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PAPER F

2006 Exam Questions!

ICAS International Competitions and Assessments for Schools

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED.

STUDENT'S NAME:

Read the instructions on the **ANSWER SHEET** and fill in your **NAME, SCHOOL** and **OTHER INFORMATION**.
Use a 2B or B pencil.
Do **NOT** use a pen.
Rub out any mistakes completely.

You **MUST** record your answers on the **ANSWER SHEET**.

MATHEMATICS

Mark only **ONE** answer for each question.
Your score will be the number of correct answers.
Marks are **NOT** deducted for incorrect answers.

MULTIPLE-CHOICE QUESTIONS:
Use the information provided to choose the **BEST** answer from the four possible options.
On your **ANSWER SHEET** fill in the oval that matches your answer.

FREE-RESPONSE QUESTIONS:
Write your answer in the boxes provided on the **ANSWER SHEET** and fill in the oval that matches your answer.

You may use a ruler and spare paper.
A **CALCULATOR** is required.

Educational Assessment Australia
eaa.unsw.edu.au

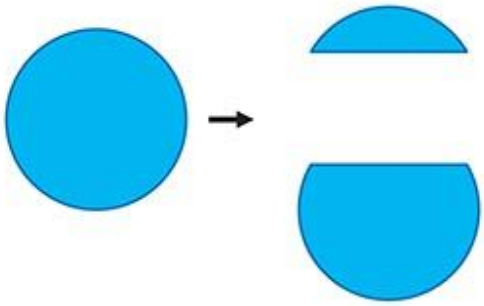
1. Here is a number pattern.

What is the next number in this pattern?

(A) 25 (B) 20

(C) 19 (D) 17

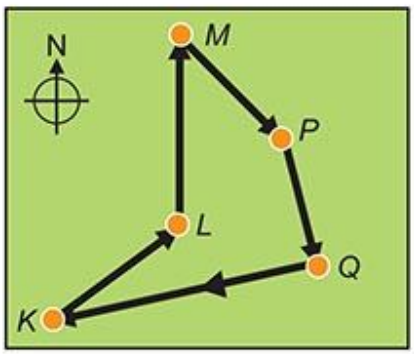
2. A circular disc is cut into two pieces, as shown.



Which statement is correct for the two pieces compared to the disc?

(A) The total area has increased.
(B) The total area has decreased.
(C) The total perimeter has increased.
(D) The total perimeter has decreased.

3. The diagram shows the path of a toy car.



Between which two points does the car travel southeast?

(A) between *L* and *M*
(B) between *M* and *P*
(C) between *P* and *Q*
(D) between *Q* and *K*

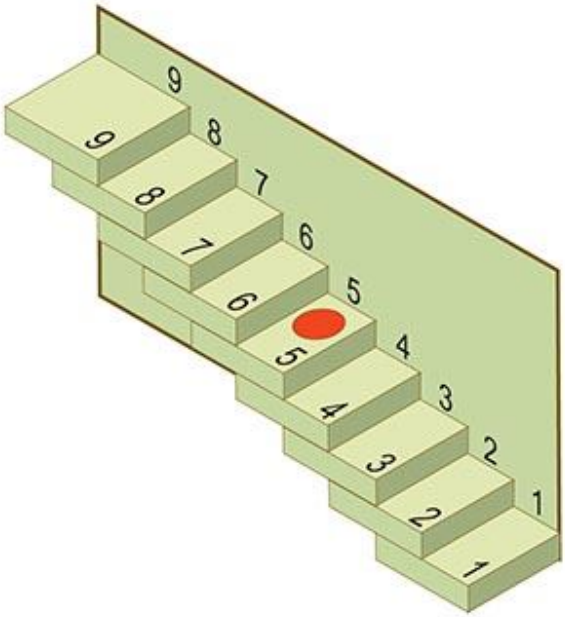
4. Ling has a $30 phone card. This card allows her to make a call to any location for 25c.

Which expression shows the number of phone calls that Ling can make with this card?

(A) 30×4 (B) 30×25

(C) $30\div4$ (D) $30\div25$

5. Gary is on step 5 of these steps.



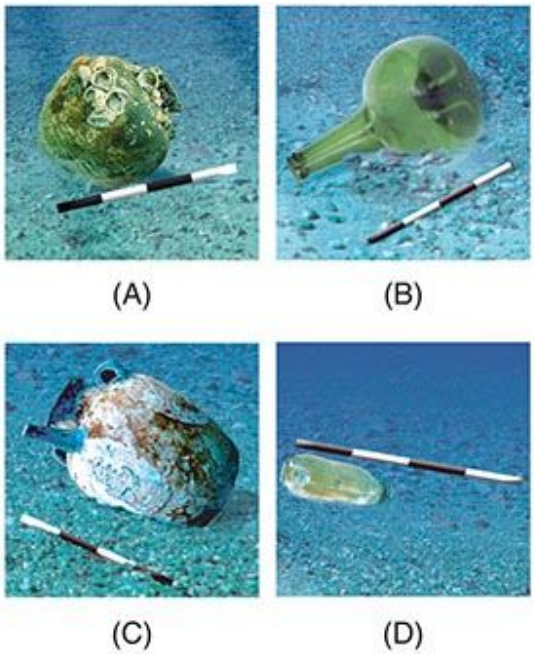
He moves three steps up and then six steps down.

How many steps must he move to get back to step 5?

(A) two steps up
(B) two steps down
(C) three steps up
(D) three steps down

6. An ocean diver used a 40 cm scale bar to estimate the length of objects lying on the sea floor.

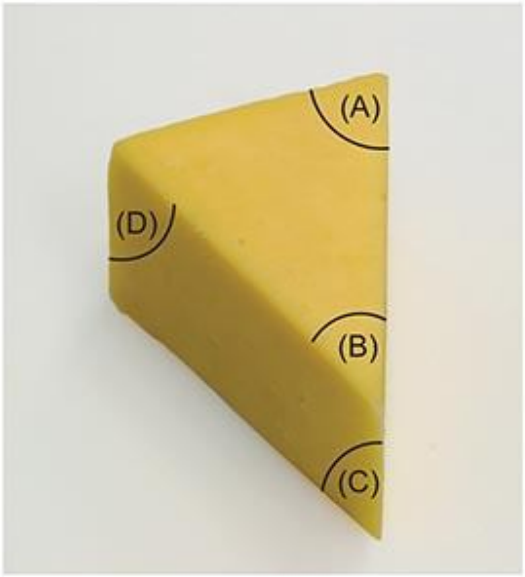
Which object is about 35 cm in length?



(A) (B)

(C) (D)

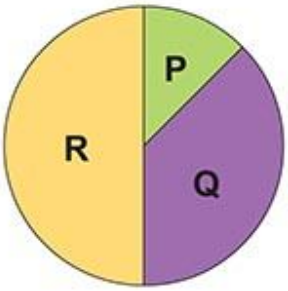
7. On this wedge of cheese, which angle is about 70°?



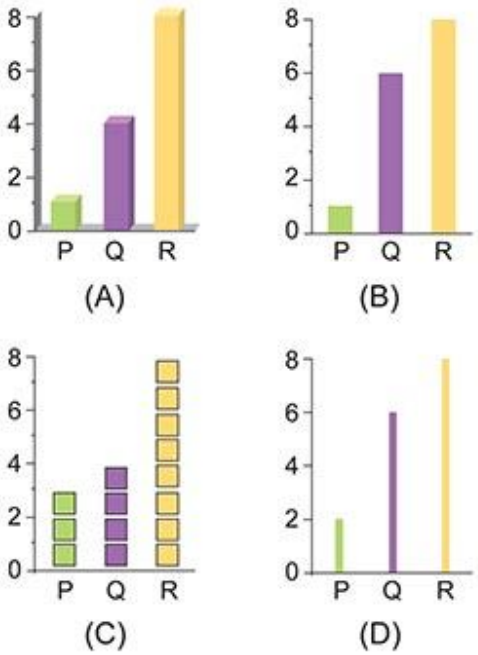
8. Which row contains only square numbers?

(A)	2	4	8	16
(B)	4	16	32	64
(C)	4	16	36	64
(D)	16	36	64	96

9. Sally drew this graph.



Which of these graphs shows the same data as Sally's graph?



10. Simon used stars to make a pattern that has rotational symmetry.

Which star can Simon remove so that this pattern still has rotational symmetry?

11. Jaya watched a DVD for 1 hour and 45 minutes.

She started watching the DVD at 2:55.

Which clock shows the time that the DVD finished?

(A)

(B)

(C)

(D)

12. Lisa wrote this formula to work out the total number of litres in 24 soft drink cans.

$$24x = y$$

What does x represent?

(A) the number of litres in one can
(B) the number of litres in 24 cans
(C) the number of soft drink cans
(D) the number of cans per litre

13. Which of these expressions is equivalent to $\frac{5}{7}$?

(A) $\frac{5}{7}+\frac{7}{5}$ (B) $\frac{5\times5}{7\times7}$

(C) $\frac{5+2}{7+2}$ (D) $\frac{5\times7}{7\times7}$

14. Boris has the coil of wire shown.

He looks through the coil in the direction shown by the arrow.

Which diagram shows what the coil looks like from this direction?

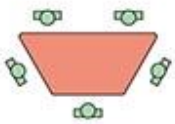

(A)


(B)


(C)

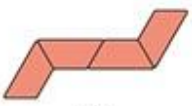

(D)

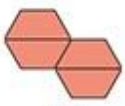
15. A table this shape will seat five people, as shown.

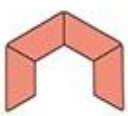


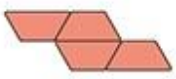
Four tables are put together.

Which of these arrangements will seat exactly twelve people?


(A)


(B)


(C)

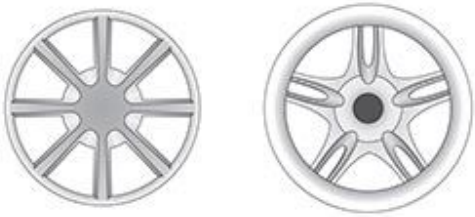

(D)

16. Which of these numbers is smallest?

(A) 0.1 (B) 0.09

(C) 0.109 (D) 0.0999

17. Which wheel will appear to be in the same position after a rotation of 270°?



(A) (B)

(C) (D)

18. The table shows a summary of weather conditions for the last 100 days.

	Rain	No rain
Cloud	20	30
No cloud	0	50

Based on this record, what is the probability that one of the days had cloud, but no rain?

(A) $\frac{2}{5}$ (B) $\frac{3}{5}$

(C) $\frac{3}{10}$ (D) $\frac{5}{10}$

19. Kara wrote this expression.

$$\frac{6}{\frac{1}{4}+\frac{3}{5}}$$

Which of these is closest in value to Kara's expression?

(A) 5 (B) 7

(C) 14 (D) 25

20. Here are examples of a short notation for writing the sum of counting numbers.

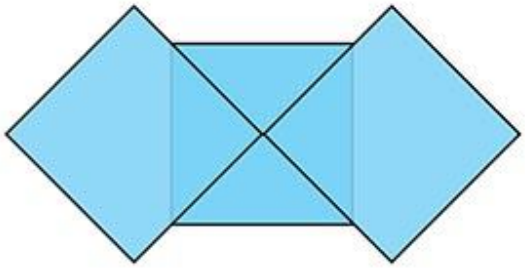
$\varpi_2 = 2 + 1$
$\varpi_3 = 3 + 2 + 1$
$\varpi_4 = 4 + 3 + 2 + 1$
$\varpi_5 = 5 + 4 + 3 + 2 + 1$

What is the value of $\varpi_8 - \varpi_2$?

(A) 21 (B) 33

(C) 34 (D) 35

21. Jill made this shape using three overlapping squares. Each square had sides 12 cm.



What is the total area, in cm^2, of the shape?

(A) 288 (B) 300

(C) 360 (D) 432

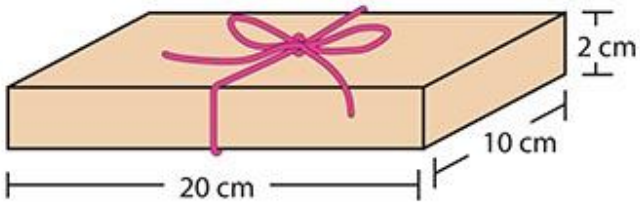
22. $\frac{1}{2}(y+3)=8$

What is the value of y?

(A) 13 (B) 10

(C) 7 (D) 1

23. Merlin tied a birthday gift with coloured string, as shown.



He used 30 centimetres of string for the bow.

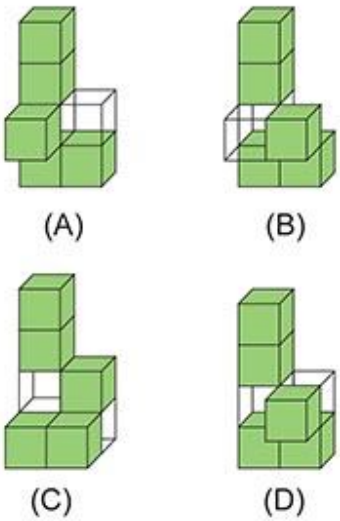
What was the total length of the string he used for tying the gift?

(A) 24
(B) 44
(C) 54
(D) 72

24. A solid is made out of seven blocks, two of which are clear plastic.

Here are three views of the solid.

Which of these is the solid?



25. Jack arranged six identical blocks, as shown.

What is the value of a?

(A) 60 (B) 100
(C) 120 (D) 240

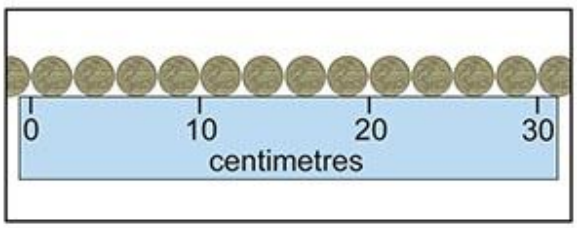
26. A postman delivered eight letters to four houses leaving at least one at each house.

Which statement must be true?

(A) Each house received more than one letter.
(B) One house received at least three letters.
(C) No house received more than two letters.
(D) No house received more than five letters.

27. John held a "coin drive" to collect money for a charity. He asked people to add coins to a straight line of $1 coins arranged end-to-end along the footpath. When the line was finished it was 2 km long.

John placed his ruler along part of the line and counted exactly twelve coins in 30 cm.



About how many dollars did John collect?

(A) $5 000
(B) $8 000
(C) $50 000
(D) $80 000

28. Magic squares are number puzzles where each row, each column and each diagonal add to the same "magic" number, M.

In this magic square, the letters r to z represent different numbers and $M = 3v$.

r	s	t
u	v	w
x	y	z

Which of the following is a correct expression for y?

(A) $2v - r$
(B) $2v - s$
(C) $2v - x$
(D) $2v - z$

29. Kent has a recipe for salad dressing that uses 12 spoons of oil and 3 spoons of vinegar.

Kent decides to use $\frac{2}{3}$ of the amount of oil, but the same amount of vinegar.

What fraction of Kent's dressing will be vinegar?

(A) $\frac{3}{11}$ (B) $\frac{1}{3}$

(C) $\frac{3}{8}$ (D) $\frac{8}{11}$

30. Maria used plain and patterned tiles on her floor.

Cost of Tiles

	Plain tiles	Patterned tiles
ceramic	\$4.75/m^2	\$5.90/m^2
stone	\$5.80/m^2	\$6.50/m^2
lino	\$6.90/m^2	\$7.40/m^2
carpet	\$7.50/m^2	\$8.00/m^2

Half the floor area was covered with plain tiles and the other half with patterned tiles.
The floor area was 24 m^2.
The total cost of tiling the floor was \$168.

Which of these options was chosen for the floor tiles?

	Plain tiles	Patterned tiles
(A)	ceramic	lino
(B)	stone	carpet
(C)	carpet	stone
(D)	lino	ceramic

31. The table shows the medal-winning times for the three events that made up the men's triathlon at the 2004 Olympics.

Medal	Swim	Cycle	Run
Gold	18 min 19 s	1 h 44 s	32 min 4 s
Silver	18 min 13 s	1 h 51 s	32 min 11 s
Bronze	18 min 17 s	1 h 45 s	32 min 31 s

What was the difference in the total time taken by the Gold and Silver medal winners?

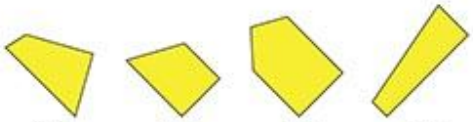
(A) 7 seconds (B) 8 seconds

(C) 19 seconds (D) 20 seconds

32. A square was cut into four pieces.

The shaded triangle is one of the pieces.

Which of these shapes is **NOT** one of the other three pieces of the square?



33. Chris used this graph to work out the exchange rates of American, Australian and New Zealand dollars.

Chris changed 750 Australian dollars into New Zealand dollars. He spent 270 of these New Zealand dollars.

How many American dollars did he get for his remaining New Zealand dollars?

(A) 400
(B) 500
(C) 540
(D) 810

34. Here are the first four terms in a number pattern.

Term 1	$1+1^2=2$
Term 2	$2+2^2=6$
Term 3	$3+3^2=12$
Term 4	$4+4^2=20$

Which of these terms will end in zero?

(A) Term 6459236
(B) Term 6459237
(C) Term 6459238
(D) Term 6459239

35. Kate bought boxes of apples and oranges. Each box contained either apples or oranges, but not both.

Each box of apples contained the same number of apples. The oranges were in boxes of 60.

The total number of apples and oranges that Kate bought was 280.

Which of these could be the number of apples in a box?

(A) 45
(B) 50
(C) 60
(D) 75

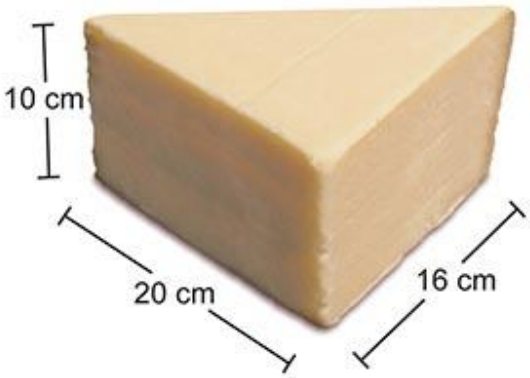
37. Tom has these three number cards.

Tom uses all three cards to make a 3-digit number.

What is the mean (average) of all the different numbers Tom can make in this way?

(Write only the number on your answer sheet.)

36. Farm Cheese is sold in packages shaped as half of a rectangular prism, as shown.



Each cubic centimetre of Farm Cheese weighs 2.5 grams.

A company has ordered 3.5 tonnes of these cheese packages.

How many of these cheese packages has the company ordered?

(Write only the number on your answer sheet.)

38. This clock shows the angle between the hour and minute hands at 5 minutes past 12.

How many minutes after 12 o'clock will there be an **exact** angle of 132° between the hour and minute hands?

(Write only the number on your answer sheet.)

39. The difference between two numbers, a and b, is 24.

When 4 is added to both a and b, the larger of these new numbers is 5 times the smaller of these new numbers.

What is the value of the smaller of the two numbers, a and b?

(Write only the number on your answer sheet.)

40. What are the last two digits of this number?

$$16^{198}$$

(Write only the number on your answer sheet.)