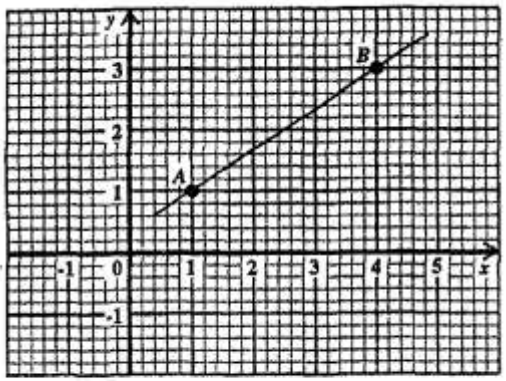
52.



Which of the following relations is described by the arrow diagram shown above?

(A) x is greater than y
(B) x is a multiple of y
(C) x is divisible by y
(D) x is a factor of y

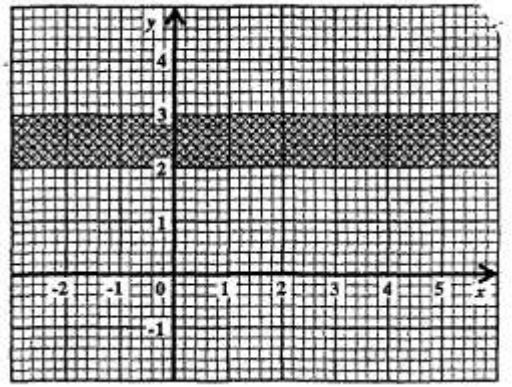
53.



What is the gradient of the straight line AB in the figure above?

(A) $-\frac{3}{2}$
(B) $-\frac{2}{3}$
(C) $\frac{2}{3}$
(D) $\frac{3}{2}$

54.



In the graph above, the shaded area can be represented by

(A) $\{(x, y): 2 \leq y \leq 3\}$
(B) $\{(x, y): 2 \geq y \geq 3\}$
(C) $\{(x, y): 2 \leq x \leq 3\}$
(D) $\{(x, y): 2 \geq x \geq 3\}$

55. If $h(x) = \frac{3x - 2}{5}$, then $h(-6) =$

(A) 4

(B) -4

(C) $\frac{16}{5}$

(D) $\frac{-16}{5}$

Items 56-59 refer to the following frequency distribution. The distribution shows the weights of letters, in grams, posted during a certain week.

Weight of Letter (g)	No. of Letters
10	1
20	5
30	2
40	1

56. The mode, in grams, of the distribution is

(A) 1
(B) 5
(C) 20
(D) 40

57. What is the median, in grams, of the distribution?

(A) 3.5
(B) 5
(C) 20
(D) 25

58. The total weight, in grams, of all the letters posted during that week, is

(A) 9
(B) 100
(C) 109
(D) 210

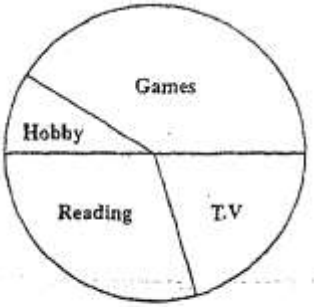
59. The mean, in grams, of the distribution is

(A) 11.1
(B) 23.3
(C) 25.0
(D) 27.5

60. The heights, in cm, of five students are 150, 152, 155, 170, 153. The range, in cm, is

(A) 5
(B) 20
(C) 150
(D) 155

61.

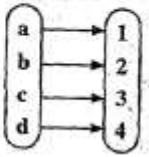


The pie chart above shows how 100 children spend their leisure time. The number of persons who spend it in games is approximately

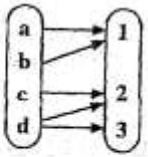
(A) 25
(B) 40
(C) 50
(D) 75

62. Which of the following does NOT represent a function?

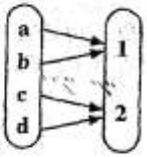
(A)



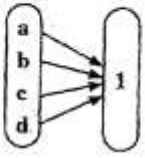
(B)



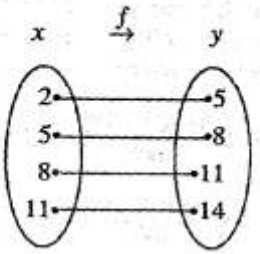
(C)



(D)



63.



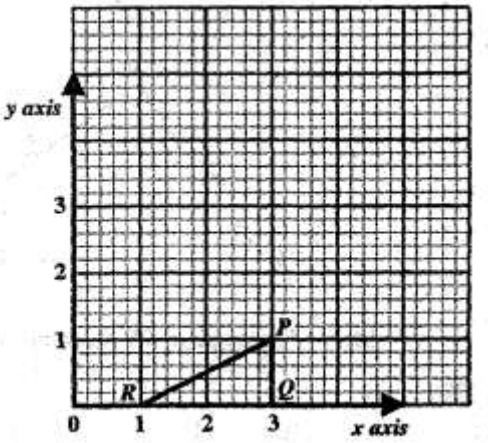
The arrow diagram above shows a function. Which of the following BEST describes the function?

(A) $f: x \to y$
(B) $y = x$
(C) $y = x + 3$
(D) $x = y - 3$

64. If $f: x \to 1 - 2x$, then $f(-3)$ is equal to

(A) -1
(B) -5
(C) 1
(D) 7

Items 65—66 refer to the diagram below.



65. The co-ordinates of the point Q are

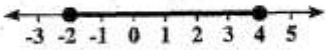
(A) (3, 1)
(B) (3, 0)
(C) (0, 3)
(D) (1, 3)

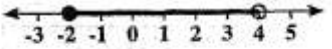
66. The gradient of RP is

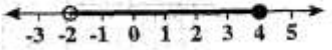
(A) $\frac{1}{3}$
(B) $\frac{1}{2}$
(C) $\frac{2}{3}$
(D) $\frac{3}{2}$

67. Which of the line graphs below represents $\{x : -2 < x \leq 4\}$?

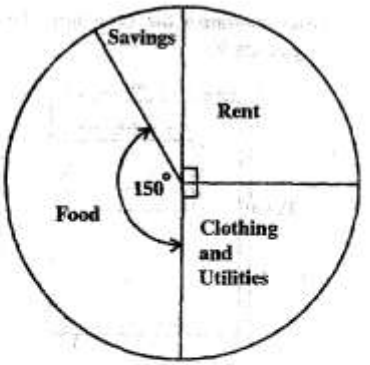
(A) 

(B) 

(C) 

(D) 

68.



The pie-chart above, **not drawn to scale**, shows how Mary spends her salary of $1200 each month. How much does she spend on food?

(A) $120
(B) $300
(C) $400
(D) $500

Item 69 refers to the table below.

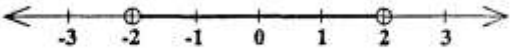
A die is thrown twenty times and the scores recorded as shown.

Score	1	2	3	4	5	6
Frequency	2	1	3	5	6	3

69. The median score is

(A) 3
(B) 4
(C) 5
(D) 6

70.



The graph of the inequality in the diagram above is defined by

(A) $-2 < x < 2$
(B) $-2 < x \leq 2$
(C) $-2 \leq x \leq 2$
(D) $-2 \leq x < 2$

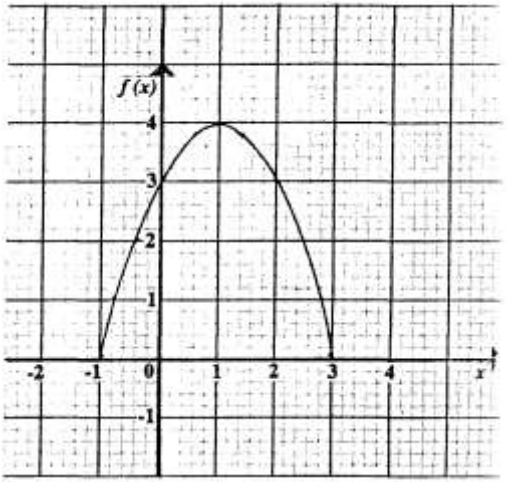
71. The gradient of the line joining the points $(-1, 4)$ and $(0, -6)$ is

(A) -10
(B) -2
(C) 2
(D) 10

72. Which of the following does not lie on the line $y = 3 - 2x$?

(A) (0, 3)
(B) (–1, 5)
(C) (2, 1)
(D) (–2, 7)

Item 73-74 refer to the graph below.



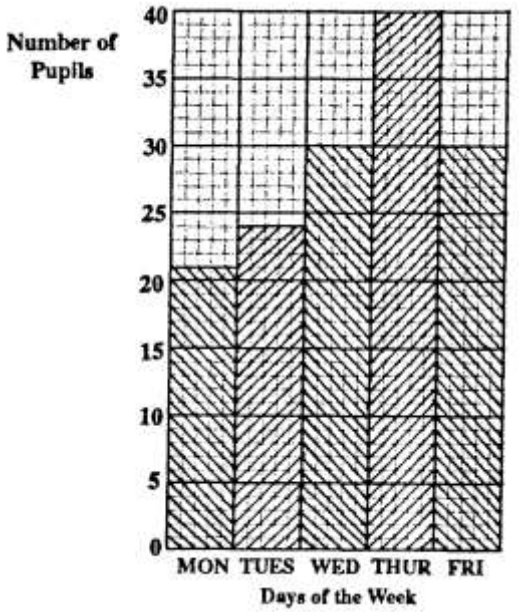
73. Which of the following represents the equation of the graph above?

(A) $f(x) = 3 + 2x - x^2$
(B) $f(x) = x^2 - 2x - 3$
(C) $f(x) = x^2 + 2x - 3$
(D) $f(x) = 3 - 2x - x^2$

74. The values of x for which $f(x) = 0$ are

(A) $x = 3$ and $x = 4$
(B) $x = 1$ and $x = 4$
(C) $x = -1$ and $x = 3$
(D) $x = 0$ and $x = 3$

Items 75 - 76 refer to the following diagram, which shows the number of pupils who attended school during a week.



75. How many pupils attended school on Tuesday?

(A) 20
(B) 22
(C) 24
(D) 25

76. What was the average daily attendance for he week?

(A) 27
(B) 29
(C) 30
(D) 40

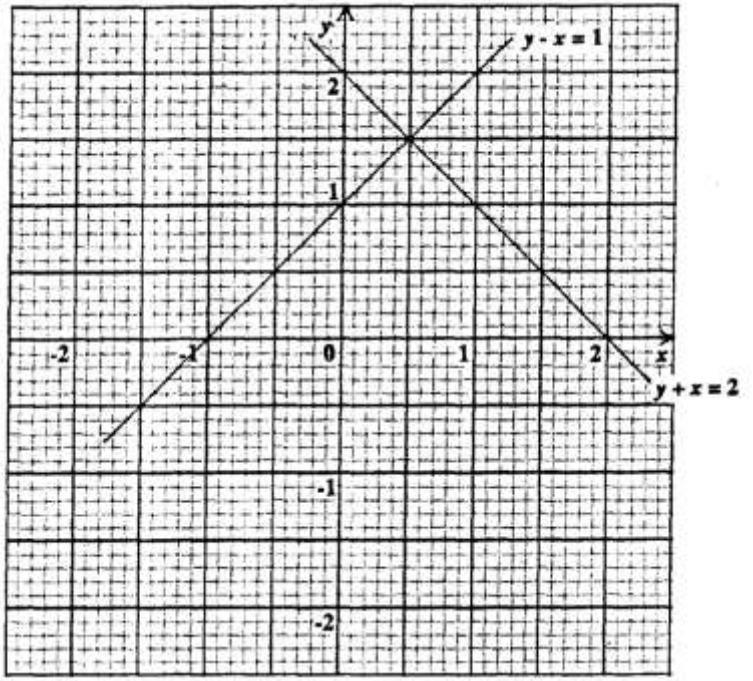
77. The mean of 11 numbers is 7. One of the numbers 13, is deleted. What is the mean of the remaining 10 numbers?

(A) 7.7
(B) 6.4
(C) 6.0
(D) 5.8

78. The score which occurs most frequently in a distribution is the

(A) median
(B) mean
(C) range
(D) mode

79.



The graphs above are of the lines

$y + x = 2$ and $y - x = 1$.

The solution set of the simultaneous linear equations

$y + x = 2$ and $y - x = 1$ is

(A) $\{-1, 0\}$
(B) $\{2, 0\}$
(C) $\{0, 2\}$
(D) $\{0.5, 1.5\}$