9	M	E	3	(	Q	)

Education Bureau

Territory-wide System Assessment 2014

Secondary 3 Mathematics

QUESTION BOOKLET

INSTRUCTIONS

1. There are 49 questions in this paper.
2. The time allowed is 65 minutes.
3. Answer ALL questions in the separate ANSWER BOOKLET.
4. The use of HKEAA approved calculators is permitted.
5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
6. Rough work should be done on the rough work sheet provided.
7. The diagrams in this paper are not necessarily drawn to scale.

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	=	πrl
	Volume	=	$\frac{1}{3}\pi r^2 h$
Prism	Volume	=	base area × height
Pyramid	Volume	=	$\frac{1}{3}$ × base area × height

SECTION A: Choose the best answer for each question.
You should mark all your answers in the ANSWER BOOKLET.

1. During the Christmas party, Miss Chan gave some candies to 32 students. Each boy got 2 candies and each girl got 3 candies. Which of the following numbers **CANNOT** be the total number of candies?

A. 60
B. 70
C. 80
D. 90

2. Which of the following is correct?

A. $9 < \sqrt{90}$
B. $11 < \sqrt{110}$
C. $13 < \sqrt{130}$
D. $15 < \sqrt{150}$

3. Which of the following is a polynomial?

A. $x^3 + x$
B. $\frac{x}{x^3 + 1}$
C. $\sqrt{x^3 + x}$
D. $3^x + x$

4. Simplify $(3x^2 - 2x) - x$.

A. 0

B. $x^2 - x$

C. $3x^2 - 3x$

D. $-3x^3 + 2x^2$

5. If $y > 1$, which of the following **MUST** be correct?

A. $(y^3)^2 = y^9$

B. $y^3 \times y^4 = y^{12}$

C. $\frac{y^{18}}{y^2} = y^9$

D. $y^{18} \div y^6 = y^{12}$

6. Marvin solves the equation $\frac{-3x - (5 - 2x)}{2} = 5$ as follows:

1st line	$-3x - (5 - 2x)$	$= 10$
2nd line	$-3x - 5 - 2x$	$= 10$
3rd line	$-5x - 5$	$= 10$
4th line	$-5x$	$= 15$
5th line	x	$= -3$

Determine on which line Marvin first made a mistake.

A. 1st line

B. 2nd line

C. 3rd line

D. 4th line

7. Which of the following points lies on the straight line $y = 2x + 5$?

A. $(-1, -7)$
B. $(7, 1)$
C. $(-2, 1)$
D. $(1, 26)$

8. The price of an adult ticket of the Coral Park is $\$x$. The price of a child ticket is half of the price of an adult ticket. If the total cost of buying 3 adult tickets and 1 child ticket is not more than \$800, which of the following inequalities can be used to find the range of values of x?

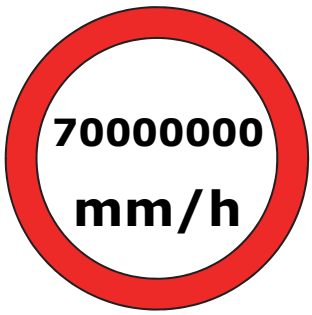
A. $3x + 2x \geq 800$
B. $3x + 2x \leq 800$
C. $3x + \frac{x}{2} \geq 800$
D. $3x + \frac{x}{2} \leq 800$

9. Which of the following traffic signs shows the speed limit of a road section with the most suitable unit and degree of accuracy?

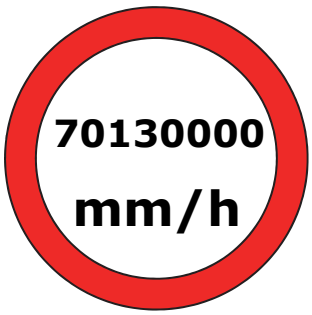
A.

B.

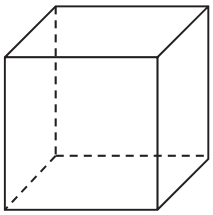
C.



D.

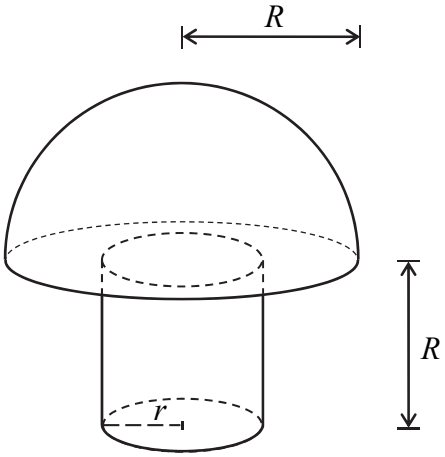


10. The figure shows a solid cube of side 5 cm. Find the total surface area of the cube.



A. 25 cm^2
B. 120 cm^2
C. 125 cm^2
D. 150 cm^2

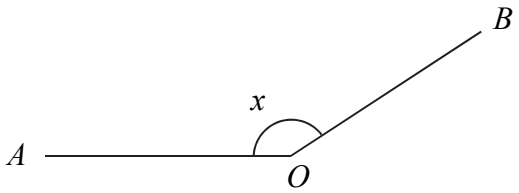
11.



The solid in the figure is formed by a hemisphere and a cylinder. The radius of the hemisphere is R. The base radius and height of the cylinder are r and R respectively. Which of the following could be expressed by $\frac{\pi}{3}R(3r^2+2R^2)$?

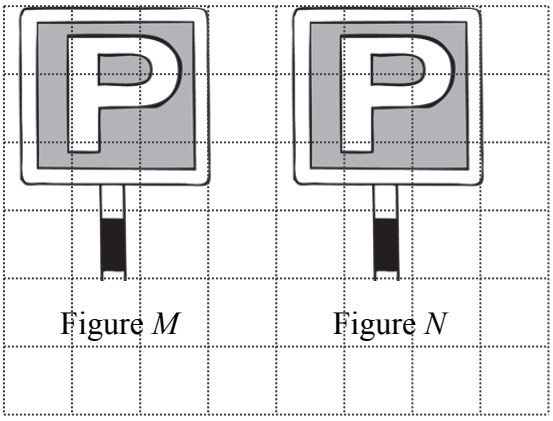
A. Volume of the solid
B. Height of the solid
C. Curved surface area of the solid
D. Total surface area of the solid

12. In the figure, x is



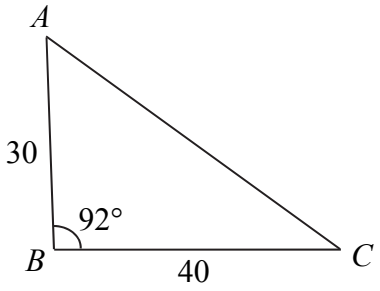
A. an acute angle
B. an obtuse angle.
C. a straight angle.
D. a reflex angle.

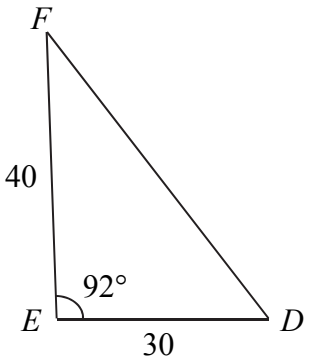
13. Figure M is changed to Figure N after a single transformation. What is the corresponding transformation?



A. Enlargement
B. Rotation
C. Translation
D. Reflection

14.

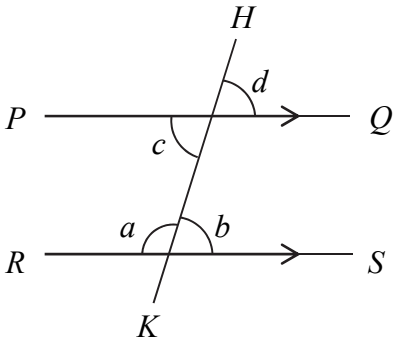




According to the figures above, which of the following is correct?

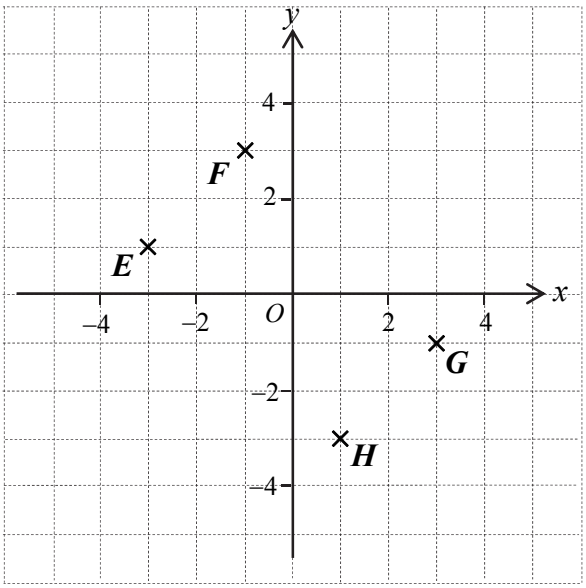
A. $\triangle ABC \cong \triangle FED$ (Ratio of 2 sides, included angle)
B. $\triangle ABC \cong \triangle FED$ (AAA)
C. $\triangle ABC \cong \triangle DEF$ (SAS)
D. $\triangle ABC \cong \triangle DEF$ (RHS)

15. In the figure, PQ // RS and HK is a straight line. Which of the following is a pair of interior angles on the same side?



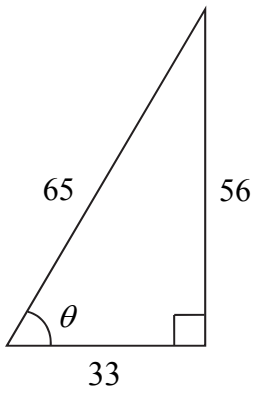
A. a and b
B. a and c
C. b and c
D. b and d

16. In the figure, which point can be represented by (1 , –3)?



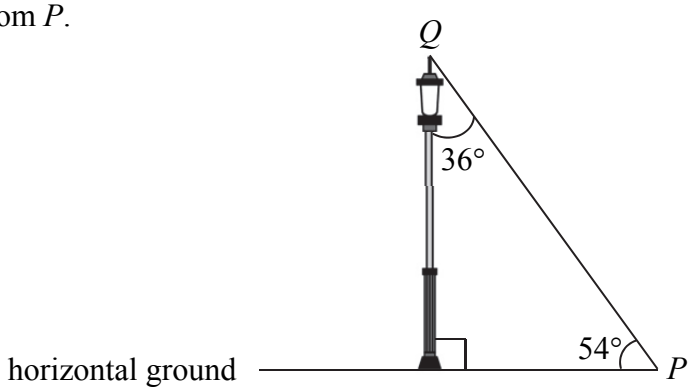
A. ***E***
B. ***F***
C. ***G***
D. ***H***

17. Find the value of $\tan\theta$ in the figure.



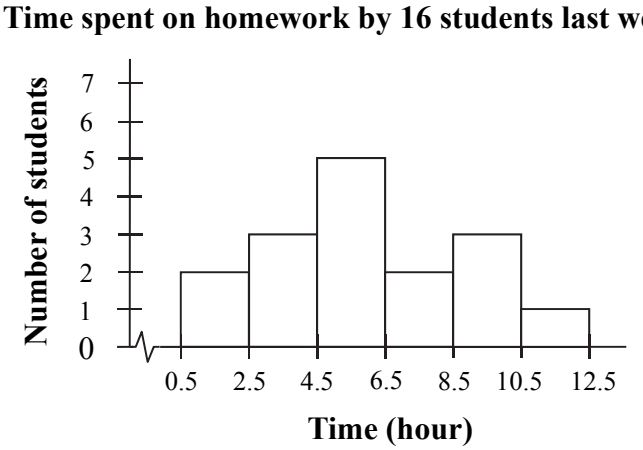
A. $\frac{33}{56}$
B. $\frac{56}{33}$
C. $\frac{33}{65}$
D. $\frac{56}{65}$

18. In the figure, a lamp post is standing vertically on the horizontal ground. Find the angle of elevation of the top Q of the lamp post from P.



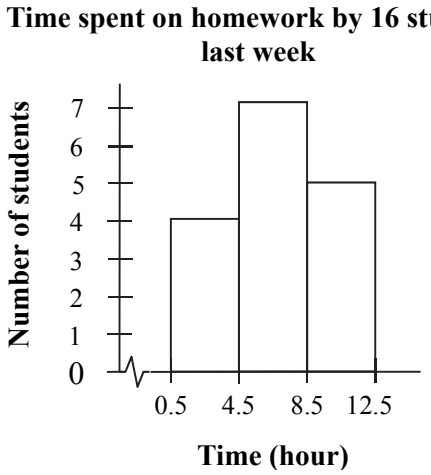
A. 36°
B. 54°
C. 90°
D. 126°

19. The histogram below shows the time spent on homework by 16 students last week.

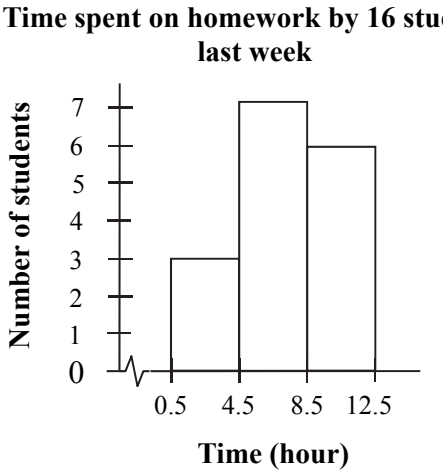


Edwin used the same data set to draw another histogram. Which of the following is most likely the histogram drawn by Edwin?

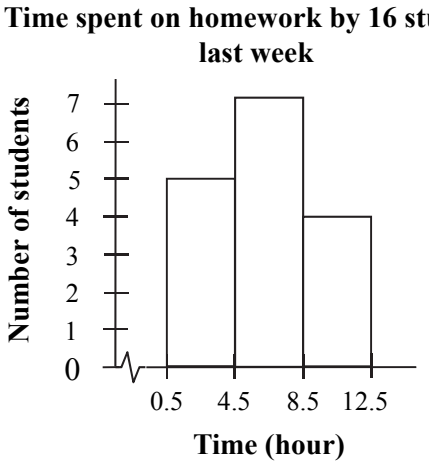
A.



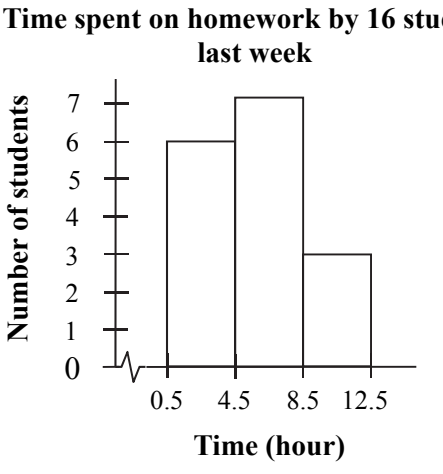
B.



C.



D.



20. The following data show the weights (kg) of 5 students:

60, 50, 40, 50, 60

Based on the above data, which of the following is correct?

A. The mean is 40 kg.
B. The mean is 50 kg.
C. The median is 40 kg.
D. The median is 50 kg.

SECTION B: Write ALL the answers in the ANSWER BOOKLET.
Working need not be shown.

21. Calculate $9-(-4)+4$.

22. Round off 0.005 816 to 3 decimal places.

23. The rainfall of a city in July is 500 mm. The rainfall in August is less than the rainfall in July by 100 mm. Find the ratio of the rainfall of the city in July and that in August.

24. A machine can produce 18 bottles of sauce in one minute. How many bottles of sauce can be produced by the machine in one hour?

25. Figure 1 to Figure 4 consist of 3, 6, 9 and 12 dots respectively.

Figure 1	
Figure 2	
Figure 3	
Figure 4	

According to the above pattern, how many dots does Figure n consist of ? (Express the answer in terms of n)

26. Expand $2x(x^2-x+3)$.

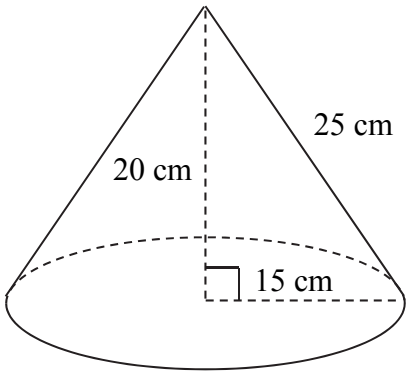
27. Factorize $2x^2 + 6x$.

28. Factorize $1 - 25x^2$.

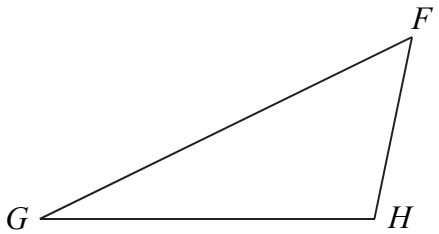
29. Solve $3(x - 1) = -9$.

30. Solve the inequality $3x - 13 < 5$.

31. The figure shows a right circular cone. The height, base radius and slant height are 20 cm, 15 cm and 25 cm respectively. Find the volume of the cone. Express the answer in terms of π.



32. Use suitable notation and given letters to represent the triangle below.



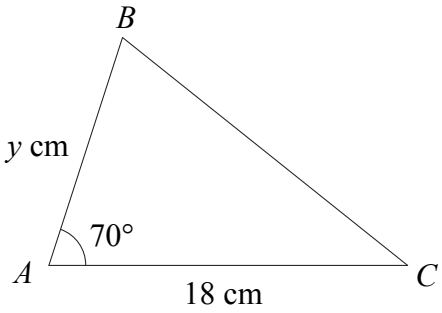
33. Which two of the following figures have the same number of axes of symmetry?

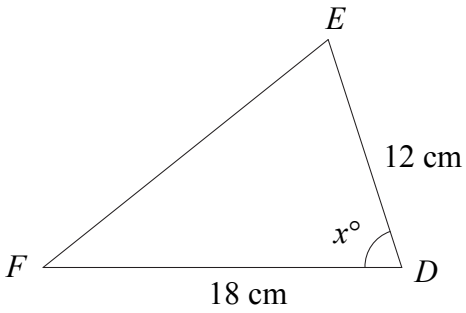
Figure *T*

Figure *S*

Figure *A*

34.



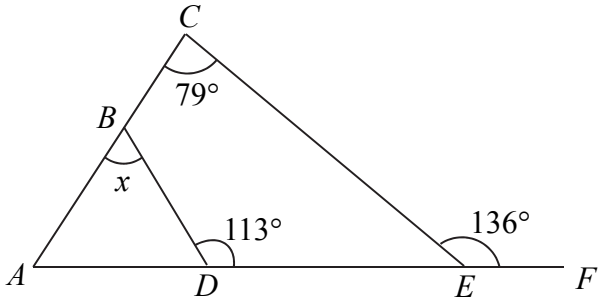


In the figure, $\triangle ABC \cong \triangle DEF$. Find

(a) the value of x,

(b) the value of y.

35. In the figure, ABC and $ADEF$ are straight lines, $\angle BDE = 113°$, $\angle ACE = 79°$ and $\angle CEF = 136°$. Find x.



36. Figure I shows a cube $ABCDEFGH$. In Figure II, $BGED$ is a plane of reflectional symmetry of the cube. Apart from the plane $BGED$, name **ONE OF THE OTHER** planes of reflectional symmetry containing vertex B.

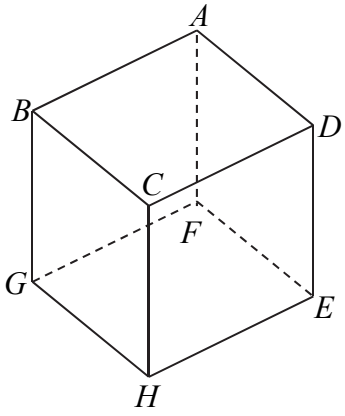


Figure I

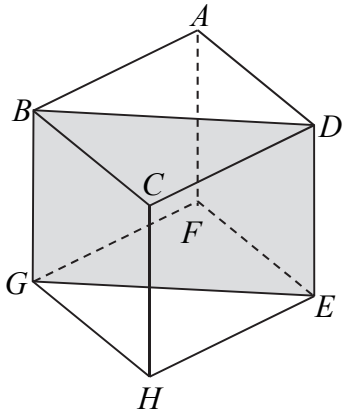
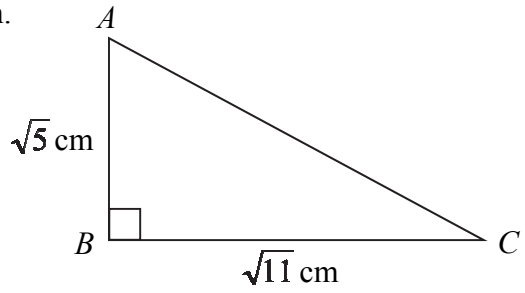


Figure II

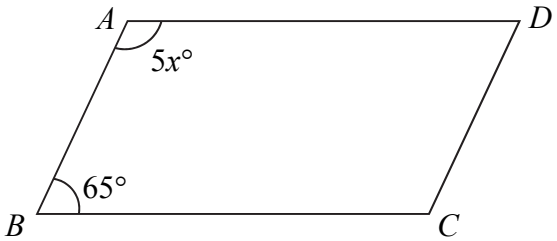
37. In the figure, $\angle ABC = 90°$, $AB = \sqrt{5}$ cm and $BC = \sqrt{11}$ cm.

Find the length of AC.



38. In the figure, $ABCD$ is a parallelogram.

Find the value of x.



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39. The stem-and-leaf diagram below shows the lunch expenses of 3A students last Friday.

Lunch expenses of 3A students last Friday

Stem ($10)	Leaf ($1)
1	3 8 9
2	4 6 6 7 8 9
3	2 2 3 4 5 8 8 8 9
4	0 6 7 8 9 9
5	0

According to the above stem-and-leaf diagram, answer the following questions.

(a) How many students are there in 3A?

(b) What was the least lunch expense of 3A students last Friday?

(c) How many students spent more than $45 on their lunch last Friday?

40. Alfred joins his school's speech competition. The following table shows the weight of each marking item and his marks in these items.

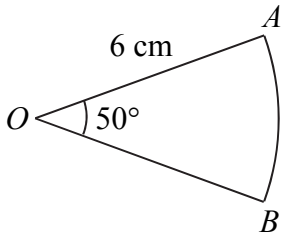
	Marking item			
	Content	Organization	Speaking Skills	Stage Performance
Mark	80	75	63	90
Weight	3	2	4	1

Find the weighted mean mark of Alfred.

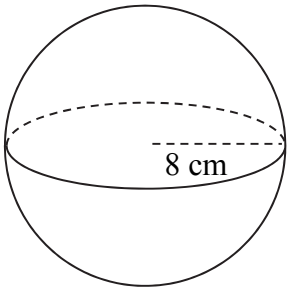
SECTION C: All working must be clearly shown.
Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.

41. Calvin deposits \$2 000 in a bank at an interest rate of 5% p.a. compounded yearly. Find the **amount** and **interest** he will receive after 2 years.

42. In the figure, the radius of sector OAB is 6 cm and $\angle AOB = 50°$. Find the length of $\overset{\frown}{AB}$. Correct the answer to 3 significant figures.



43. The figure shows a sphere of radius 8 cm. Find the surface area of the sphere. Correct the answer to the nearest cm^2.



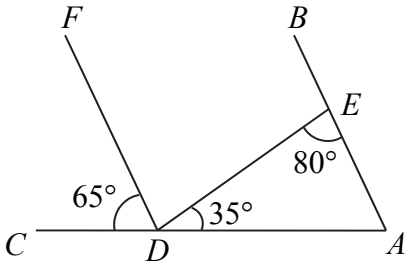
44. Solve the simultaneous equations $\begin{cases} x = 2y + 3 \\ x - y - 10 = 0 \end{cases}$.

45. Complete the table for the equation $2x + y - 2 = 0$ in the **ANSWER BOOKLET**.

x	-1	0	3
y		2	

According to the table, draw the graph of this equation on the rectangular coordinate plane given in the **ANSWER BOOKLET**.

46. In the figure, AEB and ADC are straight lines. $\angle CDF = 65°$, $\angle ADE = 35°$ and $\angle AED = 80°$. Prove that $AB // DF$.



47. In a shopping mall, customers can join a lucky draw for any purchase of \$1 000 or above. Miss Lee bought 3 items in the shopping mall. The prices of the items are \$312, \$601 and \$121. Give **an appropriate approximation** for the price of each of the items. Hence, estimate the total amount that Miss Lee paid for the items. Briefly explain whether she can join the lucky draw.

48. The table below shows the number of visitors of a country from 2007 to 2011.

Year	2007	2008	2009	2010	2011
Number of visitors (million)	13	17	24	22	28

Construct a broken line graph to present the above data in the **ANSWER BOOKLET**.

49. A letter is randomly chosen from each of the two words 'BOY' and 'TOY' respectively.
    (a) Some of the possible outcomes are given in the table provided in the **ANSWER BOOKLET**. Fill in the remaining ones in the blanks.
    (b) Find the probability that the two letters chosen are the same.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.