2020 年全港性系統評估(中學)
便覽

Territory-wide System Assessment 2020
(Secondary Schools)
Quick Guide

第四部分
Part 4

數學科
Mathematics

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Part 4

Mathematics

Secondary 3

1. Scope of the Assessment

The Secondary 3 Assessment is based on the documents *Syllabuses for Secondary Schools – Mathematics (Secondary 1 – 5), 1999* and *Mathematics Curriculum: Basic Competency for Key Stage 3 (Tryout Version)*. It focuses on the basic and important areas of the Secondary 1 to 3 curriculum and tests on the concepts, knowledge, skills and applications in these areas. It covers the three dimensions Number and Algebra, Measures, Shape & Space and Data Handling.

2. Format of the Assessment

The Assessment will be conducted in a paper-and-pencil mode. (Use of HKEAA approved calculators is allowed.) In order to cover adequately the areas to be assessed in Key Stage 3, a number of test items will be set for the full paper of the Assessment. These will be divided into 4 sub-papers of 65 minutes each. Each student will be required to attempt one of the sub-papers only.

Each sub-paper will consist of some 40 test items, covering the three dimensions Number and Algebra, Measures, Shape & Space and Data Handling. In the Assessment, various types of test items will be used. Some are multiple-choice items which can be marked objectively. Some are open-ended items, in which students have to write their own answers, or write out the necessary mathematics expressions, conclusions and explanations.

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Sub-paper / Dimension	Sub-paper 1	Sub-paper 2	Sub-paper 3	Sub-paper 4
Number and Algebra Measures, Shape & Space Data Handling	65 minutes	65 minutes	65 minutes	65 minutes

3. Exemplars

Some examples are shown below to illustrate the different types of items set. These examples are by no means exhaustive.

Number and Algebra Dimension

1. $\dfrac{(a^2)^3}{a^5} =$

   A. 0.
   B. 1.
   C. a.
   D. a^3.

2. Factorise $4x^2 - y^2$.

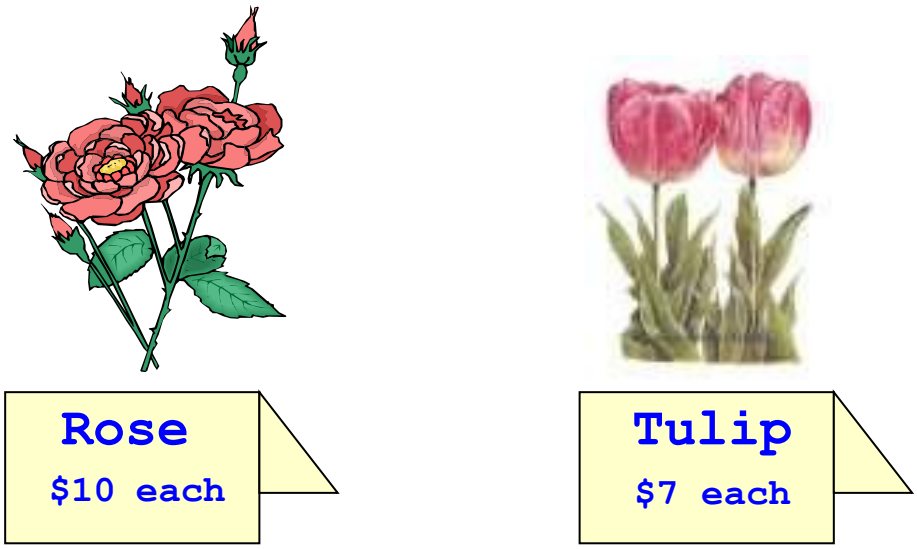
   A. $(2x - y)^2$
   B. $4(x + y)(x - y)$
   C. $(2x + y)(2x - y)$
   D. $(4x + y)(4x - y)$

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3. The coefficient of x^2 in the polynomial $x^3 - x^2 + 4$ is

A. -1.
B. 0.
C. 1.
D. 2.

4.



In Sunny Florist, the prices of a rose and a tulip are \$10 and \$7 respectively. Mary bought x roses and y tulips for \$74. The number of tulips that she bought was $\frac{1}{3}$ of that of roses. Which of the following pairs of simultaneous equations shows the relationships between x and y?

A. $\begin{cases} 7x + 10y = 74 \\ y = 3x \end{cases}$

B. $\begin{cases} 7x + 10y = 74 \\ y = \frac{x}{3} \end{cases}$

C. $\begin{cases} 10x + 7y = 74 \\ y = 3x \end{cases}$

D. $\begin{cases} 10x + 7y = 74 \\ y = \frac{x}{3} \end{cases}$

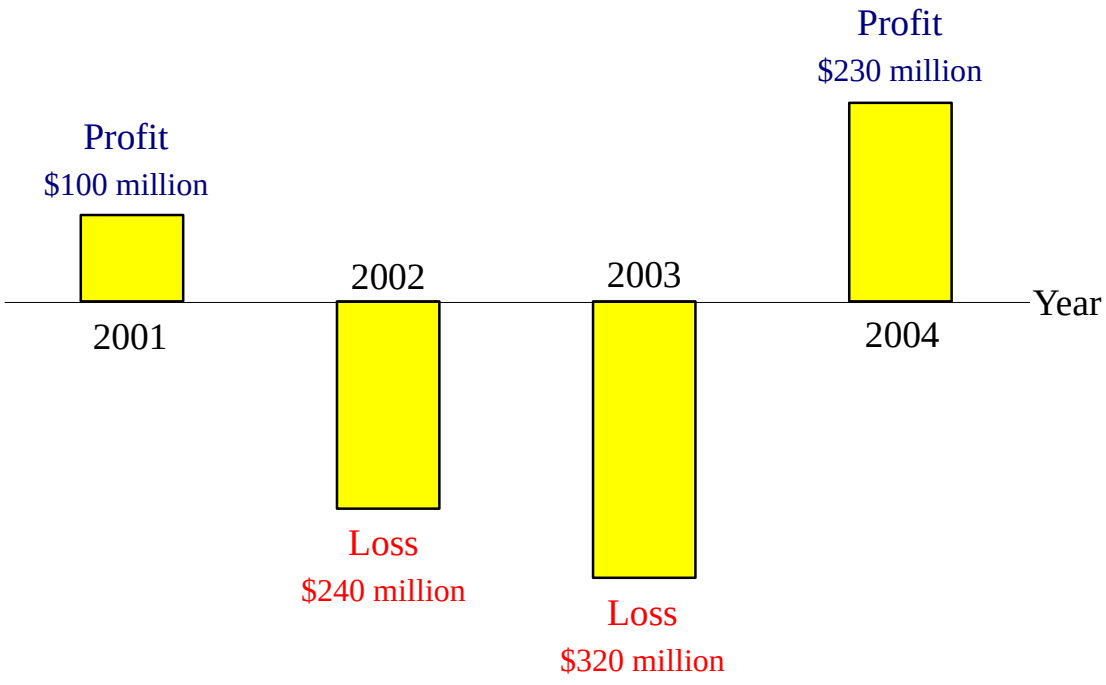
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5. Which of the following is/are identity/identities?
(There may be more than one answer.)

I. $3x = 6$
II. $3x + 4x = 7x$
III. $3x - 2 = -2 + 3x$
IV. $3(x + 1) = 3x + 1$

6.

Financial Performance of Universe Company
(From 2001 to 2004)

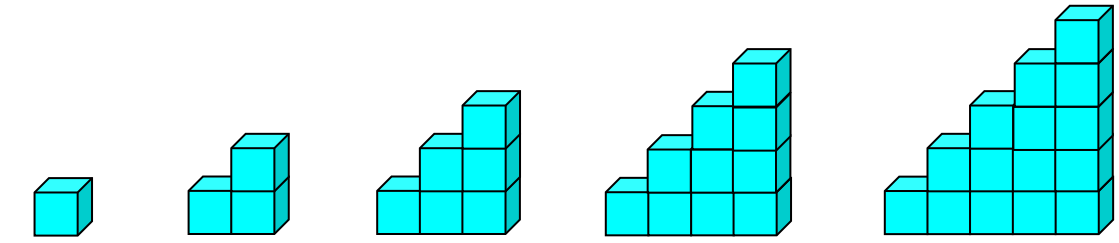


Refer to the chart showing the financial performance of Universe Company. Complete the table below with positive or negative numbers.

Year	Profit / Loss ($ million)
2001	+100
2002	
2003	
2004	

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7. Peter used some cubes to build five solids below:



Solid 1 Solid 2 Solid 3 Solid 4 Solid 5

Following the same pattern,

(a) the number of cubes used to build Solid 6 is _____ ;

(b) the number of cubes used to build Solid 7 is _____ .

8. Solve the inequality $7 - 3x \leq 1$.

9. Estimate the sum of 72 000 + 70 300 + 68 020 + 70 010.
Show your method of estimation.

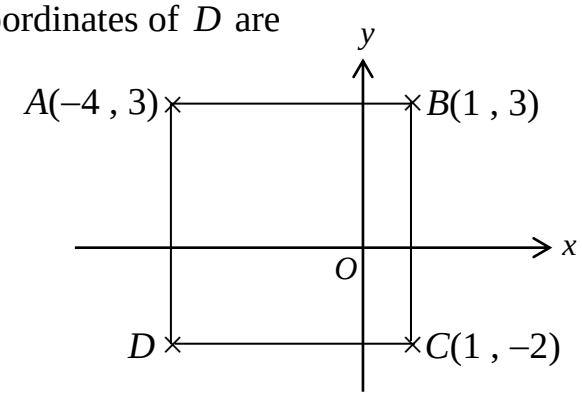
10. Jason deposits $25 000 in a bank at an interest rate of 6% p.a. compounded yearly. Find the amount that he will receive after 2 years.

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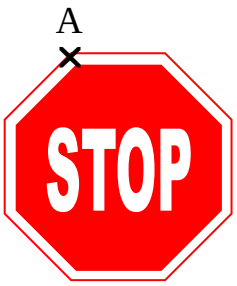
Measures, Shape and Space Dimension

11. In the figure, $ABCD$ is a square. The coordinates of D are

A. $(-1 , 2)$.
B. $(-1 , -2)$.
C. $(-4 , 2)$.
D. $(-4 , -2)$.



12.



Find the image of the above figure after rotating clockwise about A through 90°.

A.



B.



C.



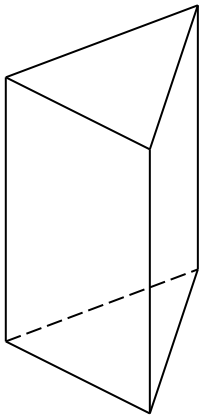
D.



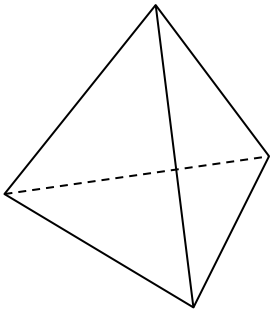
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13. Which of the following solids is possibly a regular polyhedron?

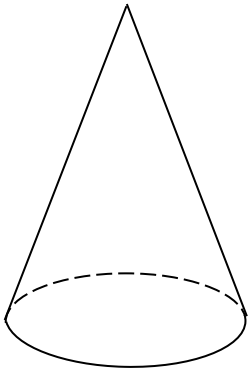
A.



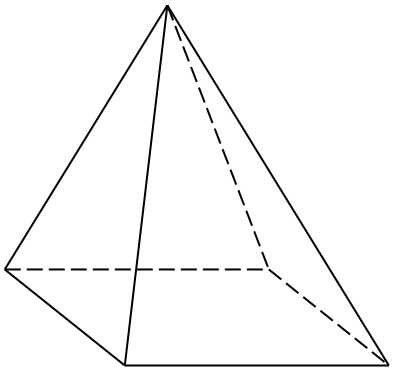
B.



C.

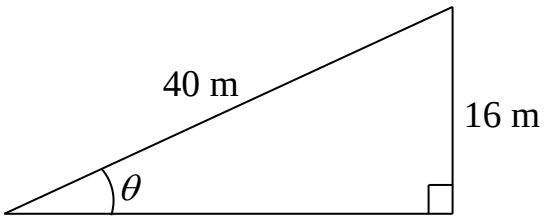


D.



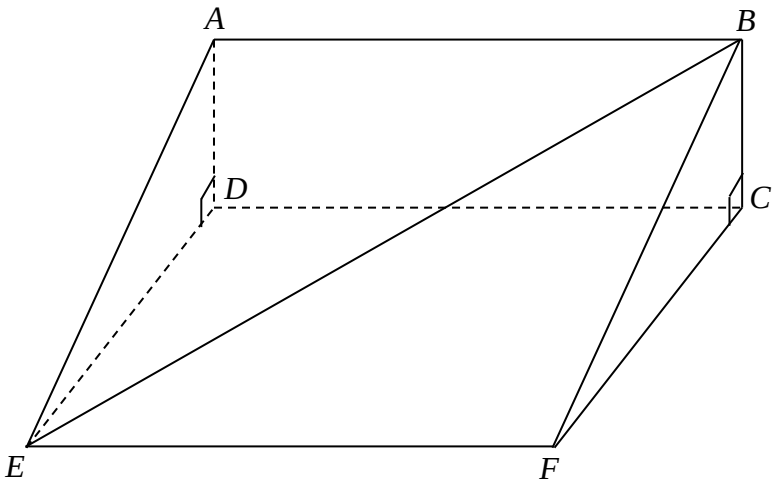
14. Mary is walking uphill along a road. After she has walked 40 m, she is 16 m vertically above the ground. Find θ correct to the nearest 0.1°.

A. 21.8°
B. 23.6°
C. 66.4°
D. 68.2°



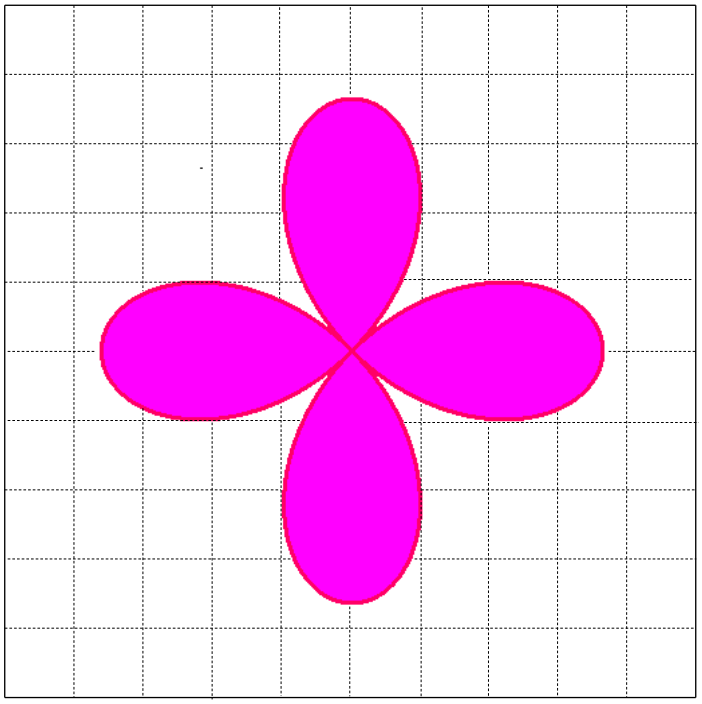
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15.



The figure shows a triangular prism. *ADCB* and *CDEF* are rectangles. *ADCB* is a vertical plane, and *CDEF* is a horizontal plane. Name the angle between the line *BE* and the plane *CDEF*.

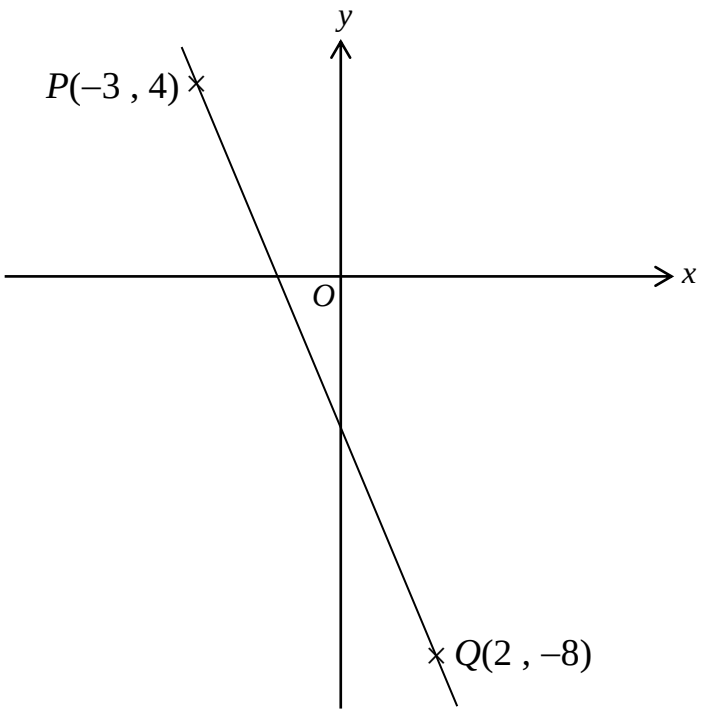
16.



Refer to the above figure. Draw all axes of symmetry.

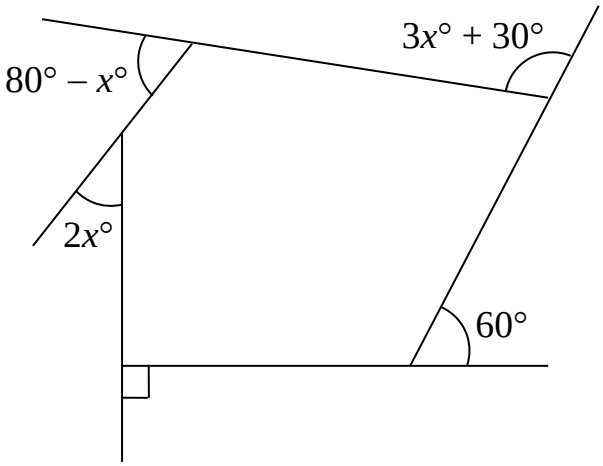
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17.



In the figure, the distance between $P(-3\ ,\ 4)$ and $Q(2\ ,\ -8)$ is _____ units.

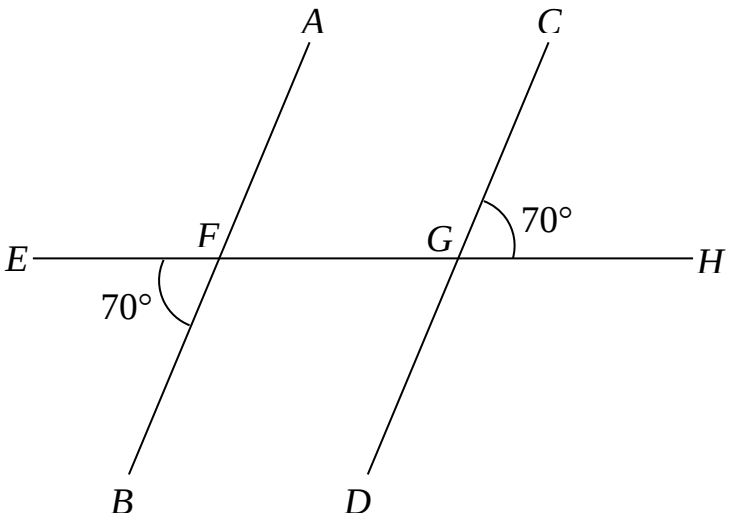
18.



In the figure, find the value of x.

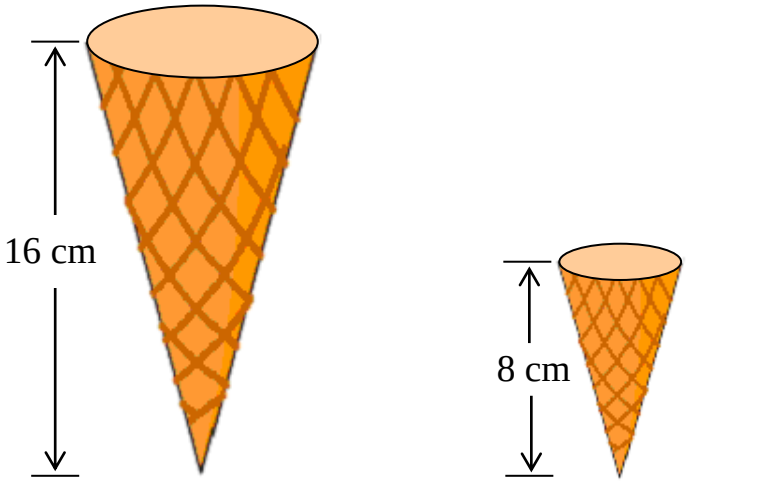
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19.



In the figure, AB, CD and EH are straight lines. $\angle EFB = \angle CGH = 70°$. Prove that $AB \parallel CD$.

20.



The figure shows two similar ice-cream cones: a regular cone and a mini-cone. Both ice-cream cones are right circular cones. Their heights are 16 cm and 8 cm respectively.

The curved surface area of the regular cone is 208 cm^2. Find the curved surface area of the mini-cone.

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Data Handling Dimension

21. The following table shows the monthly salaries of 20 employees of Fortune Hypermarket.

Monthly salary ($)	6 500	8 200	11 700	17 500	26 000
Number of employees	5	4	6	4	1

The mean monthly salary of the 20 employees is

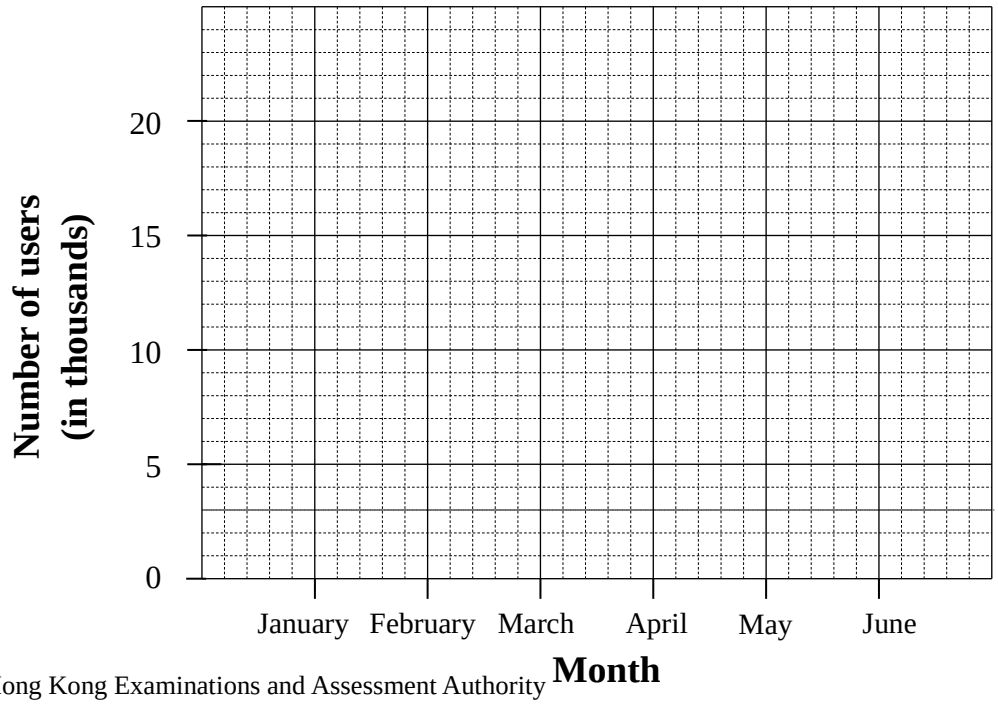
A. $16 250.
B. $13 980.
C. $11 700.
D. $11 575.

22. The table below shows the number of computer users of Energy Youth Centre from January to June this year.

Month	January	February	March	April	May	June
Number of users (in thousands)	11	9	12	14	15	16

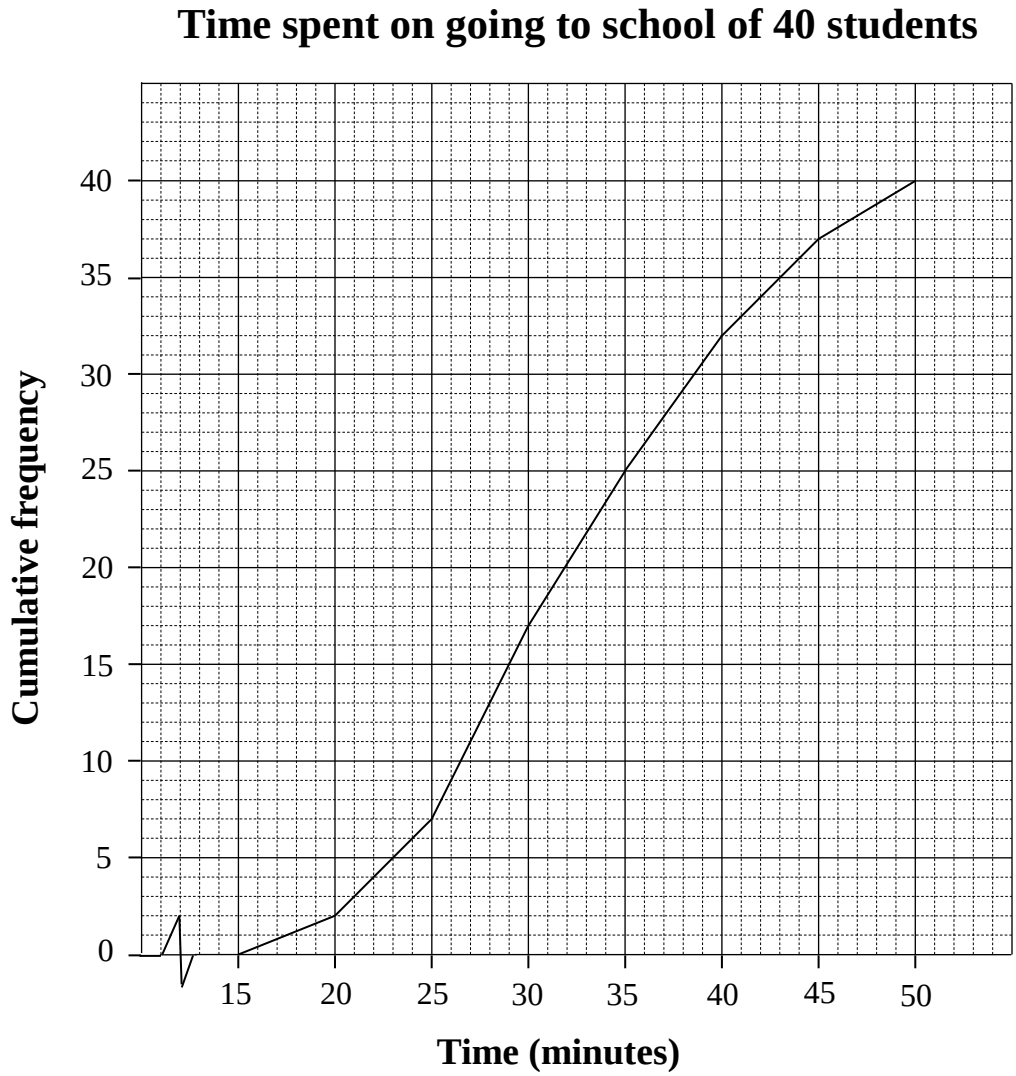
Draw a broken line graph on the following graph paper to represent the data.

Number of computer users of Energy Youth Centre



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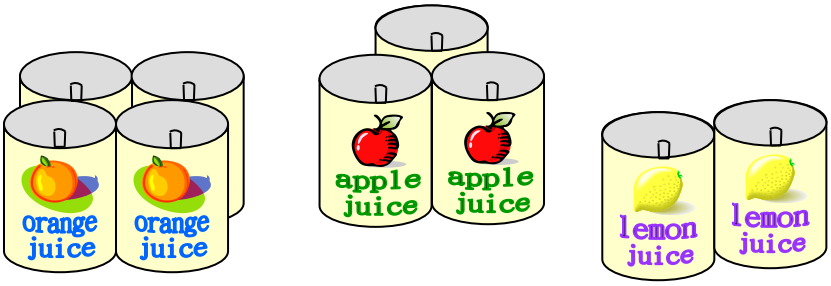
23. During the mathematics lesson, the teacher conducted a survey on the time spent on going to school of 40 students. He drew a cumulative frequency polygon to show the result of the survey.



The median is _____ minutes.

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24.



In the backpack of Tom, there are 4 cans of orange juice, 3 cans of apple juice and 2 cans of lemon juice. Tom takes out a can of juice randomly.

(a) Find the probability that a can of apple juice is taken out.
(b) Find the probability that a can of orange juice is **NOT** taken out.

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FORMULAS FOR REFERENCE

Sector	Arc length	$= 2\pi r \times \frac{\theta}{360^\circ}$
	Area	$= \pi r^2 \times \frac{\theta}{360^\circ}$
Sphere	Surface area	$= 4\pi r^2$
	Volume	$= \frac{4}{3}\pi r^3$
Cylinder	Curved surface area	$= 2\pi rh$
	Volume	$= \pi r^2 h$
Cone	Curved surface area	$= \pi rl$
	Volume	$= \frac{1}{3}\pi r^2 h$
Prism	Volume	= base area × height
Pyramid	Volume	$= \frac{1}{3}$ × base area × height

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Suggested Answers

1. C

2. C

3. A

4. D

5. II and III

6.

Year	Profit / Loss ($ million)
2001	+100
2002	–240
2003	–320
2004	+230

7. (a) 21
   (b) 28

8. $x \geq 2$

9. $72\,000 + 70\,300 + 68\,020 + 70\,010$
   $= (72\,000 + 68\,020) + 70\,300 + 70\,010$
   $\approx 2 \times 70\,000 + 70\,000 + 70\,000$
   $= 280\,000$

   * Accept other reasonable methods of estimation.

10. The amount that Jason will receive after 2 years
    $= \$25\,000 \times (1 + 6\%)^2$
    $= \$28\,090$

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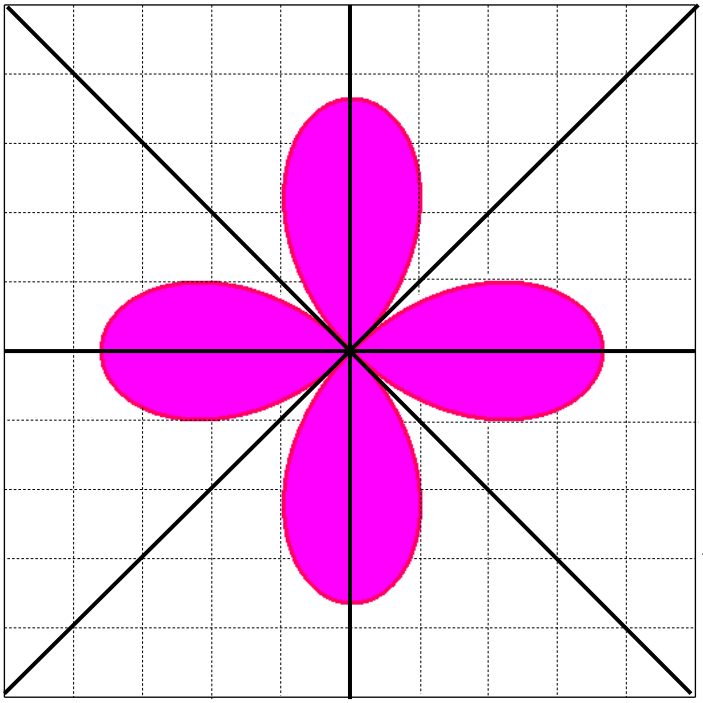
11. D

12. C

13. B

14. B

15. $\angle BEC$ or $\angle CEB$

16. 

17. 13

18. 25

19. $\angle FGD = \angle CGH = 70°$ (vert. opp. $\angle$s)

$\angle EFB = 70°$ (given)

$\because \quad \angle EFB = \angle FGD = 70°$

$\therefore \quad AB \,//\, CD$ (corr. $\angle$s equal)

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20. Let A cm^2 be the curved surface area of a mini-cone.

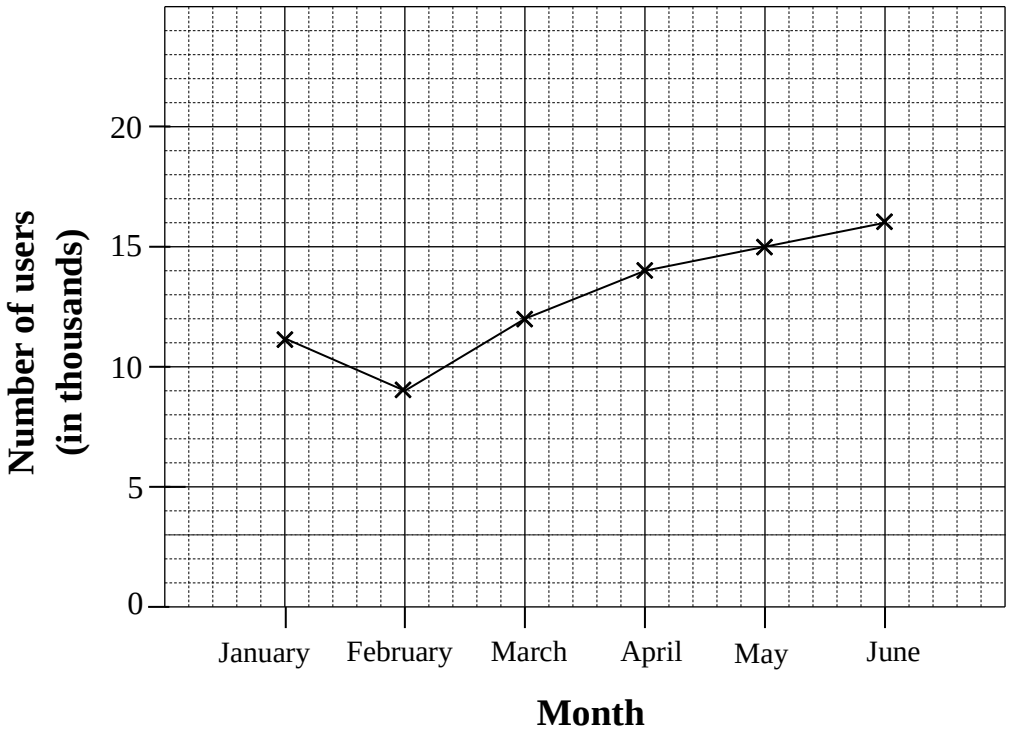
$$\frac{A}{208} = \left(\frac{8}{16}\right)^2$$

$$A = 52$$

The curved surface area of a mini-cone is 52 cm^2.

21. D

22. **Number of computer users of Energy Youth Centre**



23. 32

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24. (a) The probability that a can of apple juice is taken out

$$= \frac{3}{4+3+2}$$

$$= \frac{3}{9}$$

$$= \frac{1}{3}$$

(b) The probability that a can of orange juice is not taken out

$$= \frac{3+2}{4+3+2}$$

$$= \frac{5}{9}$$

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