22 This cube has a side length of 10 cm.
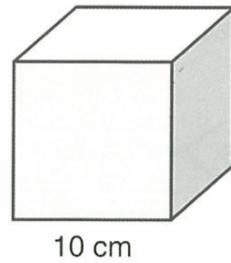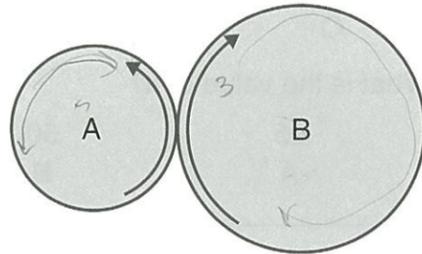
The lengths of the sides of the square base are reduced by 20% while the height remains unchanged.

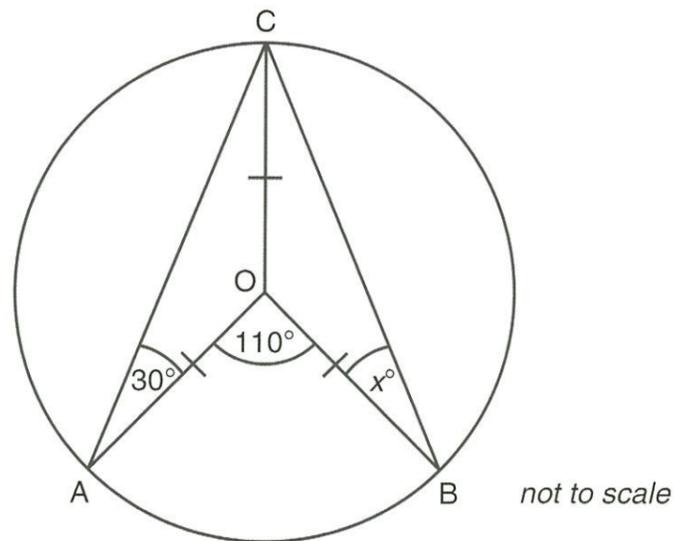By what percentage has the volume been reduced?

10 cm

20%	36%	40%	64%
A	**B**	**C**	**D**

23 Two wheels are connected in this way.

For every five revolutions of wheel A, wheel B revolves three times.

When wheel A revolves 60 times, how many times does wheel B revolve?

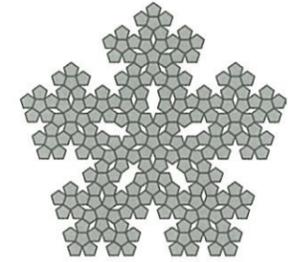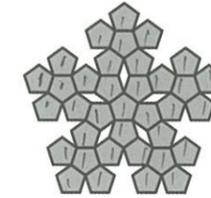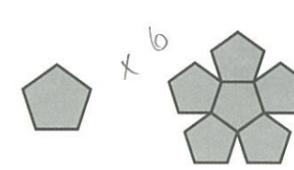| 36	58	100	180
A	**B**	**C**	**D**

24 In this diagram, O is the centre of the circle.

not to scale

What is the value of *x*?

25	30	40	55
A	**B**	**C**	**D**

25 These shapes are made by joining pentagons.

The number of pentagons in a shape is 6 times the number of pentagons in the previous shape.

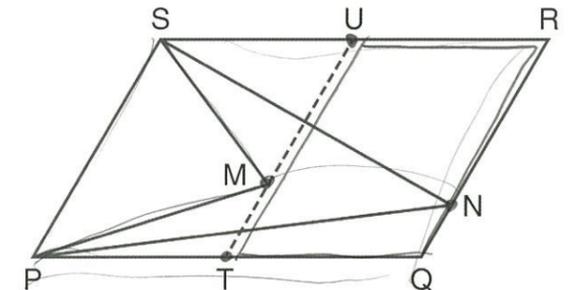Shape 1   Shape 2   Shape 3   Shape 4

How many pentagons are there in shape 4?

125	180	216	625
A	**B**	**C**	**D**

26 PQRS is a parallelogram.

T is the mid-point of PQ and U is the mid-point of RS.

N is any point on QR and M is any point on TU.

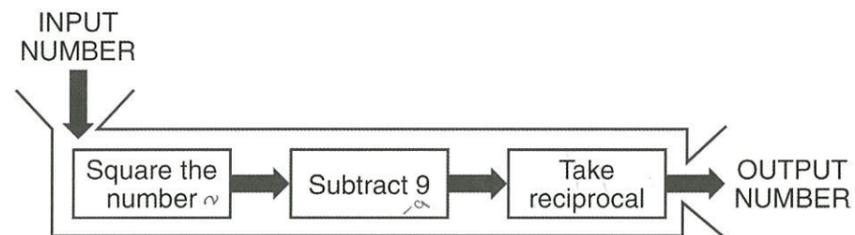Which of these is **not** equal to the area of quadrilateral PMSN?

A area of triangle PMS

B $\frac{1}{2}$ area of triangle PNS

C $\frac{1}{2}$ area of parallelogram TQRU

D $\frac{1}{2}$ area of parallelogram PQRS

27 What is the temperature shown on this gauge?

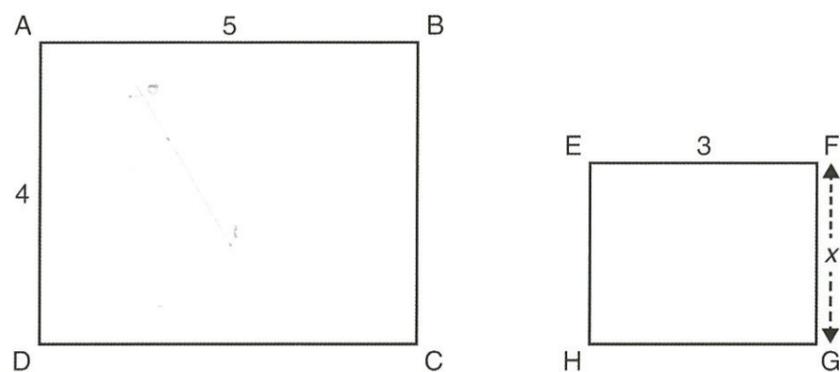| 23 °C	23.5 °C	26.5 °C	27 °C
A	**B**	**C**	**D**

28 This is an input–output machine.

INPUT
NUMBER

| Square the number n | → | Subtract 9 | → | Take reciprocal | → | OUTPUT NUMBER |

Sara wants the output number to be a real number.

Which of these **cannot** be the input number?

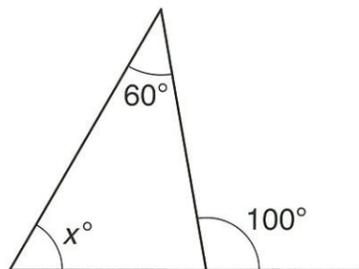| 0	–3 only	3 and –3	9
A	**B**	**C**	**D**

---

29 Rectangles ABCD and EFGH are similar, with dimensions as marked.
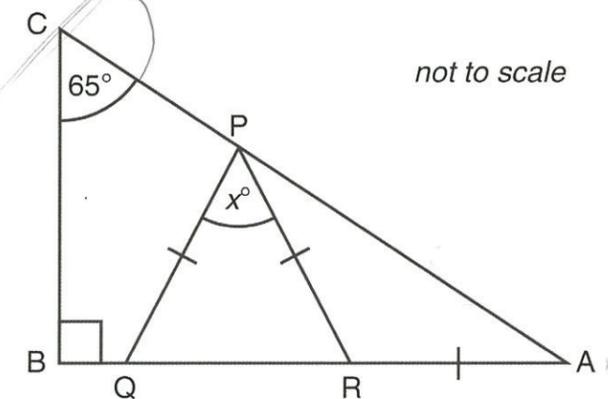
What is the value of x?

2.0	2.2	2.4	2.5
A	**B**	**C**	**D**

---

30 What is the value of x?

40	50	60	80
A	**B**	**C**	**D**

20 Line segments AR, PQ and PR are of equal length.

not to scale

What is the value of x?

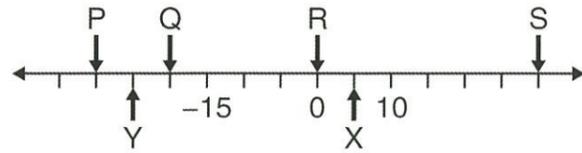| 25	50	77.5	80
A	**B**	**C**	**D**

---

21 L and N are the mid-points of QR and PR.

not to scale
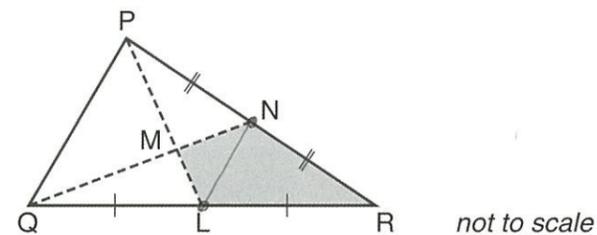
What fraction of the triangle PQR is shaded?

$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{4}{7}$
A	**B**	**C**	**D**

16 X and Y are two numbers marked on this number line.

At which point on the number line is the value of "X − Y"?

| point P	point Q	point R	point S
A	**B**	**C**	**D**

17 In a game, John rolls a fair six-sided dice and tosses a fair coin.

What is his probability of getting a 3 and a tail?

$\frac{1}{6}$	$\frac{1}{8}$	$\frac{2}{3}$	$\frac{1}{12}$
A	**B**	**C**	**D**

18 Which calculation gives the biggest answer?

$30+(-15) = 15$	$30-(-15) = 45$	$-30+(-15)$	$-30-(-15)$
A	**B**	**C**	**D**

19 This cone is placed inside a cube with side length 20 centimetres.
The diameter of the cone is equal to the side length of the cube.
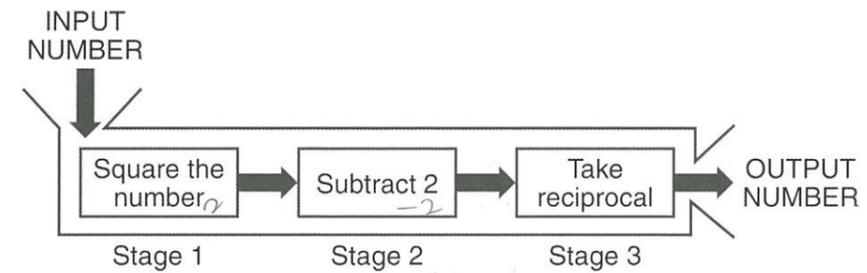The height of the cone is equal to the height of the cube.
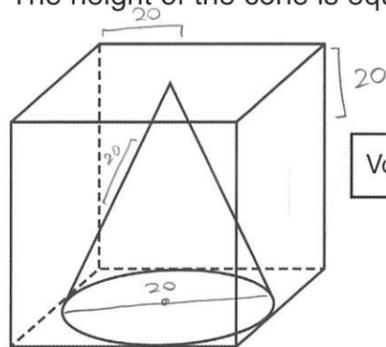
Volume of cone = $\frac{1}{3}$ × area of base × height

Which calculation gives the volume of the cone in cubic centimetres?

A $\frac{1}{3} \times 20^2 \times 20$

B $\frac{1}{3} \times \left(\frac{20}{2}\right)^2 \times 20$

C $\frac{1}{3} \times \pi \times 20^2 \times 20$

D $\frac{1}{3} \times \pi \times \left(\frac{20}{2}\right)^2 \times 20$
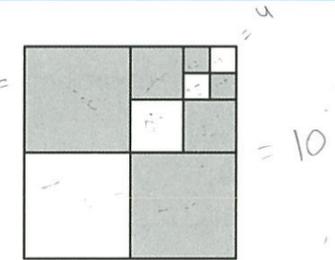
31 This is an input–output machine.

The input number is $-1\frac{1}{2}$.
What is the output number?

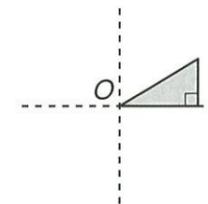| $-\frac{1}{5}$	$-\frac{4}{17}$	1	4
A	**B**	**C**	**D**

32 The grey shapes and the white shapes in this diagram are squares.

What fraction of the overall shape is shaded grey?

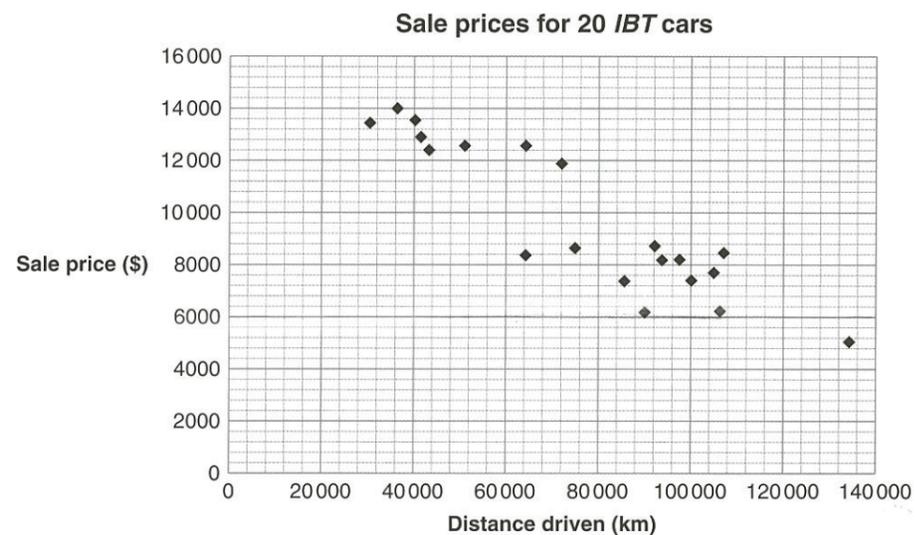| $\frac{3}{4}$	$\frac{11}{21}$	$\frac{11}{32}$	$\frac{21}{32}$
A	**B**	**C**	**D**

33 The triangle is rotated one half-turn about point *O*.

Which diagram shows the new position of the triangle?

| **A** | **B** | **C** | **D** |

34 The sale price of a particular type of car depends on the distance it has been driven.
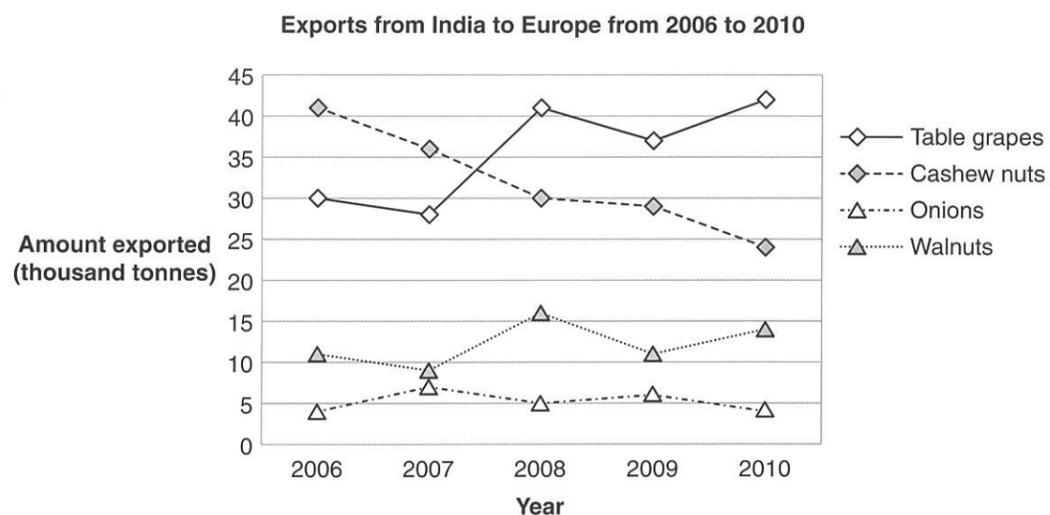
Sale prices for 20 *IBT* cars

Toshi's *IBT* car has been driven 60,000 kilometres.

Using this data, approximately what sale price can Toshi expect for his *IBT* car?

$5000	$11 000	$60 000	$89 000
(A)	**B**	**C**	**D**

---

35 The graph shows the amounts of four foods that India exported to Europe from 2006 to 2010.

Exports from India to Europe from 2006 to 2010

Which export changed by the greatest amount from 2006 to 2010?

Table grapes	Cashew nuts	Onions	Walnuts
(A)	**B**	**C**	**D**

13

○ weighs 1 gram

⬡ weighs *c* grams

△ weighs *e* grams

What is the total weight of the following in grams?

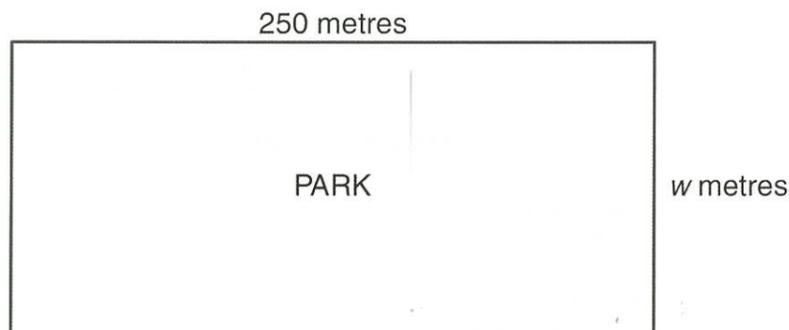| $5c + 3e + 2$	$c + e + 2$	10	$10ec1$
(A)	**B**	**C**	**D**

---

14 A 20 litre solution is 85% paint and 15% thinner.

Five litres of thinner is added to this solution.

What percentage of the new solution is **paint**?

25%	68%	80%	85%
A	**B**	**(C)**	**D**

---

15 The length of this rectangular park is 250 metres.
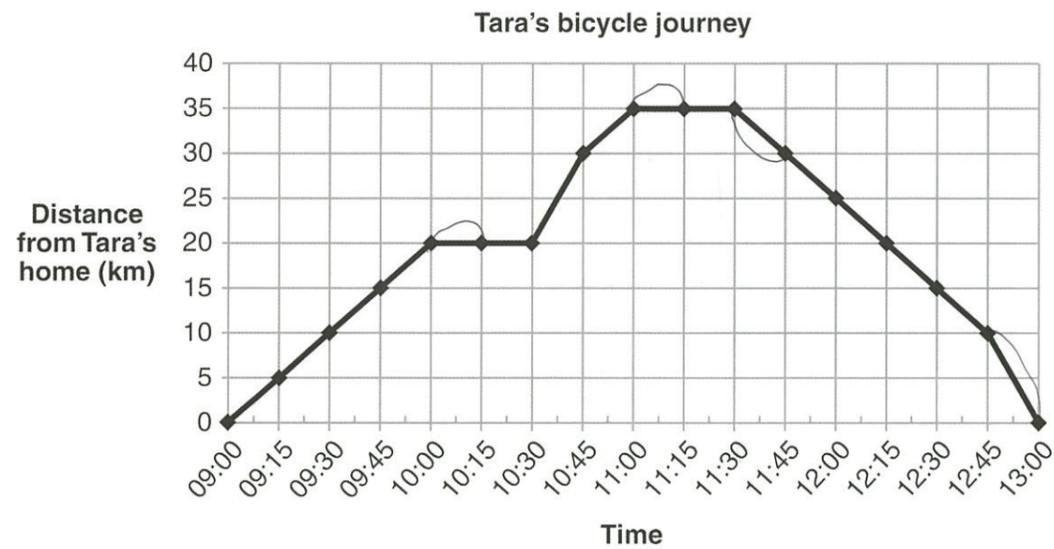
The perimeter of the park is P metres.

250 metres

PARK w metres

Which calculation **cannot** give the width (w) of the park in metres?

| $w = \dfrac{P}{2} - 125$	$w = \dfrac{P}{2} - 250$	$w = \dfrac{1}{2}(P - 500)$	$w = \dfrac{P - 500}{2}$
A	**(B)**	**C**	**D**

10 Tara rides a bicycle to the shop. She takes the same route back home.
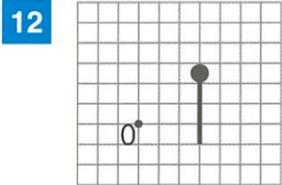
This graph shows Tara's journey.

Tara's bicycle journey

When did Tara start to return home?

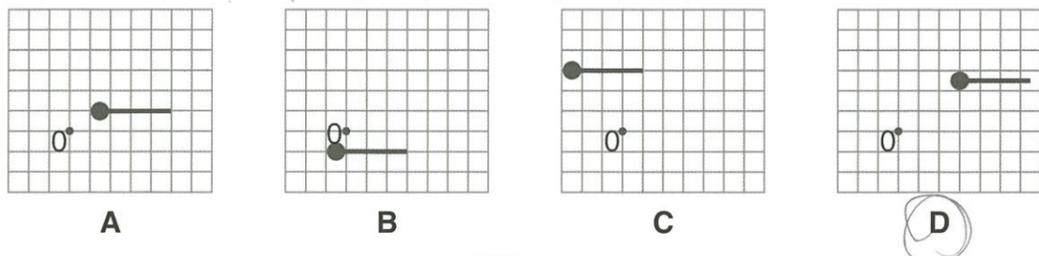| 10:00	11:00	11:30	13:00
A	B	C	D

11 All faces of this cube are painted.

It is cut along the dashed lines to get 64 smaller cubes.

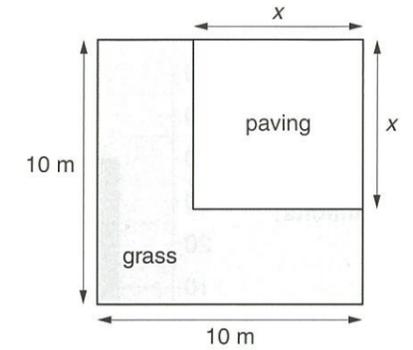How many of the smaller cubes **do not** have any painted faces?

4	8	24	32
A	B	C	D

12
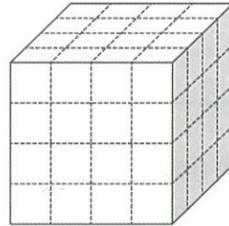
A shape is rotated anticlockwise through 90° about point 0.

Which picture shows the new position of the shape on the grid?

A	B	C	D

36 This is a plan view of a garden.

The grass (shaded) has an area of 64 square metres.

What is the length of the sides labelled x?

5.5 m	6.0 m	6.8 m	9.0 m
A	B	C	D

37 Box 1 has twice the volume of Box 2.
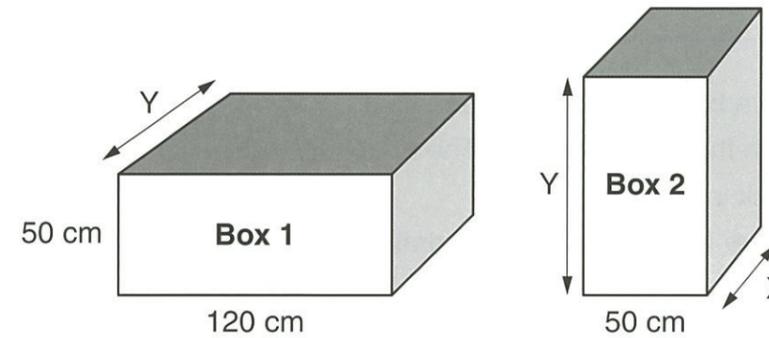
What is the value of X?

25 cm	48 cm	60 cm	70 cm
A	B	C	D

38
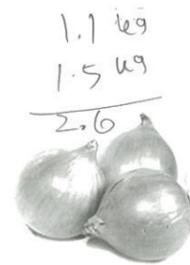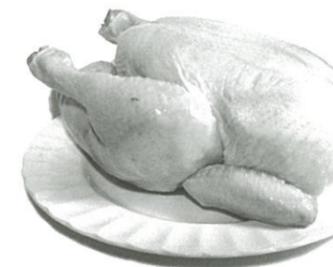
Onions 500 grams   Chicken 1.5 kg   Tomatoes 600 grams

What is the total weight of these items?

1.25 kilograms	1.61 kilograms	2.6 kilograms	12.5 kilograms
A	B	C	D

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39

Soft Drink Sales

☐ Cherry Cola
■ Lemon Cola

Number of cans (millions)

Year

The graph shows the sales of two types of soft drink over 4 years. If the sales trends continue for the next 10 years, determine the year in which the sales of Cherry Cola will be the same as the sales of Lemon Cola.

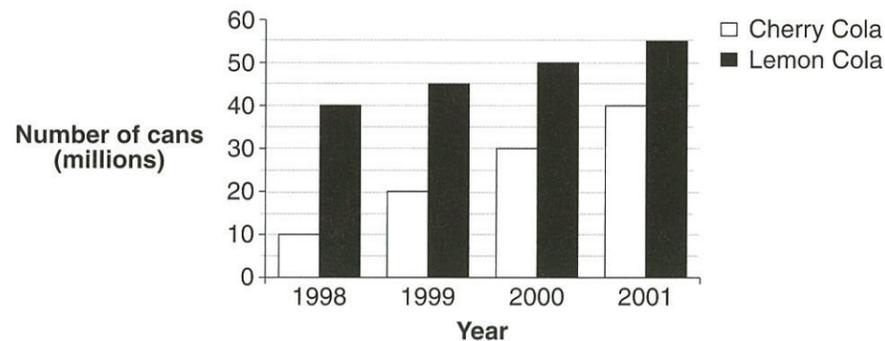| 2003	2004	2005	2006
A	**B**	**C**	**(D)**

40 There are 10 marbles in a bag: 5 red and 5 blue.

Sue draws a marble from the bag at random. The marble is red.

She puts the marble back into the bag.

What is the probability that the next marble she draws at random is red?

$\frac{1}{2}$	$\frac{4}{10}$	$\frac{1}{5}$	$\frac{1}{10}$
A	**(B)**	**C**	**D**

41 The diameter of this circle is 20 cm.

Three-quarters of the circle is shaded.

Which calculation gives the area of the shaded region?
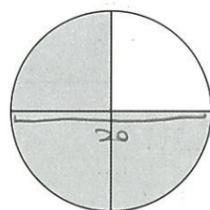
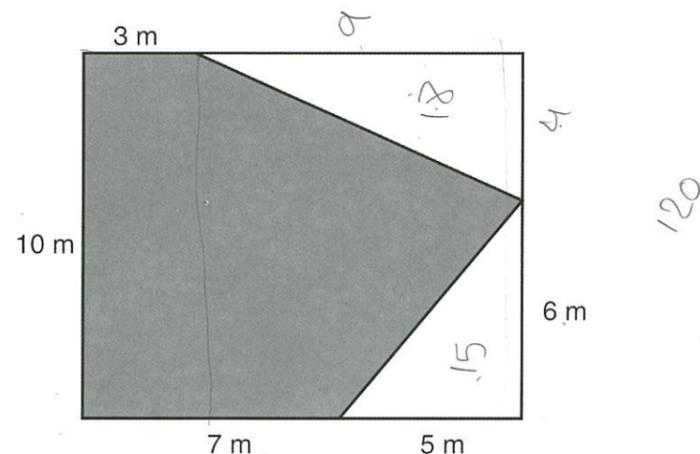| $\frac{3}{4} \times \pi \times 10^2$	$\frac{3}{4} \times \pi \times 10$	$\frac{3}{4} \times \pi \times 20^2$	$\frac{3}{4} \times \pi \times 20$
A	**B**	**C**	**(D)**

42 There are 5 red apples and 7 green apples in a bag.

What fraction of the apples in the bag are red?

$\frac{1}{5}$	$\frac{1}{7}$	$\frac{5}{7}$	$\frac{5}{12}$
A	**B**	**C**	**(D)**

6 In this rectangle some side lengths are shown.

3 m

10 m

6 m

7 m   5 m

What is the area of the shaded region in square metres?

36	75	87	90
A	**B**	**(C)**	**D**

7 A woman takes $3000 on a vacation and spends $150 each day.

Which expression gives the amount she has in dollars after n days?

$150n$	$2850n$	$3000 + 150n$	$3000 - 150n$
A	**B**	**C**	**(D)**

8 Ali rides a bicycle for one hour.

For the first 20 minutes his average speed is 18 km/h.

For the next 40 minutes his average speed is 15 km/h.

What is his overall average speed?

16 km/h	16.5 km/h	17 km/h	17.5 km/h
A	**(B)**	**C**	**D**

9 This is a pattern of shapes made with matchsticks.

Shape 1   Shape 2   Shape 3   Shape 4
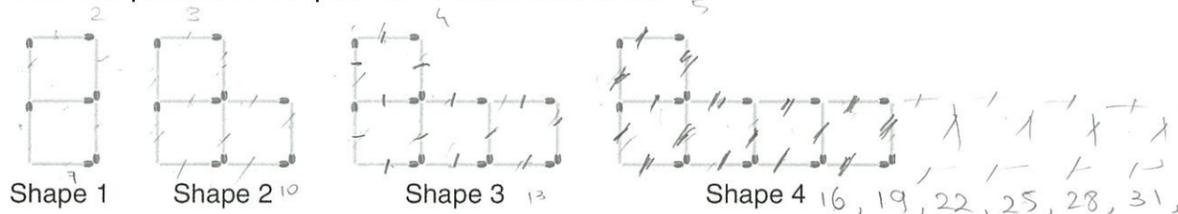
How many matchsticks will shape 10 have?

22	27	34	44
A	**B**	**(C)**	**D**

1 PQRS is a rectangle.

The lengths of PM and QM are shown in the diagram.

What is the value of x?

$6x - 8 = 2x + 4$
$6x - 2x = 8 + 4$
$\dfrac{4x}{4} = \dfrac{12}{4} = 3$

Diagram: rectangle PQRS with diagonals meeting at M. Top-left P, top-right S, bottom-left Q, bottom-right R. Segment labelled $6x - 8$ near top-left, segment labelled $2x + 4$ near bottom-left.

$\dfrac{1}{2}$	1	3	8
A	B	C	D

(C circled)
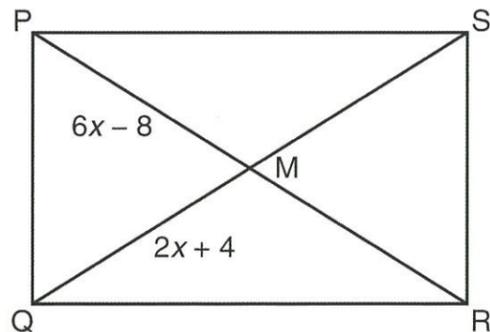
2 At a sports club, each student must choose one indoor sport and one outdoor sport from the list.

How many possible combinations of sports are there?

Indoor	Outdoor
Badminton	Cricket
Basketball	Football
Table tennis	Hockey
	Rugby

12	9	7	2
A	B	C	D

(D circled)

3 The total cost of a tablet device comprises the cost of material, labour and overheads in the ratio 3 : 4 : 1.

The cost of material is $315.

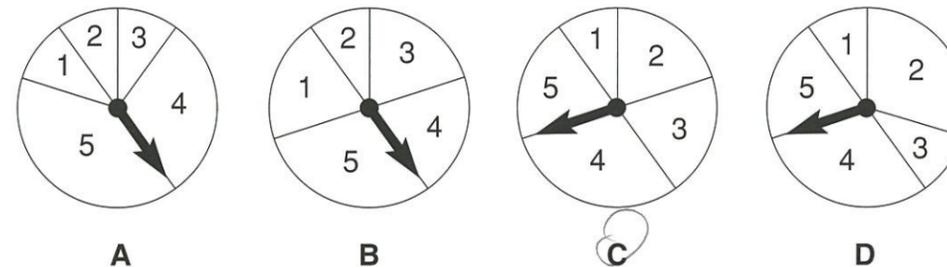What is the total cost of the tablet?

$525	$735	$840	$945
A	B	C	D

(B circled)

4 Which of these numbers is the largest?

3.2	3.154	3.0007	3.00125
A	B	C	D

(A circled)

5 The area of a chopping board is 0.3 m².

What is this area in square centimetres?

30 cm²	300 cm²	3000 cm²	30,000 cm²
A	B	C	D

(A circled)

43 Which of these spinners has the greatest chance of showing an even number?

Spinner A: sections 1, 2, 3, 4, 5.
Spinner B: sections 1, 2, 3, 4, 5.
Spinner C: sections 1, 2, 3, 4, 5.
Spinner D: sections 1, 2, 3, 4, 5.

A	B	C	D

(C circled)

44 A clear glass cube has 6 of its edges painted black.

Diagram: a cube with arrow labelled X pointing towards it.
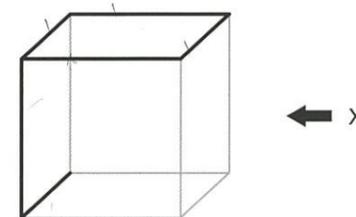
What does it look like from point X?

A	B	C	D

(A circled)
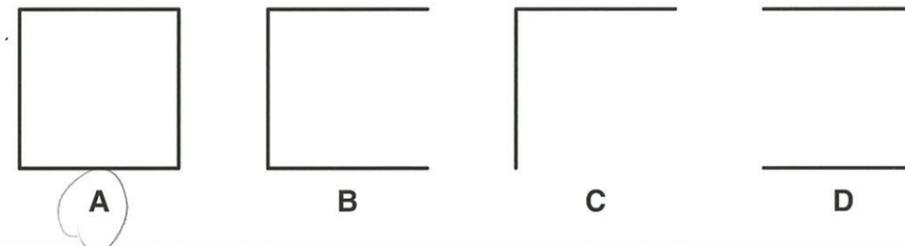
45 Dan wants to draw a pie chart using the information in the table.

Favourite activity	Number of people
Watch movies	12
Listen to music	7
Play sport	16
Other	5

The graph will have a sector for each activity.

What is the size of the sector angle for the activity 'Watch movies'?

30°	54°	63°	108°
A	B	C	D

(B circled)

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Mathematics
& Science

Mathematics

STUDENT NAME _____

NAME OF SCHOOL _____

TEST INSTRUCTIONS

FILL IN YOUR DETAILS

Turn to your ANSWER SHEET and fill in your name, school, grade, section, today's date, your date of birth and gender.

ANSWERING QUESTIONS

Go to the MATHEMATICS ANSWER SHEET.

This test has **45 QUESTIONS**. Each question has four possible options.

Choose the BEST answer from the four options, **A, B, C** or **D**.

FILL in ONE circle on your answer sheet with a pencil.

If you make a mistake, erase the pencil mark and fill in a different circle.

You must colour the entire circle as shown below:

Correct response	Incorrect responses			
● ✓	Line	Very light pencil	Pen	Colored pencil

Marks are NOT deducted for incorrect answers.

ALL ANSWERS SHOULD BE MARKED ON YOUR ANSWER SHEET ONLY.

EQUIPMENT ALLOWED IN THIS TEST

You may use a 2B or B pencil for this test. You may NOT use a calculator for this test.

TIME ALLOWED FOR TEST

The time allowed to complete this test is **60 minutes**.

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ACER

ACER