



Student application
number

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Given name(s)

Family name

Selective High School Placement Test

Mathematical Reasoning Question Paper

11 March 2021

40 minutes

INSTRUCTIONS FOR CANDIDATES

Please read this page carefully.

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.

A separate answer sheet is provided for this test. Please fill in the following information on your answer sheet and on this question paper:

- Student application number
- Given name(s)
- Family name

There are **35** questions in this paper. For each question there are five possible answers, **A, B, C, D,** and **E**. Choose the **one** correct answer and record your choice on the separate answer sheet. If you make a mistake, erase thoroughly and try again.

You will **not** lose marks for incorrect answers, so you should attempt **all 35** questions.

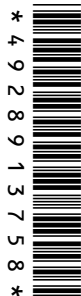
You **must** complete the answer sheet within the time limit. There will **not** be any extra time at the end of the exam to record your answers on the answer sheet.

You can use the question paper for working out, but no extra paper is allowed.

Calculators and dictionaries are **NOT** allowed.

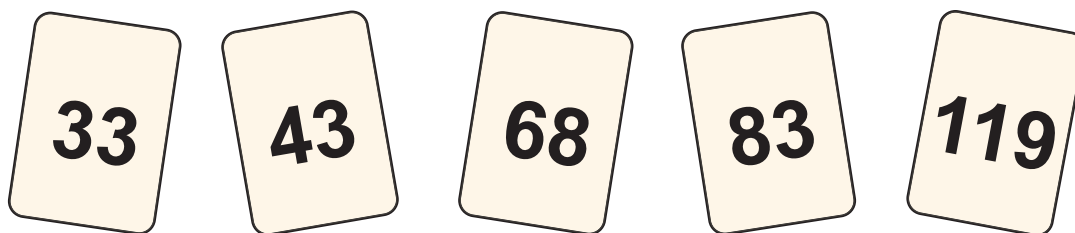


Cambridge Assessment
Admissions Testing



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- 1 Four of the numbers on the cards have the same remainder when divided by 5:



Which number has a **different** remainder?

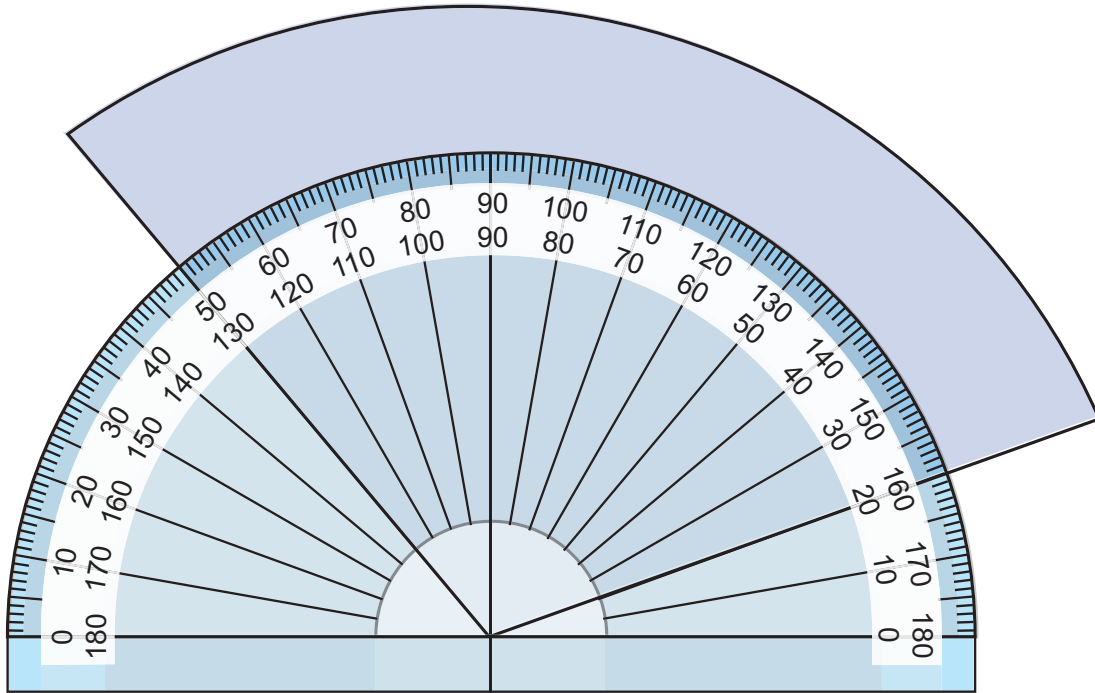
- A 33
 - B 43
 - C 68
 - D 83
 - E 119
- 2 What is the value of the missing number ▲ in this number pattern?

2, 6, ▲, 54, 162, ...

- A 10
- B 12
- C 18
- D 30
- E 50

3 Bob is measuring the obtuse angle between the two straight sides of the blue shape.

He places a protractor over the angle like this:



What is the size of this angle?

- A 110°
- B 130°
- C 150°
- D 160°
- E 210°

4 Jason has 3 different pairs of trousers and 4 different shirts.

Emily has 2 different pairs of trousers and 5 different shirts.

Each person can make an outfit from their own clothes by choosing 1 pair of trousers and 1 shirt.

Who has a larger number of possible outfits, and by how many?

- A** Jason has 2 more outfits than Emily.
- B** Jason has 1 more outfit than Emily.
- C** They have the same number of outfits.
- D** Emily has 1 more outfit than Jason.
- E** Emily has 2 more outfits than Jason.

5 Three containers have different amounts of water inside.

Container X has 1 litre 75 millilitres of water.

Container Y has 3 litres 45 millilitres of water.

Container Z has 1250 millilitres of water.

If the water from all three containers is combined, what will its volume be, in litres (L) and millilitres (mL)?

- A** 5 L 37 mL
- B** 5 L 370 mL
- C** 6 L 45 mL
- D** 6 L 450 mL
- E** 17 L 70 mL

6 Here are some number cards:



Mia arranges all the cards in a line, so that the numbers increase from left to right.

Which number is on the middle card?

- A 0.6
- B 0.65
- C 0.75
- D 0.56
- E 0.57

7 Amrita has a bag of 36 marbles. Some are blue, some are red and the rest are yellow.

There are 16 blue marbles in the bag.

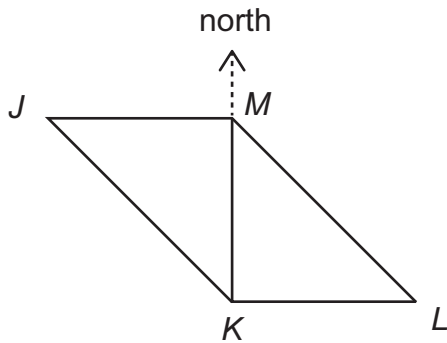
If she takes out a marble without looking, the probability that it is red is $\frac{1}{2}$

How many yellow marbles are in the bag?

- A 2
- B 4
- C 8
- D 12
- E 18

- 8 Bryony draws two right-angled isosceles triangles on the playground to make a parallelogram.

She labels the corners J , K , L and M .



The direction of north is shown.

Bryony walks along the sides of the parallelogram, from J to K to L to M .

Starting from J , which order of compass directions does she follow?

- A** SE, then E, then NW
- B** SE, then W, then NW
- C** S, then E, then N, then W
- D** SW, then E, then NE
- E** SW, then W, then NE

9 Which of these statements is/are correct?

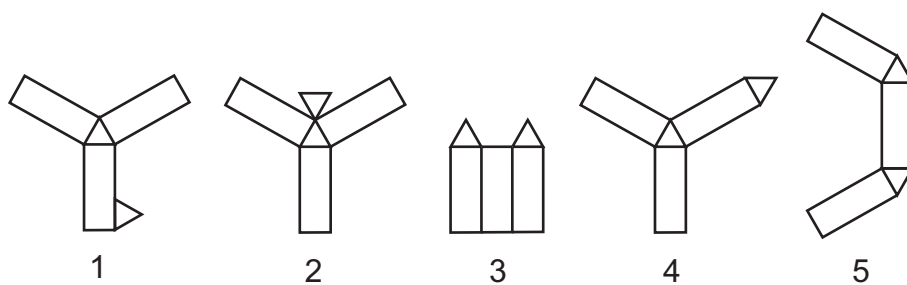
X $\frac{3}{4} + \frac{3}{4}$ is more than $1\frac{1}{4}$

Y $1 - \frac{3}{8}$ is less than $\frac{3}{8}$

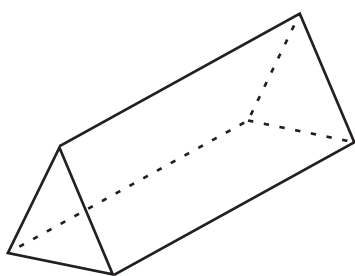
Z $\frac{1}{6}$ is more than $\frac{1}{10}$

- A** statement Y only
- B** statement Z only
- C** statements X and Y only
- D** statements X and Z only
- E** statements Y and Z only

10 Here are 5 different nets:

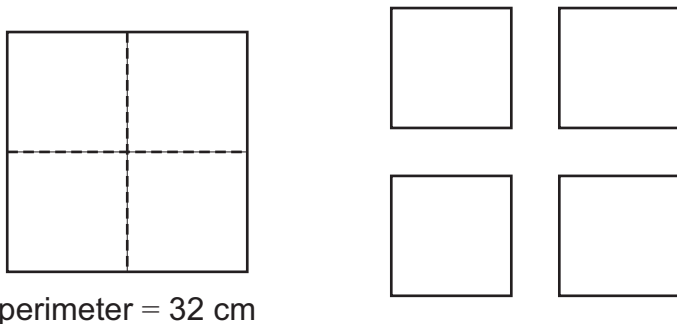


Which of the nets can be folded to make the triangular prism shown?



- A net 1 only
- B net 4 only
- C nets 2 and 4 only
- D nets 3 and 5 only
- E nets 4 and 5 only

- 11 The perimeter of a square is 32 cm.



The square is cut into four smaller squares, as shown in the diagram.

What is the perimeter of one of these pieces?

- A 8 cm
 - B 12 cm
 - C 16 cm
 - D 20 cm
 - E 24 cm
- 12 When an even number is divided by 8, what are all of the possible remainders?
- A 2
 - B 2, 4
 - C 2, 4, 6
 - D 1, 3, 5, 7
 - E 1, 2, 3, 4, 5, 6, 7

13 The time in Auckland is 13 hours ahead of the time in London.

The time in Calgary is 7 hours behind the time in London.

When it is 5 pm in Calgary, what time is it in Auckland?

- A** 1 am
- B** 11 am
- C** 1 pm
- D** 9 pm
- E** 11 pm

14 Four old units for capacity are: gill, pint, quart and peck.

- 4 gills equal 1 pint.
- 1 pint equals half a quart.
- 8 quarts equal 1 peck.

How many gills equal 1 peck?

- A** 13
- B** 14
- C** 16
- D** 32
- E** 64

- 15 In the prices below, each shape represents a missing digit.

\$70.2□

\$68.5△

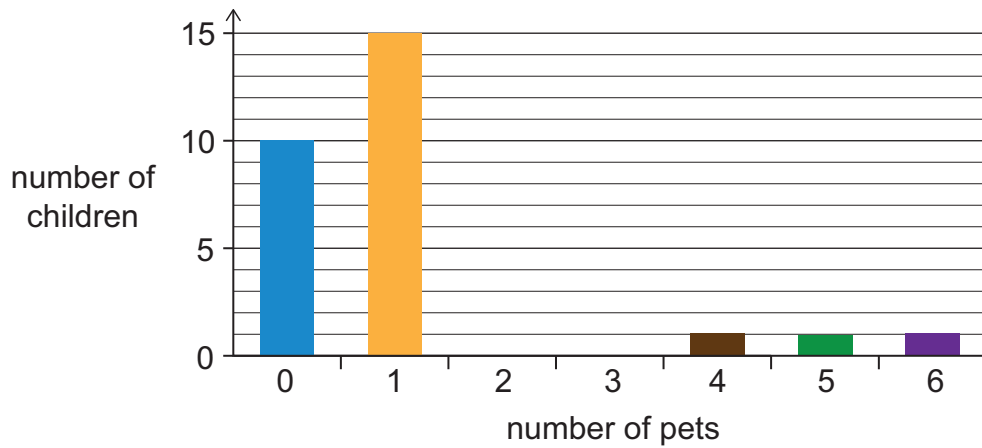
What is the greatest possible difference between the prices?

- A \$1.61
- B \$1.79
- C \$2.21
- D \$2.39
- E \$2.71

16 40 children were asked how many pets they have.

Most of the results are shown below in the column graph, but the bars for two and three pets are missing.

The number of children with two pets is twice the number with three pets.



How many children have two pets?

- A 4
- B 6
- C 8
- D 10
- E 12

17 Finn, Gabriella and Hassan have some stickers.

Finn has 8 times as many stickers as Gabriella.

Hassan has $\frac{1}{2}$ as many stickers as Gabriella.

Finn has times as many stickers as Hassan.

What is the missing number in the sentence above?

A $\frac{1}{16}$

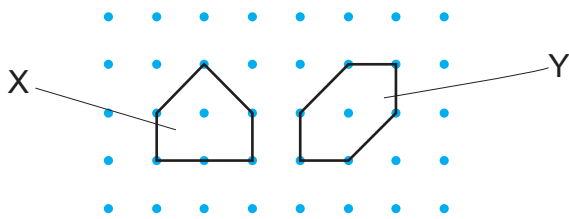
B $\frac{1}{4}$

C 4

D 12

E 16

18 The shapes X and Y are drawn on a square grid.



Which of the following statements is/are correct?

- 1 Shape X has a larger perimeter than shape Y.
- 2 Shapes X and Y have the same perimeter.
- 3 Shape X has a larger area than shape Y.
- 4 Shapes X and Y have the same area.

- A none of them
B statement 4 only
C statements 1 and 4 only
D statements 2 and 3 only
E statements 2 and 4 only

19 A large packet of biscuits holds 36 biscuits.

Two large packets hold the same number of biscuits as three medium packets.

Two medium packets hold the same number of biscuits as three small packets.

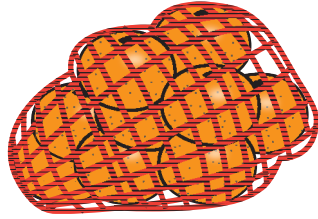
How many biscuits does a small packet hold?

- A 4
B 8
C 9
D 12
E 16

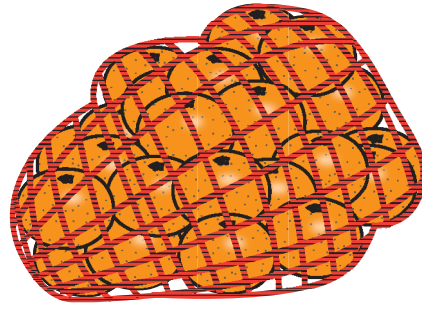
20 In a shop, there are three ways to buy mandarins, as shown.



1 mandarin
for \$0.50



bag of 10 mandarins
for \$4.50

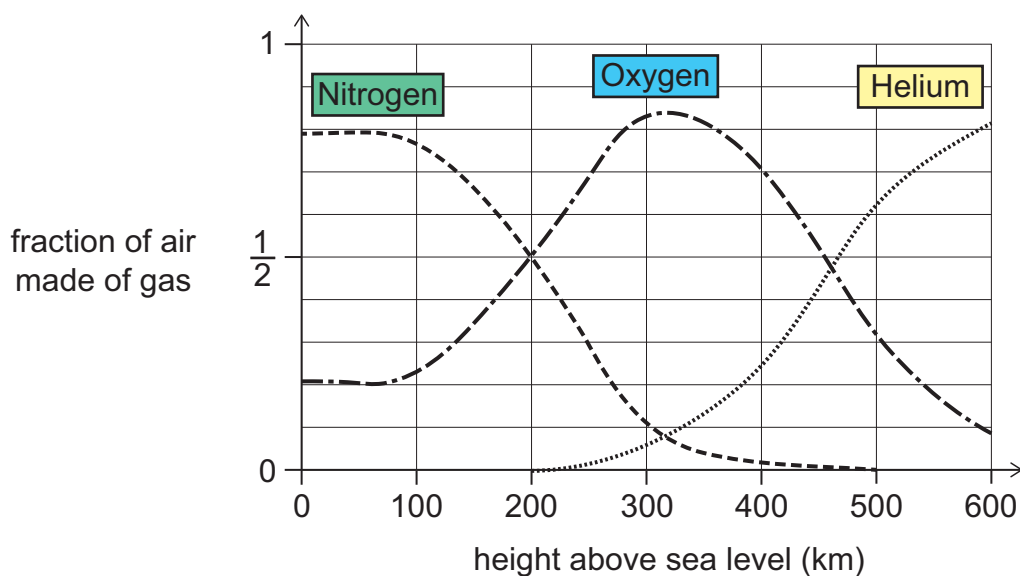


bag of 30 mandarins
for \$13.00

Jack has \$25. What is the largest number of mandarins he can buy?

- A 50
- B 54
- C 55
- D 56
- E 60

- 21 This graph shows what fraction of the air is made of different types of gas, at different heights above sea level.



Which of these statements is/are correct?

- X** At any height above sea level, the fraction of nitrogen is higher than the fraction of helium.
 - Y** There is more than one height at which the fractions of oxygen and helium are the same.
 - Z** At 200 km above sea level, the air is about half nitrogen and half oxygen.
- A** none of them
B statement X only
C statement Y only
D statement Z only
E statements X, Y and Z

22 A movie theatre sold a total of 500 tickets in a week.

It sold all of these tickets on Monday, Tuesday, Wednesday and Thursday.

On Tuesday, it sold half as many tickets as on Monday.

On Wednesday, it sold half as many tickets as on Tuesday.

On Thursday, it sold 80 tickets.

How many tickets were sold on Monday?

- A** 60
- B** 120
- C** 140
- D** 168
- E** 240

23 A pattern of boxes is drawn on a grid.

10				9	
9			8		
8		7			
7				6	
6			5		
5		4			
4				3	
3			2		
2		1			
1					
	A	B	C	D	E

Box 1 is at grid reference B2, box 2 is at C3, and so on.

If the pattern continues like this, what will be the grid reference of box 40?

- A B41
- B B50
- C B121
- D C39
- E C60

24 Which of these numbers is closest to $\frac{7}{10}$?

A 0.072

B 0.705

C 0.68

D 0.069

E 0.73

25 Five friends live in houses on a long straight road in this order:

Felipe, Gina, Heng, Jood, Kerry

Felipe lives 400 m from Heng and 850 m from Kerry.

Gina lives three times as far from Felipe as she lives from Heng.

Gina and Jood live equal distances from Heng.

How far does Jood live from Kerry?

A 150 m

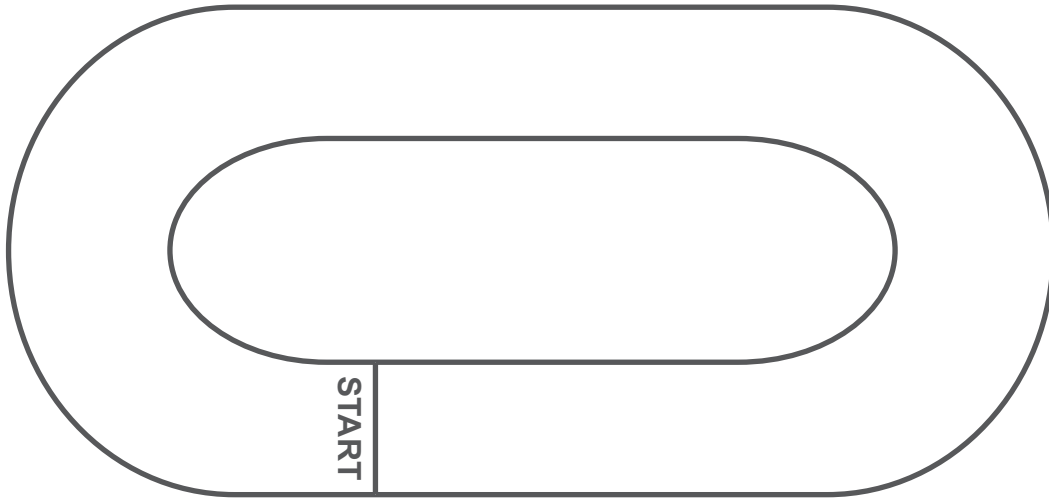
B 250 m

C 350 m

D 650 m

E 750 m

- 26** Rachel, Steve and Taran are three athletes running laps of a long track. They all start on the start line at the same time.



Rachel runs a lap every 8 minutes.

Steve runs a lap every 10 minutes.

Taran runs a lap every 12 minutes.

After how many minutes are the three athletes next on the start line at the same time?

- A** 60
- B** 72
- C** 80
- D** 96
- E** 120

27 Mateo is thinking of a whole number.

If he multiplies his number by 3, the answer is less than 30.

If he multiplies his number by 6, the answer is greater than 40.

There is more than one number Mateo could be thinking of.

What is the sum of all of the numbers Mateo could be thinking of?

A 7

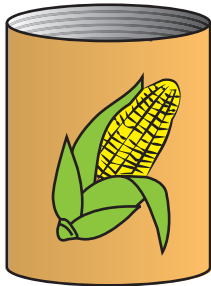
B 13

C 15

D 17

E 24

28



When this can of sweetcorn is half full, the sweetcorn and can together have a mass of 120 grams.

When the can of sweetcorn is one-quarter full, the sweetcorn and can together have a mass of 65 g.

What is the mass of the can and sweetcorn together when the can is three-quarters full?

A 165 g

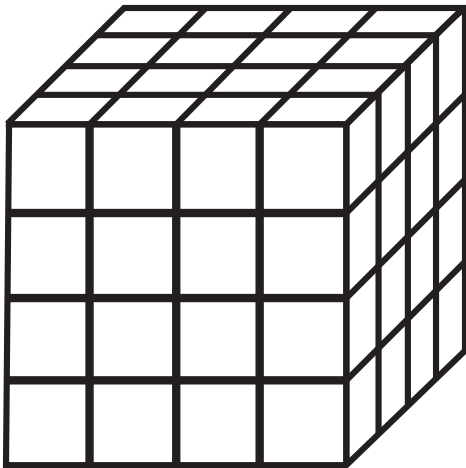
B 175 g

C 180 g

D 185 g

E 195 g

29 Tiffany makes a large cube out of 64 identical small cubes:

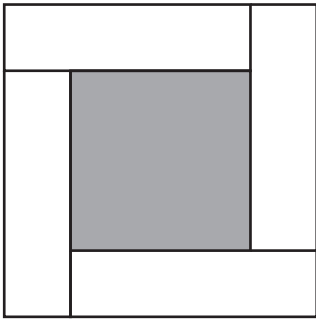


She can pick it up and look at it from any direction.

How many of the 64 small cubes can she **not** see?

- A 0
- B 8
- C 24
- D 27
- E 32

- 30 The design below is made of identical white rectangles and a shaded square:



[diagram not to scale]

The width of each rectangle is 4 cm.

The area of each rectangle is 36 cm^2 .

What is the area of the shaded square?

- A 9 cm^2
- B 16 cm^2
- C 25 cm^2
- D 64 cm^2
- E 81 cm^2

- 31 The timetable for buses between the towns of Oldville and Newtown is shown below.

Oldville to Newtown		Newtown to Oldville	
depart 07:55	arrive 09:05	depart 07:15	arrive 08:20
depart 10:20	arrive 11:25	depart 09:55	arrive 11:05
depart 15:35	arrive 16:45	depart 13:05	arrive 14:15
depart 18:05	arrive 19:00	depart 17:30	arrive 18:30

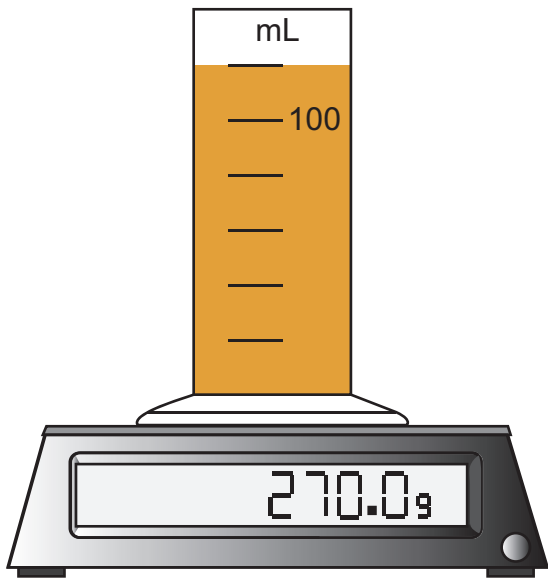
Sun-mi catches the second bus of the day from Newtown to Oldville.

She returns to Newtown on the next bus.

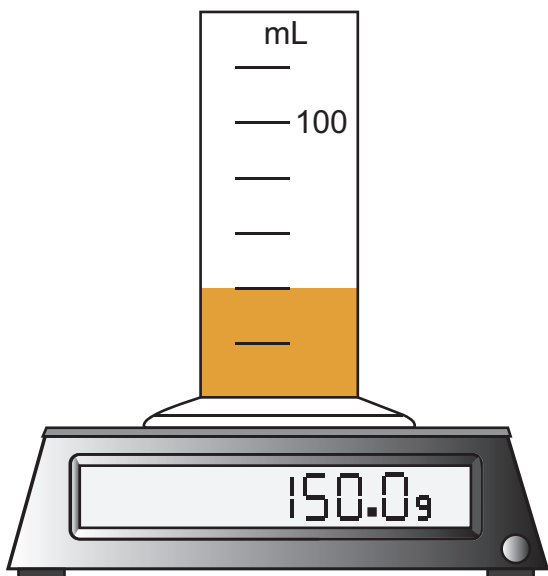
How long does she spend away from Newtown?

- A 1 hour 30 minutes
- B 3 hours 55 minutes
- C 4 hours 20 minutes
- D 6 hours 50 minutes
- E 7 hours 10 minutes

32 A container of syrup is weighed on a scale, as shown.



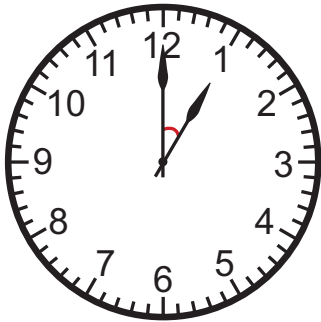
Some of the syrup is poured out of the container. Then it is weighed again, as shown.



What does the empty container weigh?

- A 80 g
- B 90 g
- C 110 g
- D 120 g
- E 150 g

- 33** The angle, measured clockwise, from the minute hand to the hour hand at 1:00 pm is 30° .



What will the angle, measured clockwise, from the hour hand to the minute hand be at 1:30 pm?

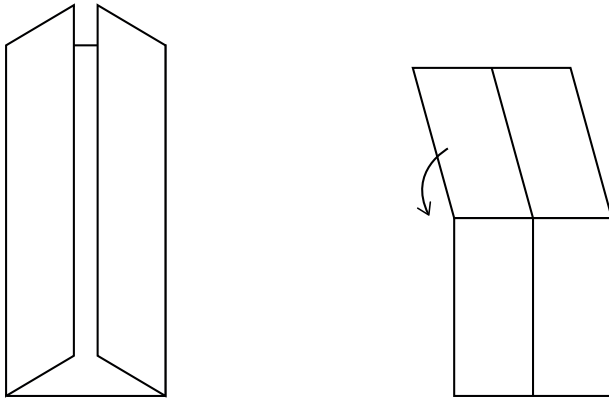
- A** 45°
 - B** 60°
 - C** 120°
 - D** 135°
 - E** 150°
- 34** The numbers 4 and 40 have highest common factor 4 and lowest common multiple 40.

A second pair of numbers also has highest common factor 4 and lowest common multiple 40.

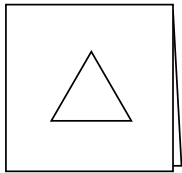
What is the sum of the second pair of numbers?

- A** 13
- B** 14
- C** 24
- D** 28
- E** 48

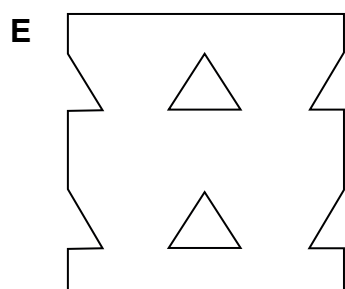
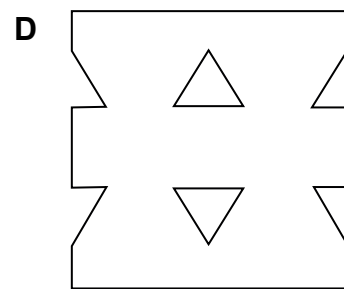
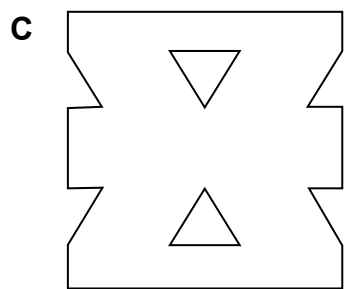
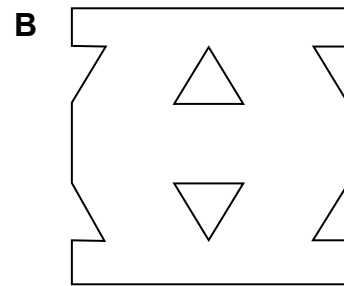
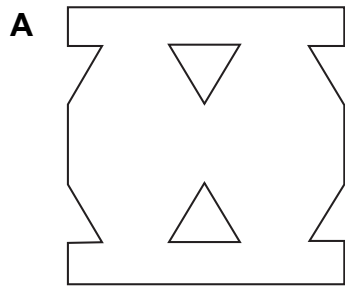
- 35 A square piece of paper is folded so that both edges meet in the middle, and then folded in half again, as shown below.



A triangle is then cut right through the centre of the folded paper.



Which of the following diagrams shows the paper when it is unfolded?



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