

### FORMULAS FOR REFERENCE

SPHERE	Surface area	$= 4\pi r^2$
	Volume	$= \frac{4}{3}\pi r^3$
CYLINDER	Area of curved surface	$= 2\pi rh$
	Volume	$= \pi r^2 h$
CONE	Area of curved surface	$= \pi rl$
	Volume	$= \frac{1}{3}\pi r^2 h$
PRISM	Volume	$= \text{base area} \times \text{height}$
PYRAMID	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

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**SECTION A(1) (33 marks)**

Answer ALL questions in this section and write your answers in the spaces provided.

1. Make  $p$  the subject of the formula  $5p - 7 = 3(p + q)$ . (3 marks)

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2. Simplify  $\frac{m^6}{m^9 n^{-5}}$  and express your answer with positive indices. (3 marks)

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3. Factorize

(a)  $r^2 + 10r + 25$ ,

(b)  $r^2 + 10r + 25 - s^2$ .

(3 marks)

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4. The stem-and-leaf diagram below shows the distribution of weights (in kg) of 15 teachers in a school.

<u>Stem (tens)</u>	<u>Leaf (units)</u>
5	0 5 5 5 8
6	2 3 7 8 8 9
7	1 3 3 5

Find the median, the range and the standard deviation of the distribution. (3 marks)

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5. Let  $k$  be a constant. If the quadratic equation  $x^2 + 14x + k = 0$  has no real roots, find the range of values of  $k$ . (4 marks)

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6. The marked price of a vase is \$ 400 . The vase is sold at a discount of 20% on its marked price.  
(a) Find the selling price of the vase.  
(b) A profit of \$ 70 is made by selling the vase. Find the percentage profit. (4 marks)

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7. The consultation fees charged to an elderly patient and a non-elderly patient by a doctor are \$120 and \$160 respectively. On a certain day, there were 67 patients consulted the doctor and the total consultation fee charged was \$9000. How many elderly patients consulted the doctor on that day?

(4 marks)

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8. In Figure 1,  $ABC$  and  $DEF$  are straight lines. It is given that  $AC \parallel DF$ ,  $BC = CF$ ,  $\angle EBF = 90^\circ$  and  $\angle BED = 110^\circ$ . Find  $x$ ,  $y$  and  $z$ .

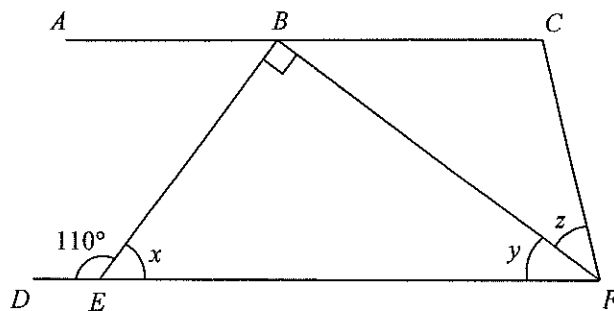


Figure 1

(4 marks)

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12. The bar chart and pie chart in Figure 4 show the distribution of the numbers of keys owned by the students in class  $A$ . The numbers of students having 2 keys, 3 keys and 4 keys are 12, 17 and  $k$  respectively.

Distribution of the numbers of keys owned by the students in class  $A$

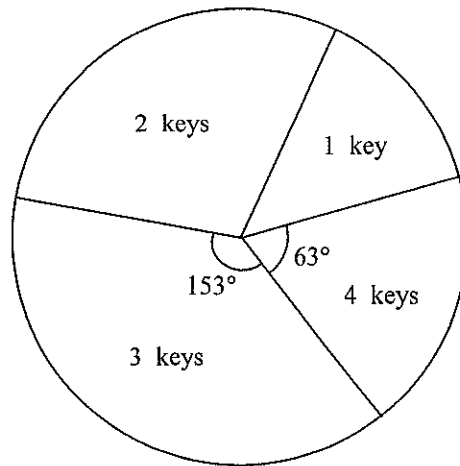
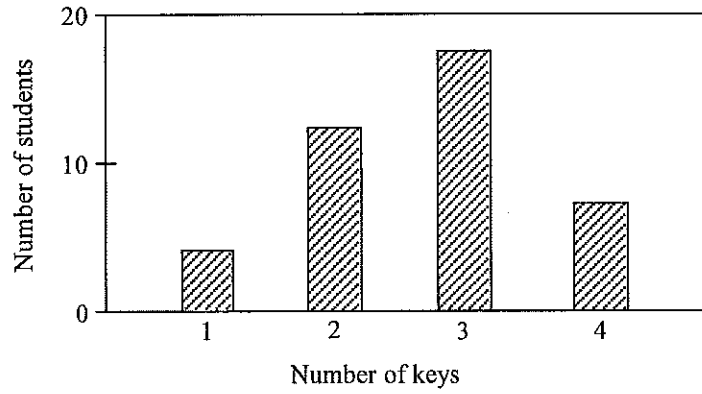


Figure 4

- (a) Find the value of  $k$ . (2 marks)

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(b) Find the number of students in class  $A$ .

(2 marks)

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(c) Find the probability that a randomly selected student in class  $A$  has only 1 key.

(3 marks)

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(d) It is given that the numbers of students in class  $A$  and class  $B$  are the same. The distributions of the numbers of keys owned by the students in class  $A$  and class  $B$  are also the same. The two classes are now combined to form a group. On each of the bar chart and the pie chart in Figure 4, is there a modification needed in order that the statistical chart can show the distribution of the numbers of keys owned by the students in this group? If your answer is 'yes', write down the modification needed.

(2 marks)

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13. In Figure 5, the perpendicular from  $B$  to  $AC$  meets  $AC$  at  $D$ . It is given that  $AB = AC$  and the slope of  $AB$  is  $\frac{-4}{3}$ .

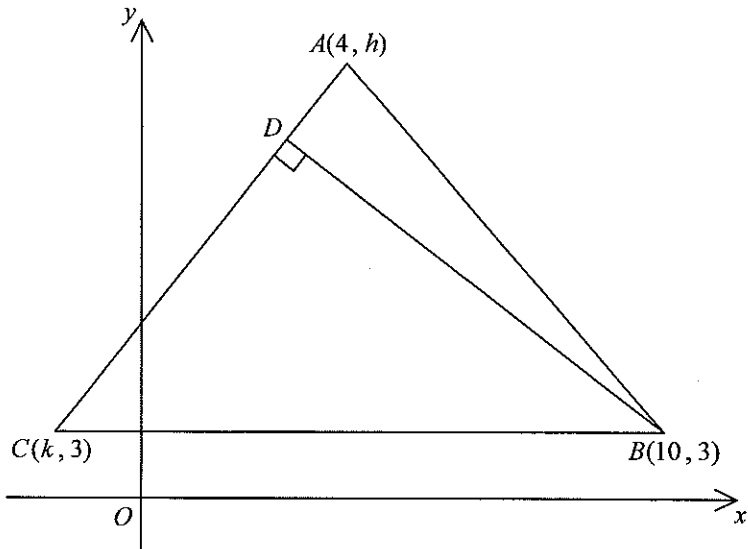


Figure 5

(a) Find the equation of  $AB$ . (2 marks)

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(b) Find the value of  $h$ . (2 marks)

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15. The following table shows the results of a survey about the sizes of shirts dressed by 80 students on a certain school day.

Student \ Size	Small	Medium	Large	Total
Boy	8	28	12	48
Girl	20	8	4	32

- (a) On that school day, a student is randomly selected from the 80 students.
  - (i) Find the probability that the selected student is a boy.
  - (ii) Find the probability that the selected student is a boy and he dresses a shirt of large size.
  - (iii) Find the probability that the selected student is a boy or the selected student dresses a shirt of large size.
  - (iv) Given that the selected student is a boy, find the probability that he dresses a shirt of large size.

(6 marks)
  
- (b) On that school day, two students are randomly selected from the 80 students.
  - (i) Find the probability that the two selected students both dress shirts of large size.
  - (ii) Is the probability of dressing shirts of the same size by the two selected students greater than that of dressing different sizes? Explain your answer.

(5 marks)

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