




Student Name			
Gender		Date of Birth	
Subject	<b>MATHEMATICS</b>	Student ID	<b>N0008</b>
School Name	<b>TOWHEED IRANIAN SCHOOL</b>		
Grade	<b>10</b>	Section	
 168-M-N0008-10-1 2101			



## Mathematics

### 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:

<b>Correct response</b> 	<b>Incorrect responses</b> 
	Line    Very light pencil    Pen    Colored pencil

Marks are NOT deducted for incorrect answers.

**ALL ANSWERS SHOULD BE MARKED ON YOUR ANSWER SHEET ONLY.**

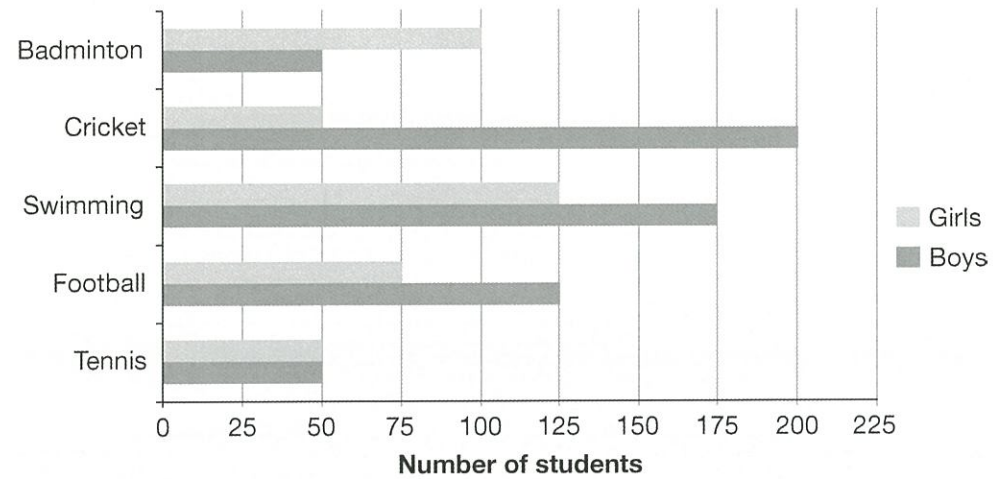
#### EQUIPMENT ALLOWED IN THIS TEST

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**.

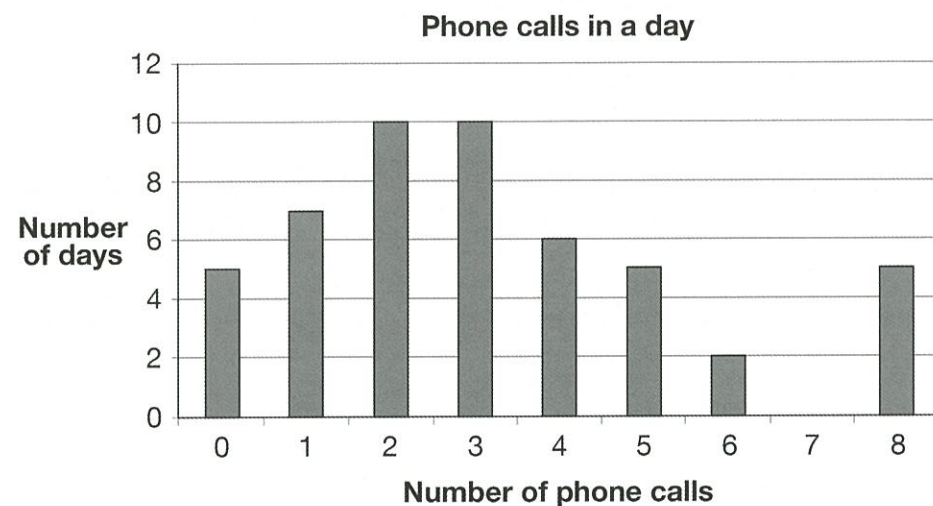
- 1 This chart shows the number of students playing different sports in a school. Each student takes part in only one sport.



One student is selected at random from the swimming group. What is the probability of this student being a girl?

- $\frac{125}{300}$        $\frac{125}{400}$        $\frac{175}{300}$        $\frac{125}{1000}$   
**A**            **B**            **C**            **D**

- 2 This chart shows the number of phone calls received by a helpdesk.



Based on the above results, what is the probability that there will be no phone calls on a given day?

- $\frac{1}{8}$              $\frac{1}{9}$              $\frac{1}{10}$              $\frac{7}{50}$   
**A**            **B**            **C**            **D**

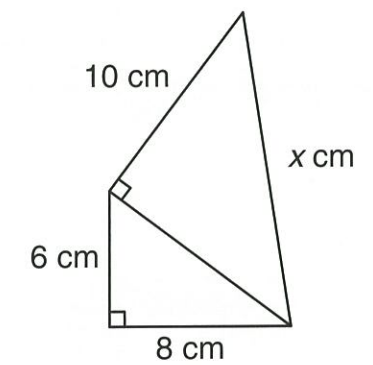
- 42 The Dolphins water polo team has played 5 games so far this season.
- The mean number of goals per game scored by the Dolphins is 4.4.
  - The range of the goals per game scored by the Dolphins is 6.

Which of these lists could be the number of goals scored by the Dolphins?

- A** 1, 5, 4, 6, 6  
**B** 2, 5, 4, 8, 3  
**C** 0, 2, 5, 5, 6  
**D** 3, 4, 4, 5, 6

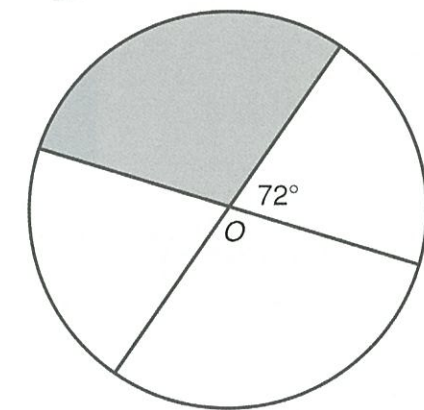
- 43 What is the length of the side marked  $x$ ?

- A**  $4\sqrt{5}$   
**B**  $4\sqrt{50}$   
**C**  $2\sqrt{10}$   
**D**  $10\sqrt{2}$



- 44 What fraction of the circle is shaded?

- A**  $\frac{1}{3}$   
**B**  $\frac{1}{4}$   
**C**  $\frac{3}{5}$   
**D**  $\frac{3}{10}$



- 45  $2x + a = b$   
What is  $x$ ?

- $\frac{b}{2} + a$        $\frac{b}{2} - a$        $\frac{b+a}{2}$        $\frac{b-a}{2}$   
**A**            **B**            **C**            **D**

38 Two fair dice are rolled. The grid shows the possible results.

	6	.	.	.	.	.	.
	5	.	.	.	.	.	.
Dice A	4	.	.	.	.	.	.
	3	.	.	.	.	.	.
	2	.	.	.	.	.	.
	1	.	.	.	.	.	.
	1	2	3	4	5	6	
	Dice B						

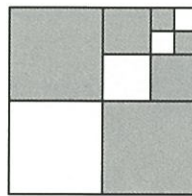


What is the probability that the sum of the two dice is 10?

- $\frac{2}{12}$ 
 $\frac{3}{12}$ 
 $\frac{2}{36}$ 
 $\frac{3}{36}$
- A
B
C
D

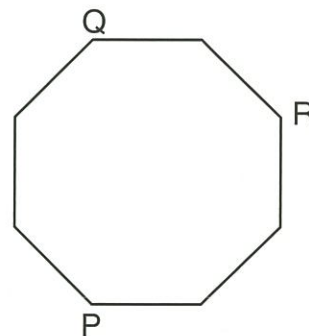
39 The grey shapes and the white shapes in this diagram are squares. What is the ratio of the white area to the grey area in the diagram?

- 11:21
11:32
21:32
21:64
- A
B
C
D



40 A regular octagon is cut into three pieces along PQ and PR. What three shapes are formed?

- A rectangle, rhombus, rhombus
B rhombus, trapezium, trapezium
C trapezium, trapezium, kite
D kite, triangle, triangle



41  $(2\frac{1}{4})^2 =$

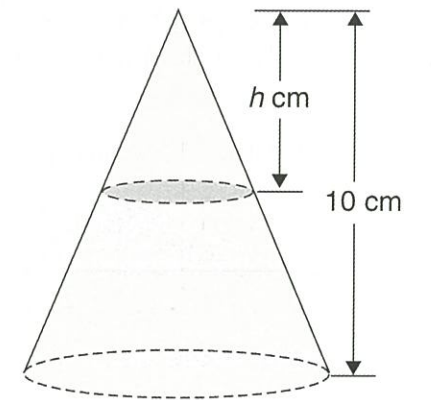
- $1\frac{1}{2}$ 
 $4\frac{1}{16}$ 
 $4\frac{1}{2}$ 
 $5\frac{1}{16}$
- A
B
C
D

3 A metal worker has a brass cone of height 10 cm.

He cuts it along the shaded portion parallel to the base to get a smaller cone of height  $h$  cm.

What is the ratio of the **volume** of the smaller cone to the larger cone?

- A  $h:10$ 
B  $h^2:10^2$ 
C  $h^3:(10-h)^3$ 
D  $h^3:10^3$



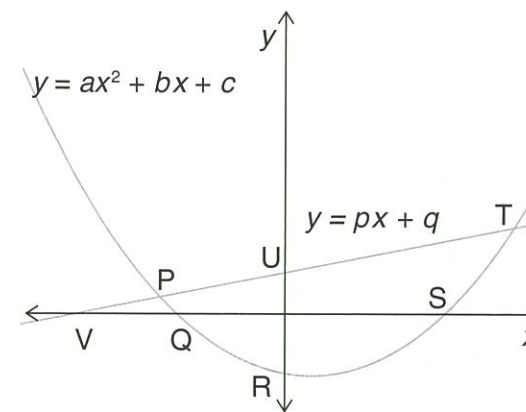
4 The speed of light is  $3 \times 10^5$  kilometres per second.

A beam of light from the nearest star takes about 4 years to reach Earth.

About how far away from Earth is the nearest star?

- A  $3.8 \times 10^{13}$  kilometres
B  $1.6 \times 10^{12}$  kilometres
C  $6.3 \times 10^{11}$  kilometres
D  $1.2 \times 10^6$  kilometres

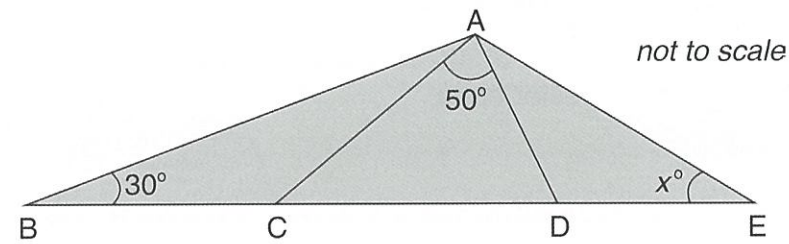
5 This is a graph of the equations  $y = ax^2 + bx + c$  and  $y = px + q$ .



Which points on the graph will give the solution to the equation  $ax^2 + bx + c = px + q$ ?

- A V, Q and S
B U and R
C Q and S
D P and T

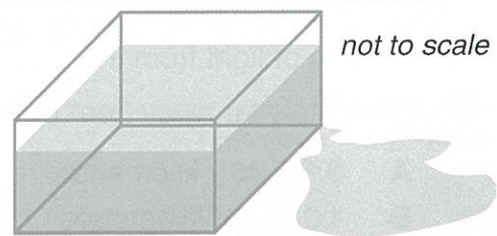
6 In this diagram BE is a straight line segment, CA = CB and DE = DA.



What is the value of  $x$ ?

- 30  
**A**
- 35  
**B**
- 70  
**C**
- 100  
**D**

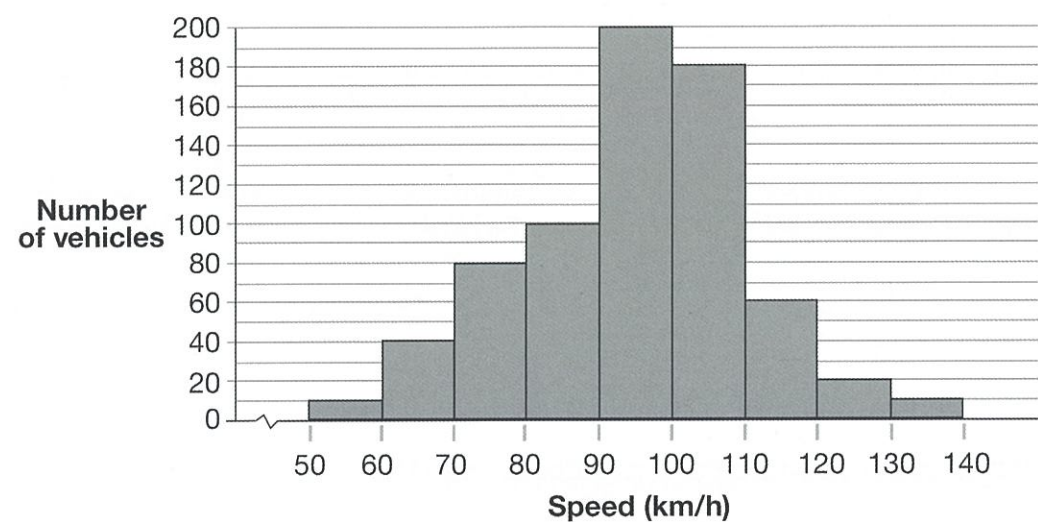
7 A large water tank is in the shape of a rectangular prism (cuboid) with a square base. When 60 kilolitres of water leaks from the tank, the water level drops by 15 cm.



What is the side length of the base of the tank?

- 9 m  
**A**
- $2\sqrt{10}$  m  
**B**
- 20 m  
**C**
- 200 m  
**D**

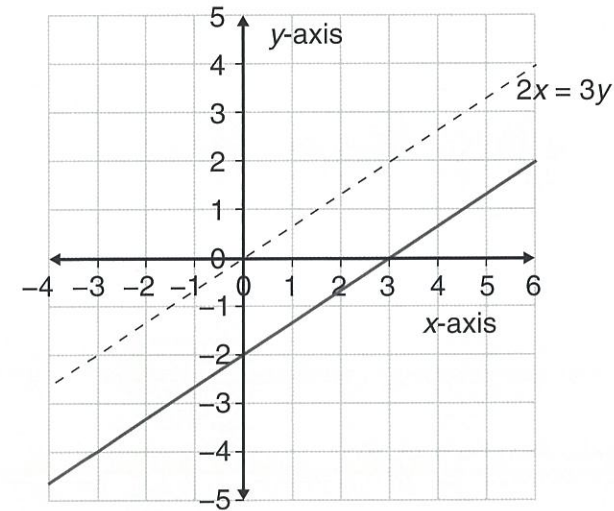
8 The speed of 700 vehicles on a section of a highway were recorded for one hour. This chart shows the results recorded.



About what percentage of vehicles were recorded with a speed of 100 km/h or above?

- 12%  
**A**
- 39%  
**B**
- 67%  
**C**
- 90%  
**D**

35 The dotted line  $2x = 3y$  passes through the origin.



What is the equation of the solid line?

- $2x = 3y + 2$   
**A**
- $2x = 3y - 2$   
**B**
- $2x = 3y + 6$   
**C**
- $2x = 3y - 6$   
**D**

36 When Melanie shoots the basketball, it goes into the hoop 70% of the time.

She has 20 practice shots.

How many times is the basketball expected to go into the hoop?

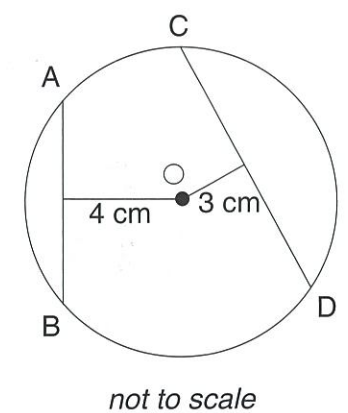
- A** 7
- B** 10
- C** 14
- D** 17



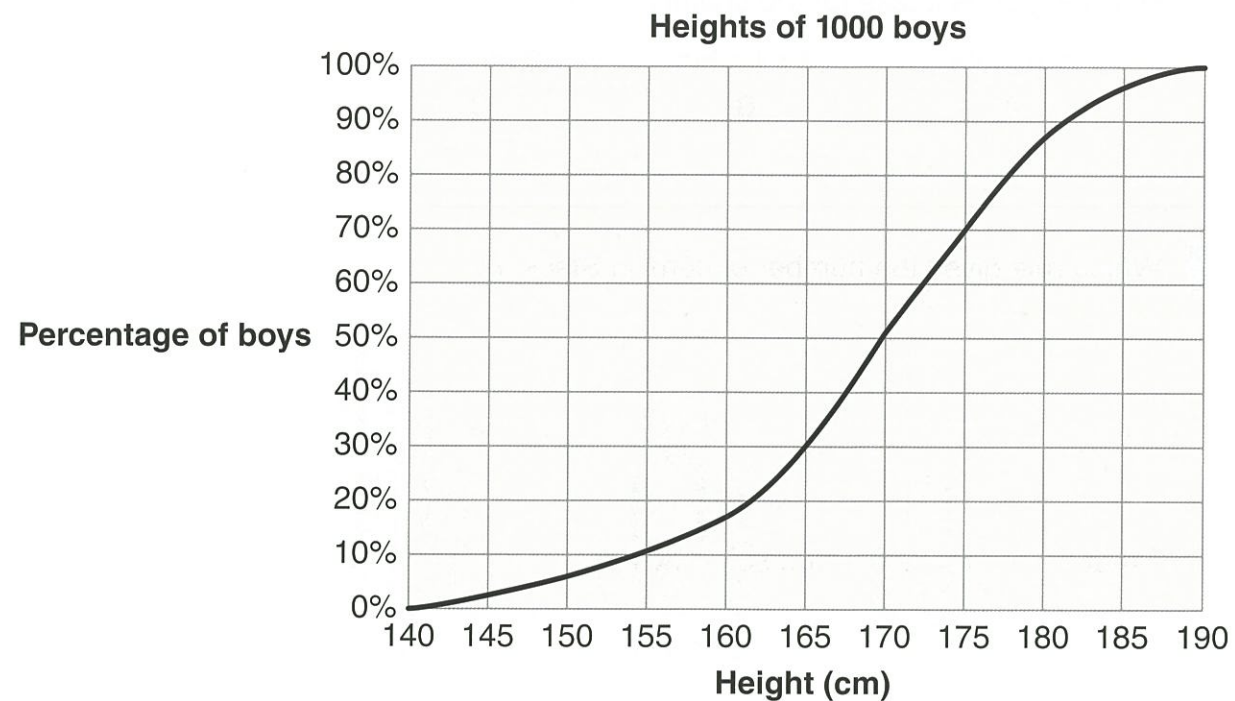
37 Chord AB is 6 cm long. The midpoint of Chord AB is 4 cm from the centre of the circle. The midpoint of Chord CD is 3 cm from the centre of the circle.

How long is Chord CD?

- A** 5 cm
- B** 6 cm
- C** 7 cm
- D** 8 cm



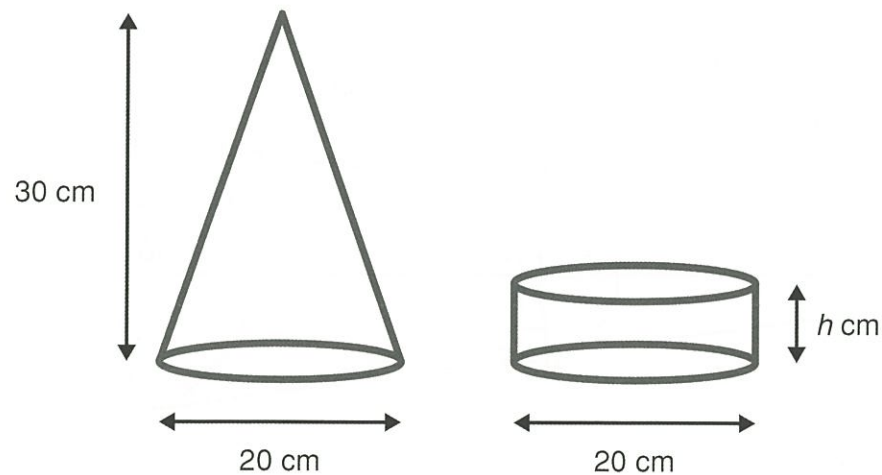
33 The graph shows the cumulative frequency data for the heights of 1000 teenage boys.



What percentage of these boys are taller than 175 cm?

- A 30%      B 55%      C 70%      D 75%

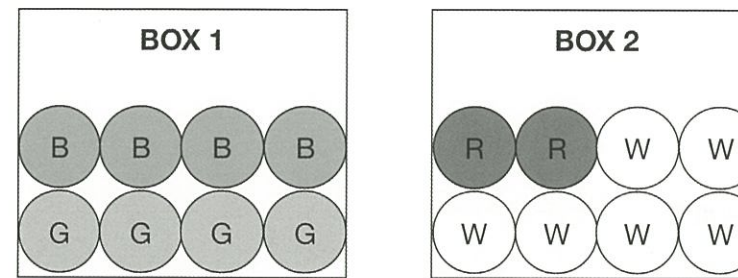
34 The volume of a cone is given by the rule  $V = \frac{1}{3} \pi r^2 h$ .



The volume of this cone is twice the volume of this cylinder. What is the height of the cylinder?

- A 2 cm      B 5 cm      C 6 cm      D 10 cm

9 Box 1 has four blue and four green balls. Box 2 has two red and six white balls.



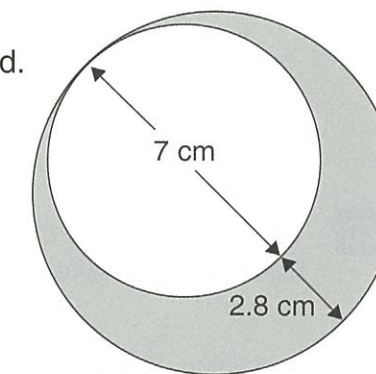
One ball is drawn at random from each box.

What is the probability of getting a green ball and a red ball?

- A  $\frac{1}{8}$       B  $\frac{1}{4}$       C  $\frac{3}{8}$       D  $\frac{3}{4}$

10 In this diagram, the lengths along the diameters are marked. Which calculation gives the area of the shaded portion?

- A  $\pi \times (4.9 - 3.5)^2$   
 B  $\pi \times (4.9^2 - 3.5^2)$   
 C  $\pi \times (7^2 - 2.8^2)$   
 D  $\pi \times (9.8^2 - 7^2)$



11 The time spent (in minutes) by 15 people waiting in a queue at a ticket counter is shown below.

0, 0, 2, 6, 2, 0, 0, 4, 5, 2, 7, 8, 0, 4, 5

What is the average waiting time in minutes?

- A 0      B 2      C 3      D 8

12 What is  $2x^2y \times 3xy^3$  equal to?

- A  $5x^2y^3$       B  $5x^3y^4$       C  $6x^2y^3$       D  $6x^3y^4$

13 Follow these instructions:

- start with  $x$
- add 4
- double the result
- now subtract 2
- then halve the result

What expression gives the result?

$x + 1$   
**A**

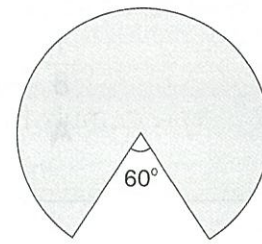
$x + 3$   
**B**

$x + 4$   
**C**

$x + 8$   
**D**

14 A sector has been cut out from a circular piece of cardboard of radius 21 cm.

What is the perimeter of the remaining piece of cardboard?  
(Use  $\pi = \frac{22}{7}$ )



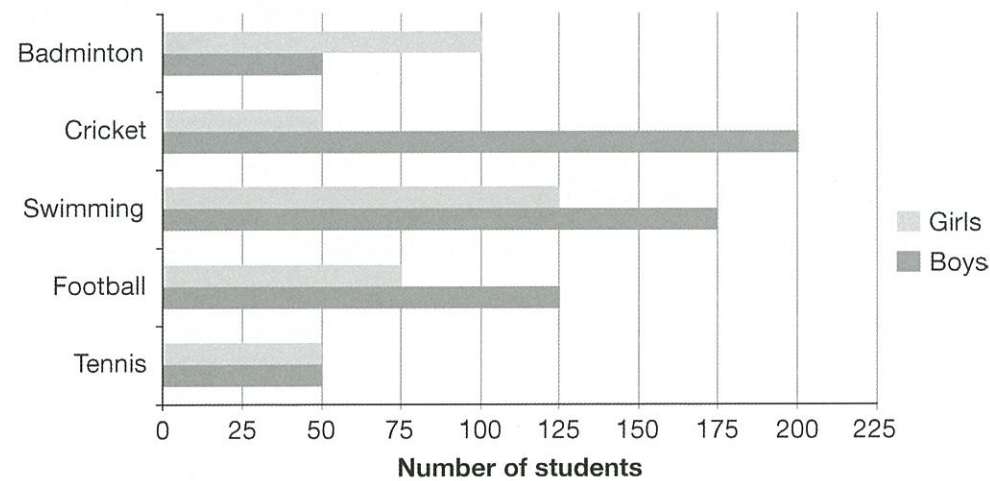
130 cm  
**A**

141 cm  
**B**

152 cm  
**C**

174 cm  
**D**

15 This chart shows the sports played by 1000 students in a school. Each student takes part in only one sport.



A student makes a pie chart, showing the total number of students playing each sport.

What should the sector angle for Swimming be on the pie chart?

$1.2^\circ$   
**A**

$72^\circ$   
**B**

$108^\circ$   
**C**

$154^\circ$   
**D**

30 A chairlift travels at 5 metres per second.

How long does it take for the chairlift to travel 3 kilometres?

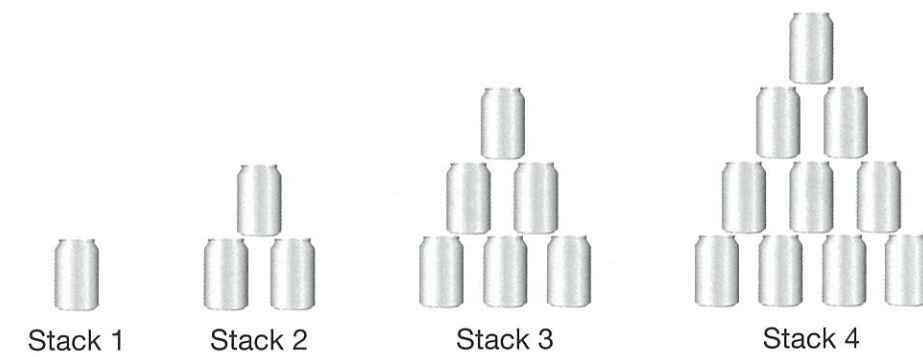
1 minute  
**A**

6 minutes  
**B**

10 minutes  
**C**

15 minutes  
**D**

31 Which rule gives the number of cans in Stack  $n$ ?



$2n - 1$   
**A**

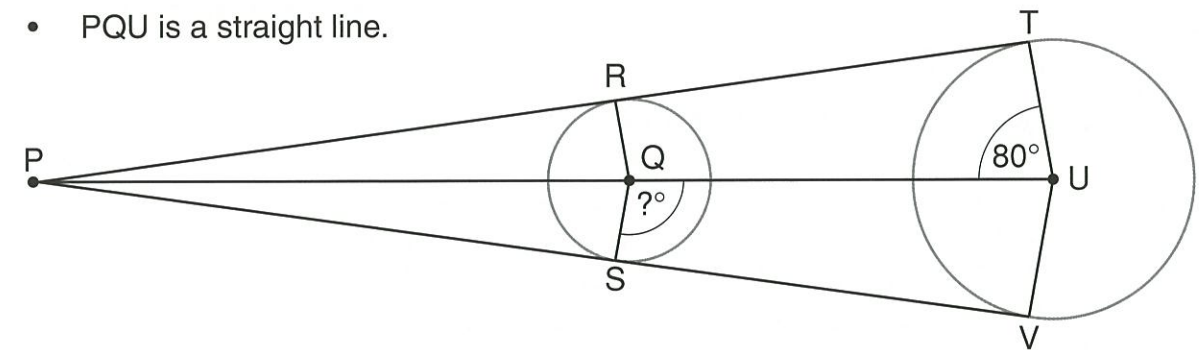
$2n + n$   
**B**

$\frac{n^2 - 1}{2}$   
**C**

$\frac{n(n + 1)}{2}$   
**D**

32 The diagram shows two circles with centres at Q and U.

- Lines PRT and PSV are tangents to both circles.
- Radii meet the tangents at points R, S, T and V.
- PQU is a straight line.

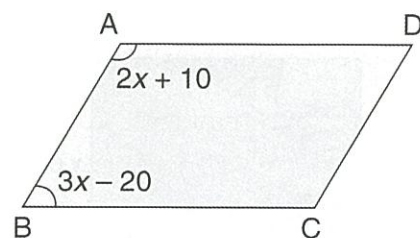


What is the size of  $\angle UQS$ ?

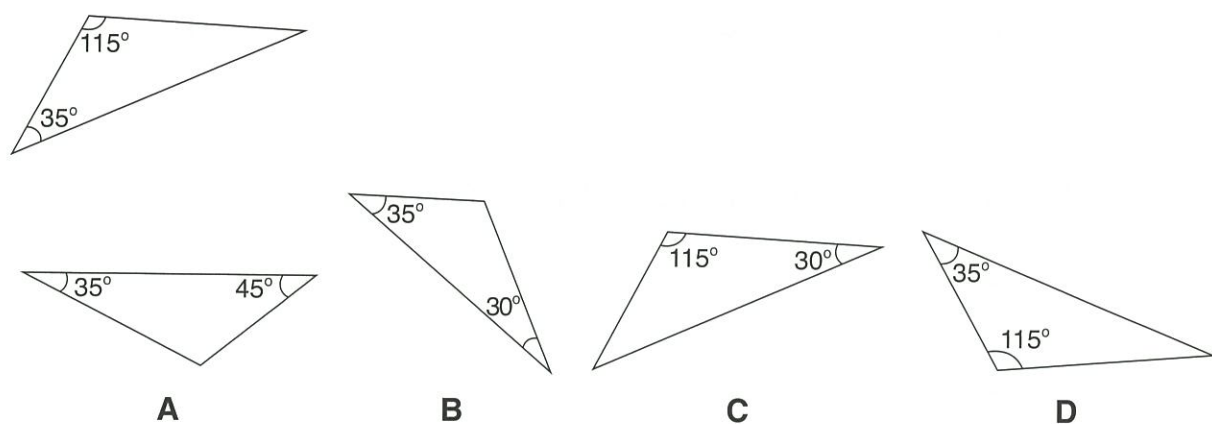
- A**  $80^\circ$
- B**  $90^\circ$
- C**  $100^\circ$
- D**  $110^\circ$

26 ABCD is a parallelogram.  
What is the value of  $x$ ?

- A 20
- B 30
- C 34
- D 38



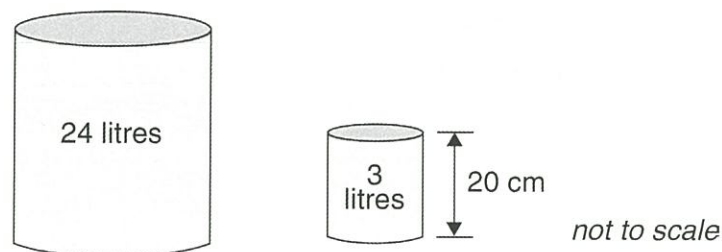
27 Which triangle is **not** similar to the triangle below?



28 Which expression is equivalent to  $(a + 3)^2 - 9$ ?

- A  $a^2 + 6a$
- B  $a^2$
- C  $2a - 3$
- D  $a$

29 These two cans of paint are similar cylinders.



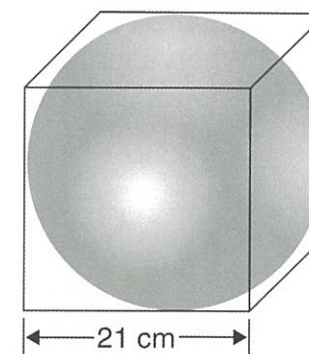
What is the height of the larger can?

- A 40 cm
- B 41 cm
- C  $40\sqrt{2}$  cm
- D 160 cm

16 A ball is placed inside a cubical box such that it touches all the faces of the box.

The side length of the box is 21 cm.  
Which calculation gives the volume of the space **not** occupied by the ball?

- A  $21^2 - \pi (10.5^2)$
- B  $21^3 - \frac{4}{3}\pi (10.5^3)$
- C  $21^3 - \pi (10.5^3)$
- D  $6 \times 21^2 - 4\pi (10.5^2)$



17 The formula to calculate a person's Body Mass Index (BMI) is:

$$\text{BMI} = \frac{\text{mass in kilograms}}{(\text{height in metres})^2}$$

This table shows what the BMI numbers mean.

BMI	Classification of the person's weight
Less than 18.5	Underweight
From 18.5 to less than 25	Normal weight
From 25 to less than 30	Overweight
30 or more	Obese

A student is 160 cm tall and has a weight of 58 kg.

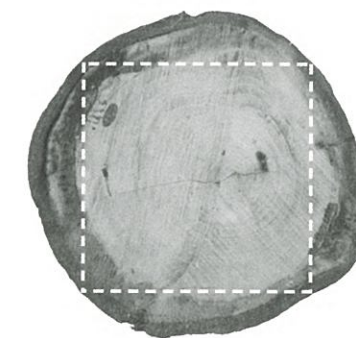
Which BMI category is the student classified as?

- A Underweight
- B Normal
- C Overweight
- D Obese

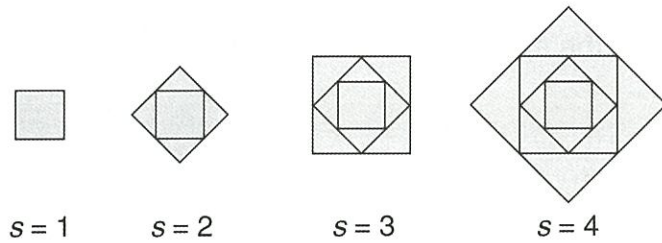
18 This log is circular, with a diameter of 2 metres.

What is the area of the largest square cross-section that can be cut from the log?

- A  $\frac{1}{2} \text{ m}^2$
- B  $1 \text{ m}^2$
- C  $\sqrt{2} \text{ m}^2$
- D  $2 \text{ m}^2$



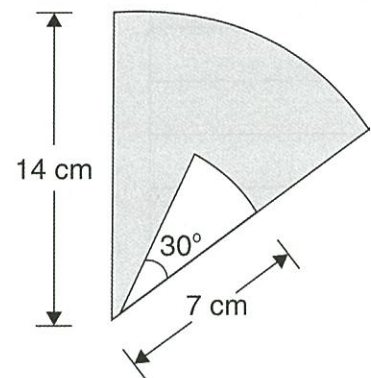
- 19 Squares are added and rotated to form a pattern. When squares are added, triangles are formed.



Which rule relates the number of triangles ( $t$ ) to the number of squares ( $s$ ) in the shapes?

- A  $t = 4$       B  $t = 4s$       C  $t = s^2$       D  $t = 4s - 4$

- 20 This diagram shows two sectors of circles with radii 7 cm and 14 cm. The angle at the centre of the larger sector is twice that of the smaller sector.



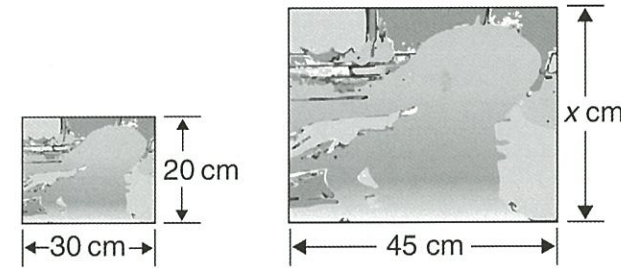
Which calculation gives the area of the shaded region?

- A  $\pi 14^2 - \pi 7^2$       B  $\frac{\pi 14^2}{6} - \frac{\pi 7^2}{6}$       C  $\frac{\pi 14^2}{6} - \frac{\pi 7^2}{12}$       D  $\frac{\pi 14^2}{60} - \frac{\pi 7^2}{30}$

- 21 What are the factors of  $x^2 + 2x - 15$ ?

- A  $(x + 3)$  and  $(x - 5)$   
 B  $(x - 3)$  and  $(x + 5)$   
 C  $(x + 3)$  and  $(x + 5)$   
 D  $(x - 3)$  and  $(x - 5)$

- 22 These two rectangular pictures are similar.



What is the value of  $x$ ?

- A 5 cm      B  $\frac{40}{3}$  cm      C 30 cm      D 35 cm

- 23 In 2015, Sam's yearly salary was \$2000 and Lin's yearly salary was \$10 000. Every year Sam's salary increases by \$1000 and Lin's salary increases by \$500.

In which year will Sam's salary equal Lin's?

- A 2019      B 2023      C 2025      D 2031

- 24 Which integer is closest to  $\sqrt{63}$ ?

- A 7      B 8      C 32      D 3969

- 25 Sam is  $x$  years old now. Lin is 3 years younger than Sam. In five years' time, Lin will be four-fifths Sam's age.

Which equation describes their ages in five years' time?

- A  $x + 5 = \frac{4}{3}(x - 3)$   
 B  $x - 3 = \frac{4}{5}(x + 5)$   
 C  $\frac{4}{5}x = (x + 2)$   
 D  $x + 2 = \frac{4}{5}(x + 5)$