

KCPE 2010

MATHEMATICS

Time: 2 hours

READ THESE INSTRUCTIONS CAREFULLY

1. You have been given the question booklet and a separate answer sheet. The question booklet contains 50 questions.
2. Do any necessary rough work in this booklet.
3. When you have chosen your answer, mark it on the **ANSWER SHEET**, not in the question book

HOW TO USE THE ANSWER SHEET

4. Use an ordinary pencil only.
5. Make sure that you have written on the answer sheet

YOUR INDEX NUMBER

YOUR NAME

NAME OF YOUR SCHOOL

6. By drawing a **dark line** inside the correct numbered boxes mark your full Index Number (i.e. School Code Number and the three-figure Candidate's Number) in the grid near the top of the answer sheet.
7. Do not make any marks outside the boxes.
8. Keep your answer sheet as clean as possible and do not fold it.
9. For each of the Question 1 – 50 four answers are given. The answers are lettered A, B, C and D. In each case only **ONE** of the four answers is correct. Choose the correct answer.
10. On the answer sheet the correct answer is to be shown by drawing a **dark line** inside the box in which the letter you have chosen is written.

EXAMPLE

In the Question Booklet:

9. A motorist covers 3 km in every $1\frac{3}{4}$ minutes. How many kilometres will he have covered from 8.1 am to 9.08 am?
 - A. 28
 - B. 84
 - C. 147
 - D. $257\frac{1}{4}$

The correct answer is B (84)

On the answer sheet:

9

[A] [B] [C] [D]

19

[A] [B] [C] [D]

29

[A] [B] [C] [D]

39

[A] [B] [C] [D]

49

[A] [B] [C] [D]

In the set of boxes numbered 9, the box with the letter **B** printed in it is marked.

11. Your **dark line** **MUST** be within the box.
12. For each question **ONLY ONE** box is to be marked in each set of four boxes.

- Which one of the following is 60400502 in words?
 - Six million four hundred thousand five hundred and two.
 - Sixty million four thousand five hundred and two.
 - Sixty million forty thousand five hundred and two.
 - Sixty million four hundred thousand five hundred and two.

Solution

60,400,502

→60,000,000..... sixty million
 400,000.....four hundred thousand
 502.....five hundred and two.

Therefore 60,400,502 in words is:
 Sixty million four hundred thousand five hundred and two.

Choice D

- What is the number 5826.3407 rounded off to 3 decimal places.
 - 5826.34
 - 5826.340
 - 5826.341
 - 5826.3410

Solution

5826.3407 rounded off to 3 decimal places.
 Note. The digit in the ten thousandths place is 7 which is more than 5. Therefore, add 1 to the thousandths place value digit 5826.3407 rounded off to 3 decimal places is 5826.341.

Choice C

- How many days are there between 15th July and 15th September?
 - 60
 - 61
 - 62
 - 63

Solution

Note the keyword is "between"
 Therefore between 15th July and 15th September the first day (15th July) and the last day (15th September) are not included.

Thus 15th July to 31st July 16 days
 August 31 days
 1st Sept to 15th Sept 14 days

Thus 16 + 31 + 14 = 61 days

Choice B

- What is the place value of digit 6 in the number 706053?
 - Six hundreds
 - Hundreds
 - Six thousands
 - Thousands

Solution

Prepare the place value table as shown below.

Hundred thousand	Ten thousand	Thousands	Hundreds	Tens	Ones
7	0	6	0	5	3

Therefore the place value of digit 6 is thousands.

Choice D

- What is the value of : $\frac{3(4^2 + 2^2) - 5 \times 6 \div 2}{3 \times 5}$
 - 59
 - 17
 - 11
 - 3

Solution

$$\frac{3(4^2 + 2^2) - 5 \times 6 \div 2}{3 \times 5} \dots \text{Use BODMAS solve brackets first}$$

$$\frac{3(16 + 4) - 5 \times 6 \div 2}{3 \times 5}$$

$$\frac{(3 \times 20) - 5 \times 6 \div 2}{3 \times 5}$$

$$\frac{60 - 5 \times 6 \div 2}{3 \times 5} \dots \text{solve division next}$$

$$\frac{60 - 5 \times 3}{3 \times 5} \dots \text{solve multiplication}$$

$$\frac{60 - 15}{15}$$

$$\frac{45}{15} = 3$$

Choice D

- Teckla bought the following items from a shop.
 - 3kg of sugar @ sh.68
 - 250g of tea leaves for sh.85
 - 2 bars of soap @ sh.38
 - 1kg of cooking fat for sh.109
 - 2kg packet of rice for sh.149
 Teckla paid for the items using a sh.1000 note. How much balance did she receive?
 - sh.228
 - sh.377
 - sh.551
 - sh.623

Solution

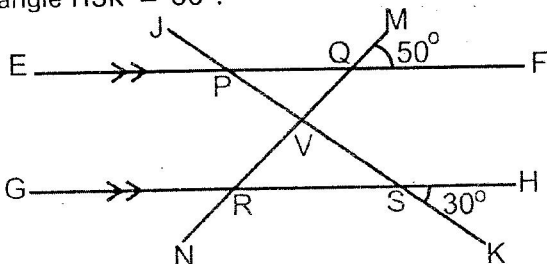
Note @ means each unit and 'for' means all units.

3kg of sugar @ sh.68 ... $3\text{kg} \times \text{sh.}68 = \text{sh.}204$
 250g of tea leaves for sh.85... = sh. 85
 2 bars of soap @ sh.38... $2 \times \text{sh.}38 = \text{sh.} 76$
 1kg of cooking fat for sh.109... = sh.109
 2kg packet of rice for sh.149... = sh.149
 Total amount paid ... Sh.623

Balance = sh.1000 - sh.623
 = sh.377

Choice B

7. In the figure below, lines EF and GH are parallel. Lines JK and MN are transversals which intersect at V. Angle MQF = 50° and angle HSK = 30°.



What is the size of angle QVS?

- A. 150° B. 130°
 C. 100° D. 80°

Solution

Angle MQF = angle VRS i.e corresponding angles

Angle HSK = angle RSV i.e vertically opposite angles

Thus if angle MQF = angle VRS = 50° and angle HSK = angle RSV = 30°

Then angle RVS = 180 - (30 + 50)

Angle RVS = 180 - 80 = 100°

QVS = 180° - 100°

QVS = 80°

Choice D

8. Which one of the numbers below is the square of $2\frac{4}{5}$?

- A. $7\frac{21}{25}$ B. $4\frac{16}{25}$
 C. $39\frac{1}{5}$ D. $5\frac{3}{5}$

Solution

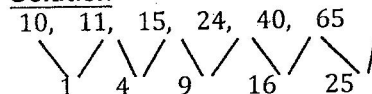
Square of $2\frac{4}{5} = \left(2\frac{4}{5}\right)^2$... write as improper fraction

$$\begin{aligned} &= \left(\frac{14}{5}\right)^2 \\ &= \frac{14 \times 14}{5 \times 5} \\ &= \frac{196}{25} \\ &= 7\frac{21}{25} \end{aligned}$$

Choice A

9. What is the next number in the pattern 10, 11, 15, 24, 40, 65, _____?
 A. 105 B. 101 C. 90 D. 74

Solution



Note the difference between two consecutive numbers is a perfect square number.

The next difference = $6^2 = 36$

Thus next number = $65 + 36 = 101$

Choice B

10. What is the simplified form of

$$5x + \frac{1}{4}(8x - 2y)?$$

- A. $37x - 8y$ B. $7x - \frac{1}{2}y$
 C. $28x - 2y$ D. $7x - 2y$

Solution

$$5x + \frac{1}{4}(8x - 2y) \dots \text{open the brackets first}$$

$$5x + \frac{1}{4} \times 8x - \frac{1}{4} \times 2y$$

$$5x + 2x - \frac{1}{2} \dots \text{collect the like terms } 7x - \frac{1}{2}y$$

Choice B

11. Below is a bus timetable from town J to town P.

TOWN	ARRIVAL TIME	DEPARTURE TIME
J		7.00 a.m.
K	9.30 a.m	10.00 a.m

L	11.15 a.m	11.30 a.m.
M	12.15 p.m.	12.25 p.m.
N	1.10 p.m.	1.20 p.m.
P	1.50 p.m.	2.00 p.m.

How long did the bus take to travel from town K to town N?

- A. 3h 10min
- B. 3h 20min
- C. 3h 40min
- D. 8h 50min

Solution

Time taken = Arrival time - Departure time
 Town N Town K
 = 1.10p.m - 10.00am ...convert to 24h clock
 = 1310h - 1000h
 = 3 hours 10min

Choice A

12. The perimeter of a rectangular plot of land is 280 metres. The width of the plot is 60 metres. What is the length of the plot?

- A. 70m
- B. 80m
- C. 110m
- D. 160m

Solutions

Perimeter of a rectangle = 2(L + W)
 280 = 2(L + 60)
 280m = 2L + 120
 280m - 120 = 2L
 160m = 2L

$$\text{Length} = \frac{160}{2}m$$

Length = 80 m

Choice B.

13. Point S and line QR are shown in the space below. Using a pair of compasses, drop a perpendicular from points S to meet line QR at T.

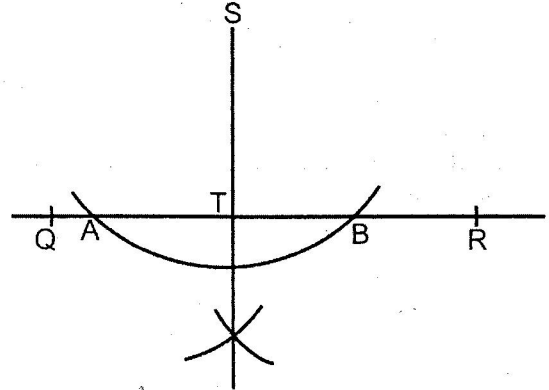


What is the length of line ST?

- A. 2.8cm
- B. 3.5cm
- C. 4.5cm
- D. 5.5cm

Solutions

- Choose a suitable radius that will cut line QR at two points with centre at S.
- From point A choose a suitable radius and make an arc, repeat the same from point B. Draw a line from S to the point where the two arcs meet.
- Let the perpendicular meet line QR at T.
- Take a ruler and measure line ST.



Line ST = 3.5cm

Choice B

14. What is the value of $\frac{2}{5} \div 1\frac{2}{3}$ of $\frac{3}{4}$

- A. $\frac{8}{9}$
- B. $\frac{1}{2}$
- C. $\frac{9}{50}$
- D. $\frac{8}{25}$

Solution

$\frac{2}{5} \div 1\frac{2}{3}$ of $\frac{3}{4}$...using BODMAS start with 'of'

$$\frac{2}{5} \div \left(1\frac{2}{3} \times \frac{3}{4} \right)$$

$$\frac{2}{5} \div \left(\frac{5}{3} \times \frac{3}{4} \right)$$

$$\frac{2}{5} \div \frac{5}{4}$$

... replace division by multiplying by the reciprocal of $\frac{4}{5}$

$$\frac{2}{5} \times \frac{4}{5} = \frac{8}{25}$$

Choice D

15. Tumbo paid sh.10,200 for a cupboard after getting a discount of 15%. What was the marked price of the cupboard?

- A. sh.1,530
- B. sh.8,670
- C. sh. 11,730
- D. sh.12,000

Solution

Marked Price = Price before discount
 Before discount = 100%
 Discount = 15%
 After discount = 85%
 $\therefore 85\% = \text{sh.}10,200$
 100% = ? cross multiply
 $\frac{100\% \times \text{sh.}10,200}{85\%}$
 = sh.12,000

Choice D

16. Three bells are set to ring out at intervals of 4 minutes, 6 minutes and 9 minutes respectively. If they all ring together now, after how many minutes will they ring together next?
 A. 12 B. 18
 C. 36 D. 216

Solution

Find the L.C.M of 4min, 6min and 9min.

2	4	6	9
2	2	3	9
3	1	3	9
3	1	1	3

L.C.M = $2 \times 2 \times 3 \times 3$
 = 36min

The bells will ring together next after 36min
 Choice C

17. A rectangular container is 2m long, 0.9m wide and 2.5m high. The container has water to a height of 1.5m. How much more water in litres is needed to fill the container?
 A. 1800 B. 2700
 C. 4500 D. 1000

Solution

Volume of container = $L \times W \times h$

$\rightarrow = 2\text{m} \times 0.9\text{m} \times 2.5\text{m}$

$\rightarrow = 4.5\text{m}^3$ Convert volume to capacity
 $1\text{m}^3 = 1000\text{L}$

Capacity of container = $4.5\text{m}^3 \times 1000$
 = 4,500L

Volume of water in container = $L \times W \times \text{depth}$
 = $2\text{m} \times 0.9\text{m} \times 1.5\text{m}$

= 2.7m^3 ... Convert volume to capacity

Capacity of water in container = $2.7\text{m}^3 \times 1000$
 = 2700L

To fill the container = $4500\text{L} - 2700\text{L}$
 = 1800L

Choice A

18. The fractions $\frac{3}{7}, \frac{2}{5}, \frac{5}{8}, \frac{1}{2}$

are to be arranged from the smallest to the largest. Which one of the following is the correct order?

- A. $\frac{1}{2}, \frac{2}{5}, \frac{3}{7}, \frac{5}{8}$ B. $\frac{2}{5}, \frac{3}{7}, \frac{1}{2}, \frac{5}{8}$
 C. $\frac{3}{7}, \frac{2}{5}, \frac{1}{2}, \frac{5}{8}$ D. $\frac{5}{8}, \frac{1}{2}, \frac{3}{7}, \frac{2}{5}$

Solution

Convert the fractions to percentage

$\frac{3}{7} \times 100 = \frac{300}{7} = 42\frac{6}{7}\%$

$\frac{2}{5} \times 100 = \frac{200}{5} = 40\%$

$\frac{5}{8} \times 100 = \frac{500}{8} = 62\frac{1}{2}\%$

$\frac{1}{2} \times 100 = \frac{100}{2} = 50\%$

... Now arrange from smallest to largest.

= $\frac{2}{5}, \frac{3}{7}, \frac{1}{2}, \frac{5}{8}$

Choice B

19. Which one of the following properties is TRUE for both a square and a rhombus?
 A. Diagonals are equal.
 B. All angles are equal.
 C. Opposite angles add up to two right angles.
 D. Diagonals bisect at right angles.

Solution

Square and rhombus share the following properties;

- (i) All sides are equal
- (ii) Opposite sides are parallel and equal
- (iii) Diagonals bisect each other at right angles.

Correct answer therefore is choice D

20. The number of birds observed in certain area during certain months of the year are as shown in the table below.

MONTHS	APRIL	MAY	JUNE	JULY	AUGUST
NUMBER OF BIRDS	96	104	80	118	94

L	11.15 a.m	11.30 a.m.
M	12.15 p.m.	12.25 p.m.
N	1.10 p.m.	1.20 p.m.
P	1.50 p.m.	2.00 p.m.

How long did the bus take to travel from town K to town N?

- A. 3h 10min
- B. 3h 20min
- C. 3h 40min
- D. 8h 50min

Solution

Time taken = Arrival time – Departure time
 Town N Town K
 = 1.10p.m – 10.00am ...convert to 24h clock
 = 1310h – 1000h
 = 3 hours 10min

Choice A

12. The perimeter of a rectangular plot of land is 280 metres. The width of the plot is 60 metres. What is the length of the plot?

- A. 70m
- B. 80m
- C. 110m
- D. 160m

Solutions

Perimeter of a rectangle = 2(L + W)
 280 = 2 (L + 60)
 280m = 2L + 120
 280m – 120 = 2L
 160m = 2L

$$\text{Length} = \frac{160}{2}m$$

$$\text{Length} = 80 \text{ m}$$

Choice B.

13. Point S and line QR are shown in the space below. Using a pair of compasses, drop a perpendicular from points S to meet line QR at T.

.S

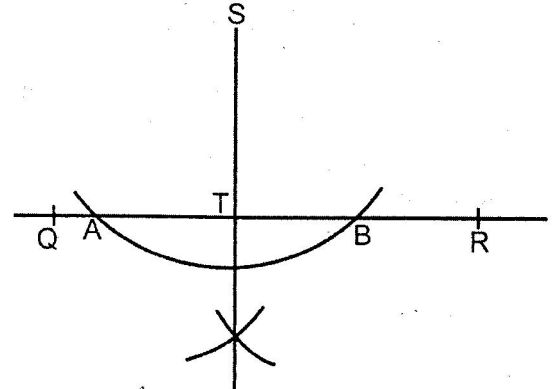


What is the length of line ST?

- A. 2.8cm
- B. 3.5cm
- C. 4.5cm
- D. 5.5cm

Solutions

- Choose a suitable radius that will cut line QR at two points with centre at S.
- From point A choose a suitable radius and make an arc, repeat the same from point B. Draw a line from S to the point where the two arcs meet.
- Let the perpendicular meet line QR at T.
- Take a ruler and measure line ST.



Line ST = 3.5cm

Choice B

14. What is the value of $\frac{2}{5} \div 1\frac{2}{3}$ of $\frac{3}{4}$

- A. $\frac{8}{9}$
- B. $\frac{1}{2}$
- C. $\frac{9}{50}$
- D. $\frac{8}{25}$

Solution

$\frac{2}{5} \div 1\frac{2}{3}$ of $\frac{3}{4}$...using BODMAS start with 'of'

$$\frac{2}{5} \div \left(1\frac{2}{3} \times \frac{3}{4} \right)$$

$$\frac{2}{5} \div \left(\frac{5}{3} \times \frac{3}{4} \right)$$

$$\frac{2}{5} \div \frac{5}{4}$$

... replace division by multiplying by the reciprocal of $\frac{5}{4}$

$$\frac{2}{5} \times \frac{4}{5} = \frac{8}{25}$$

Choice D

15. Tumbo paid sh.10,200 for a cupboard after getting a discount of 15%. What was the marked price of the cupboard?

- A. sh.1,530
- B. sh.8,670
- C. sh. 11,730
- D. sh.12,000

Solution

Marked Price = Price before discount

Before discount = 100%

Discount = 15%

After discount = 85%

∴ 85% = sh.10,200

100% = ? cross multiply

$$\frac{100\% \times \text{sh.}10,200}{85\%}$$

$$= \text{sh.}12,000$$

Choice D

16. Three bells are set to ring out at intervals of 4 minutes, 6 minutes and 9 minutes respectively. If they all ring together now, after how many minutes will they ring together next?

- A. 12 B. 18
C. 36 D. 216

Solution

Find the L.C.M of 4min, 6min and 9min.

2	4	6	9
2	2	3	9
3	1	3	9
3	1	1	3

$$\text{L.C.M} = 2 \times 2 \times 3 \times 3 = 36\text{min}$$

The bells will ring together next after 36min

Choice C

17. A rectangular container is 2m long, 0.9m wide and 2.5m high. The container has water to a height of 1.5m. How much more water in litres is needed to fill the container?

- A. 1800 B. 2700
C. 4500 D. 1000

Solution

Volume of container = L × W × h

$$\rightarrow = 2\text{m} \times 0.9\text{m} \times 2.5\text{m}$$

$$\rightarrow = 4.5\text{m}^3 \dots \dots \text{Convert volume to capacity}$$

$$1\text{m}^3 = 1000\text{L}$$

$$\text{Capacity of container} = 4.5\text{m}^3 \times 1000 = 4,500\text{L}$$

$$\text{Volume of water in container} = L \times W \times \text{depth} = 2\text{m} \times 0.9\text{m} \times 1.5\text{m} = 2.7\text{m}^3$$

$$\text{Capacity of water in container} = 2.7\text{m}^3 \times 1000 = 2700\text{L}$$

$$\text{To fill the container} = 4500\text{L} - 2700\text{L} = 1800\text{L}$$

Choice A

18. The fractions $\frac{3}{7}, \frac{2}{5}, \frac{5}{8}, \frac{1}{2}$

are to be arranged from the smallest to the largest. Which one of the following is the correct order?

- A. $\frac{1}{2}, \frac{2}{5}, \frac{3}{7}, \frac{5}{8}$ B. $\frac{2}{5}, \frac{3}{7}, \frac{1}{2}, \frac{5}{8}$
C. $\frac{3}{7}, \frac{2}{5}, \frac{1}{2}, \frac{5}{8}$ D. $\frac{5}{8}, \frac{1}{2}, \frac{3}{7}, \frac{2}{5}$

Solution

Convert the fractions to percentage

$$\frac{3}{7} \times 100 = \frac{300}{7} = 42\frac{6}{7}\%$$

$$\frac{2}{5} \times 100 = \frac{200}{5} = 40\%$$

$$\frac{5}{8} \times 100 = \frac{500}{8} = 62\frac{1}{2}\%$$

$$\frac{1}{2} \times 100 = \frac{100}{2} = 50\%$$

... Now arrange from smallest to largest.

$$= \frac{2}{5}, \frac{3}{7}, \frac{1}{2}, \frac{5}{8}$$

Choice B

19. Which one of the following properties is TRUE for both a square and a rhombus?

- A. Diagonals are equal.
B. All angles are equal.
C. Opposite angles add up to two right angles.
D. Diagonals bisect at right angles.

Solution

Square and rhombus share the following properties;

- (i) All sides are equal
- (ii) Opposite sides are parallel and equal
- (iii) Diagonals bisect each other at right angles.

Correct answer therefore is choice D

20. The number of birds observed in certain area during certain months of the year are as shown in the table below.

MONTHS	APRIL	MAY	JUNE	JULY	AUGUST
NUMBER OF BIRDS	96	104	80	118	94

Which one of the following numbers is the highest mean of the birds recorded into two consecutive months?

- A. 106 B. 99 C. 111 D. 100

Solution: consecutive means

$$\frac{\text{April} + \text{May}}{2} = \frac{96 + 104}{2} = 100$$

$$\frac{\text{May} + \text{June}}{2} = \frac{104 + 80}{2} = 92$$

$$\frac{\text{June} + \text{July}}{2} = \frac{80 + 118}{2} = 99$$

$$\frac{\text{July} + \text{August}}{2} = \frac{118 + 94}{2} = 106$$

The highest mean of two consecutive months = 106

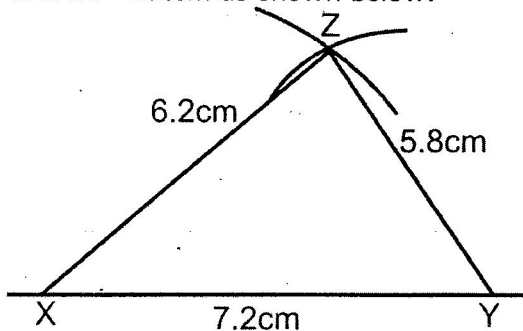
Correct answer A

21. Construct a triangle XYZ in which XY = 7.2cm, YZ = 5.8cm and ZX = 6.2cm. What is the size of angle XYZ?

- A. 125° B. 75°
C. 55° D. 50°

Solution

Use compass and ruler only to construct triangle XYZ in which XY = 7.2cm, YZ = 5.8cm and ZY = 6.2cm as shown below.



Measure angle XYZ. Angle XYZ = 55°

Correct answer C

22. What is the value of x in the equation

$$\frac{1}{2}(x+1) + \frac{1}{3}(2x-1) = 5?$$

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

Solution

$$\frac{1}{2}(x+1) + \frac{1}{3}(2x-1) = 5?$$

$$\frac{(x+1)}{2} + \frac{(2x-1)}{3} = 5$$

... multiply every

fraction by the L.C.M of 2 and 3

$$\begin{aligned} &= 6 \\ 3 \times \frac{(x+1)}{2} + 2 \times \frac{(2x-1)}{3} &= \frac{5}{1} \times 6 \end{aligned}$$

$$3(x+1) + 2(2x-1) = 30$$

... Open the brackets

$$3x + 3 + 4x - 2 = 30$$

... Collect the like terms

$$3x + 4x + 3 - 2 = 30$$

$$7x + 1 = 30$$

... Subtract 1 from both sides

$$7x = 29$$

...divide both sides by 7

$$x = \frac{29}{7}$$

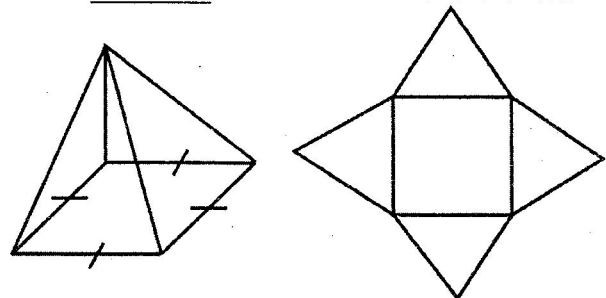
$$x = 4\frac{1}{7}$$

Correct answer A

23. A packet is in the form of a pyramid with a square base. Which one of the following statements is **TRUE** of the number of faces, edges and vertices the packet has?

- A. 4 faces, 6 edges and 4 vertices
B. 2 faces, 1 edge and 1 vertex
C. 5 faces, 9 edges and 6 vertices
D. 5 faces, 8 edges and 5 vertices.

Solution: Sketch the solid and the net.



The square pyramid has 5 faces, 8 edges and 5 vertices.

Correct choice D

24. A factory hired 9 people to complete a piece of work in 15 hours. How many more hours did it take them to complete the work if 3 people did not turn up?

- A. 30 hours B. $22\frac{1}{2}$ hours

- C. 5 hours
 D. $7\frac{1}{2}$ hours

Solutions

People	hours	
9	15	∴ 3 people did not turn
6	?	up therefore 6 people left (9 - 3)

∴ 6 people will take more hours i.e. inverse proportion.

$$\frac{9 \times 15}{6} = 22\frac{1}{2} \text{ hours}$$

∴ How many more means the difference.

$$\begin{aligned} \text{Thus } & 22\frac{1}{2} \text{ hours} - 15 \text{ hours} \\ & = 7\frac{1}{2} \text{ hours} \end{aligned}$$

Choice D

25. Which one of the following sets of measurements will form a right angled triangle when drawn?
 A. 9cm, 16cm, 25cm
 B. 10cm, 24cm, 26cm
 C. 5cm, 12cm, 17cm
 D. 7cm, 2.4cm, 2.5cm

Solution

The only set that forms a right angled triangle when drawn is 10cm, 24cm, 26cm. (i.e the family of 5, 12, 13)

Choice B.

26. A pick-up truck was loaded with 4 cartons of fat and 60 bales of flour. Each carton contained twenty four 250g packets of fat. The mass of each empty carton was 500g. Each bale contained twelve 2kg packets of flour. What is the total load, in tonnes?

- A. 1466
 B. 146.6
 C. 14.66
 D. 1.466

Solution

4 cartons of fat = 4×24 packets = 96 packets
 60 bales of flour = 60×12 packets = 720 packets.
 Total mass of fat = 96 packets $\times 250\text{g} = 24000$ grams or 24kg
 Total mass of flour = 720 packets $\times 2\text{kg} = 1,440\text{kg}$
 Total mass of empty cartons = 4 cartons $\times 500\text{g} = 2000\text{g}$ or 2kg
 Total load = mass of fat + mass of flour + mass of cartons.
 = 24kg + 1440kg + 2kg = 1466kg ∴ but 1 tonne = 1000kg
 = $\frac{1466}{1000} = 1.466$ tonnes

Choice D

27. Kamau bought a piece of land for 2 million shillings. He subdivided it into 25 plots of equal area. He then sold all the plots and made a 20% profit. What was the selling price for each plot?
 A. sh.400,000
 B. sh.96,000
 C. sh.80,000
 D. sh.16,000

Solution

Buying price = sh.2,000,000
 Profit made = $\frac{20}{100} \times 2,000,000$
 Profit = sh.400,000
 Selling price = Buying Price + Profit
 = sh.2,000,000 + sh.400,000
 = sh.2,400,000
 But sh.2,400,000 is the selling price for the 25 plots.

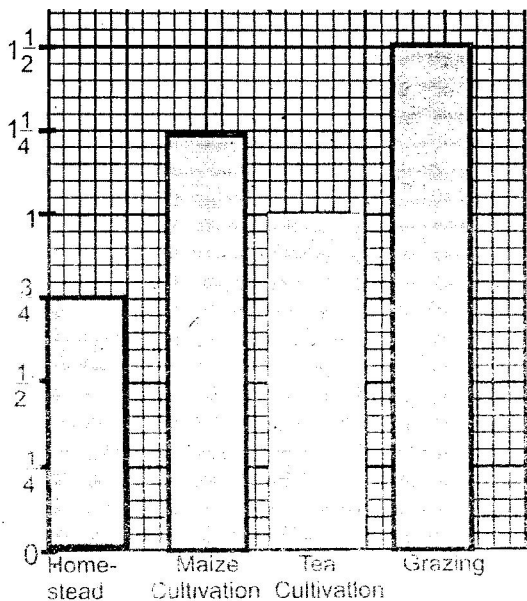
$$\begin{aligned} \therefore 1 \text{ plot was sold for} &= \frac{\text{sh.}2,400,000}{25} \\ &= \text{sh.}96,000 \end{aligned}$$

Choice B

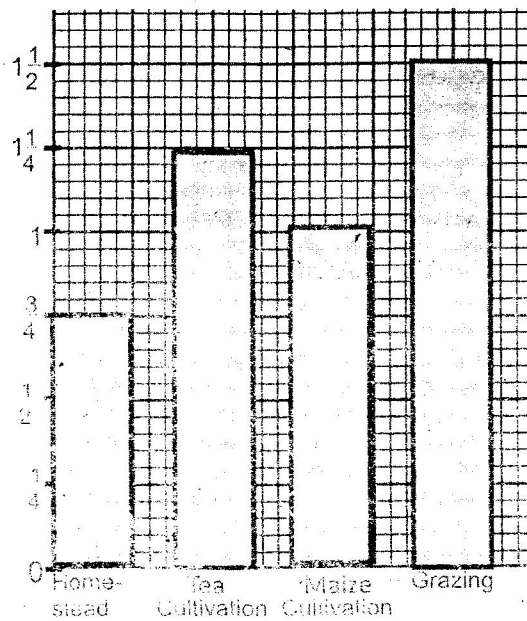
28. The table below shows how Kigen utilizes his piece of land.

Purpose	Homestead	Maize Cultivation	Tea Cultivation	Grazing
Number of Hectares	$\frac{3}{4}$	$1\frac{1}{4}$	1	$1\frac{1}{2}$

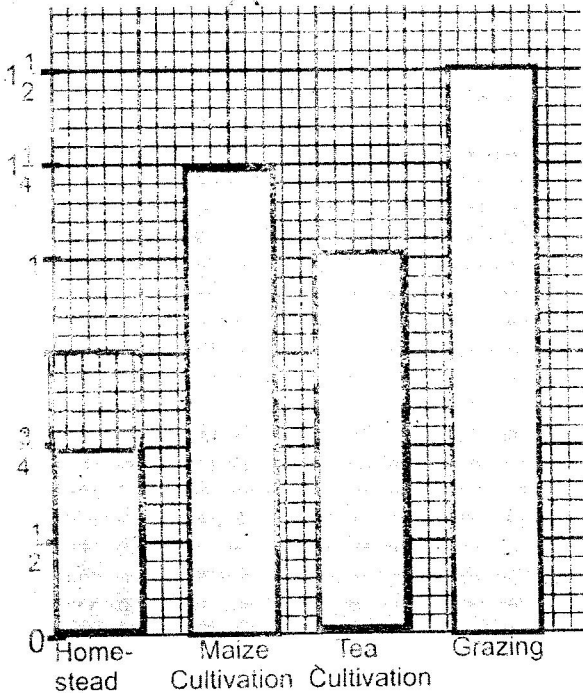
Which one of the bar graphs below correctly represents the information above.



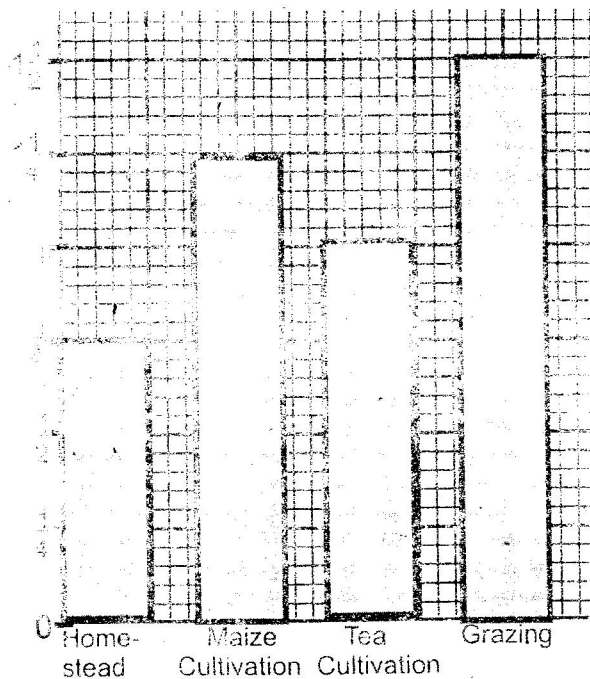
A



B



C



D

Solution

Use elimination method
 Choice A is wrong because the horizontal scale is not constant. Bar showing Tea Cultivation is not proportion to the other bars.

Choice B is wrong because Maize cultivation and Tea cultivation have been interchanged.
 Choice C has the wrong vertical scale which is not constant.
 Choice D is the correct representation of the information given.
Choice D

29. Irimu deposited sh.10, 000 in a financial institution that offered simple interest at the rate of 5% per annum. Ndege deposited sh.10, 000 in a bank that offered compound interest at the rate of 5% per annum. How much more interest had Ndege's money earned than Irimu's after 2 years?

- A. sh.25
- B. sh.1, 000
- C. sh.1, 025
- D. sh.2, 025

Solution

Irimu (Simple interest)

$$SI = P \times \frac{R}{100} \times T \text{ Where } P = \text{sh.}10,000,$$

$$R = \frac{5}{100} \text{ and } T = 2 \text{ years}$$

$$SI = \text{sh.}10,000 \times \frac{5}{100} \times 2 \text{ years}$$

$$SI = \text{sh.}1,000$$

Ndege (Compound Interest)

$$P = \text{sh.}10,000, R = \frac{5}{100} \text{ and } T = 2 \text{ years}$$

$$\text{Year 1} \longrightarrow \frac{5}{100} \times \text{sh.}10,000 \times 1 \text{ yr} = \text{sh.}500$$

Amount =

$$\text{sh.}10,000 + \text{sh.}500 = \text{sh.}10,500$$

$$\text{Year 2} \longrightarrow \frac{5}{100} \times \text{sh.}10,500 \times 1 \text{ yr} = \text{sh.}525$$

Therefore Compound Interest for 2 yrs

$$= \text{sh.}500 + 525$$

$$= \text{sh.}1,025$$

Therefore difference in interest = sh.1025

$$- \text{sh.}1,000$$

$$= \text{sh.}25$$

Choice A

30. At a sports meeting the number of men was 200. The number of girls was three times that of men and 120 more than that of women. The number of boys was 30 more than that of girls. What was the total number of people at the meeting?

Solution

Men \longrightarrow 200

Girls \longrightarrow $200 \times 3 = 600$

Women \longrightarrow $600 - 120 = 480$... women are 120 less than girls.

Boys \longrightarrow $600 + 30 = 630$

Total number of people = $200 + 600 + 480 + 630 = 1,910$

Choice C

31. The cash price of a radio was sh.4,500. The hire purchase price of the radio was 60% more than the cash price. Muya bought the radio on hire purchase terms. He paid a deposit and 12 equal monthly installments of sh.540 each. How much did he pay as deposit?

- A. sh.720
- B. 6,480
- C. sh.6,660
- D. sh.7,200

Solution

$$\text{Cash price} = \text{sh.}4,500$$

$$\text{Hire purchase} = \frac{160}{100} \times 4,500$$

$$\text{Hire Purchase} = \text{sh.}7,200$$

Hire Purchase = Deposit + Total Monthly Instalments.

$$\text{Sh.}7,200 = \text{deposit} + (12 \times \text{sh.}540)$$

$$\text{Sh.}7,200 = \text{deposit} + \text{sh.}6,480 \text{ ... but}$$

$$\text{deposit} = \text{HP} - \text{T.M.I}$$

$$\text{Deposit} = \text{sh.}7,200 - \text{sh.}6,480$$

$$= \text{sh.}720$$

Choice A

32. A rectangle 25cm long and 12cm wide has the same area as a triangle whose height is 10cm. What is the length of the base of the triangle?

- A. 15cm
- B. 30cm
- C. 60cm
- D. 300cm

Solution

$$\text{Area of rectangle} = \text{Length} \times \text{Width}$$

$$\text{Area of triangle} = \frac{1}{2} \text{ base} \times \text{height}$$

$$\text{But Length} \times \text{Width} = \frac{1}{2} b \times h$$

$$\text{Thus } 25\text{cm} \times 12\text{cm} = \frac{1}{2} \times b \times 10\text{cm}$$

$$300\text{cm}^2 = 5 \times b\text{cm}$$

$$\text{Base} = \frac{300\text{cm}^2}{5\text{cm}}$$

$$= 60\text{cm}$$

Choice C

33. What is the value of:

$$0.77 + 5.00 \text{ of } (0.57 - 0.33) + 0.88 \times 0.4?$$

- A. 2.322
- B. 1.7368
- C. 1.140
- D. 0.90592

Solution

Apply BODMAS solve bracket first

$$0.77 + 5.00 \text{ of } 0.24 + 0.88 \times 0.4 \text{ ...}$$

Solve 'of' next.

$$0.77 + 1.2 + 0.88 \times 0.4 \text{ ... solve multiplication next.}$$

$0.77+1:2+0.352 \dots\dots$ Add all
 $= 2.322$

Choice A

34. A salesman is paid a salary of sh.5000 per month. He is also paid a 2.5% commission on the sales above sh.100,000. If the salesman sold good worth sh.500,000 in a certain month. What was his total earnings?
 A. sh.10,000 B. sh.12,500
 C. sh.15,000 D. sh.17,500

Solution

Salary = sh.5,000 per month
 Commission = $\frac{2.5}{100}$ on sales above sh.100, 000
 Sales above sh.100, 000 are (sh.500, 000 – sh.100, 000)
 Sales above sh.100, 000 are sh.400,000)
 Commission = $\frac{2.5}{100} \times sh. 400,000$
 Commission = sh.10, 000
 Total earnings = salary + commission
 = sh.5,000 + sh.10,000
 = sh.15,000

Choice C

35. On a map whose scale is 1:50 000 a piece of land is represented by a rectangle measuring 3cm by 2cm. What is the actual size of this land in hectares?
 A. 15 B. 150
 C. 1500 D. 15000

Solution

Interprete the scale 1:50,000
 1cm rep 50 000cm
 1cm rep 500m
 Therefore, length 3cm will be $3 \times 500m = 1500m$
 Width 2cm will be $2 \times 500m = 1000m$
 Actual area = $L \times W = 1500m \times 1000m = 1500\ 000m^2 \dots$ but $1ha = 10,000m^2$
 $\therefore 1500000m^2 = \frac{1500000m^2}{10,000m^2}$

$= 150ha$

Choice B

36. Three schools Mwangaza, Kivuli and Nuru received a total donation of 165 text books. Kivuli got 8 books more than Mwangaza, while Nuru got half the total of what Mwangaza and Kivuli got. If the

number of books donated to Mwangaza is represented by the letter m, which one of the following equations can be used to get the value of m?

- A. $6m + 24 = 165$ B. $1\frac{1}{2}m + 12 = 165$
 C. $3m + 12 = 165$ D. $3m - 12 = 165$

Solution

Mwangaza - M books
 Kivuli - (M + 8) books \dots 8 more than Mwangaza.
 Nuru - $\frac{1}{2}(2m + 8)$ books \dots half the total

$\frac{165}{}$ of Mwangaza and Kivuli
 $M + (M + 8) + \frac{1}{2}(2m + 8) = 165$
 $M + M + 8 + M + 4 = 165$ collect the like terms
 $M + M + M + 8 + 4 = 165$
 $3M + 12 = 165$

Choice C

37. At the beginning of year 2005, there were 800 pupils in a school of whom 55% were boys. At the end of the year the number of girls had increased by 20% and that of boys had decreased by 10%. What was the total number of pupils in the school at the end of the year?
 A. 828 B. 916 C. 826 D. 880

Solution

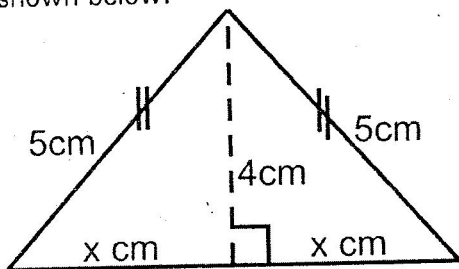
800 pupils $\begin{cases} \text{Boys } \frac{55}{100} \times 800 \\ \text{Girls } \frac{45}{100} \times 800 \end{cases}$
 In 2005 Boys were $\frac{55}{100} \times 800 = 440$
 Girls were $\frac{45}{100} \times 800 = 360$
 Increase girls by 20% thus $\frac{120}{100} \times 360 = 432$
 Decrease boys by 10% thus $\frac{90}{100} \times 440 = 396$
 Total number of pupils now = $432 + 396 = 828$ pupils

Choice A

38. The height of an isosceles triangle is 4cm. Each of the two equal sides measures 5cm. What is the area of the triangle?
 A. $6cm^2$ B. $12cm^2$
 C. $15cm^2$ D. $24cm^2$

Solution

Make a sketch of an isosceles triangle as shown below.



Note: The height is perpendicular to the base and also bisects the base into two equal parts.

Apply Pythagorean theory to get x i.e.

$$x^2 = 5^2 - 4^2$$

$$x^2 = 9$$

$$x = 3\text{cm}$$

thus the whole base = $2x = 6\text{cm}$

$$\text{area of triangle} = \frac{1}{2}b \times h$$

$$= \frac{1}{2} \times 6\text{cm} \times 4\text{cm}$$

$$= 12\text{cm}^2$$

Choice B

39. The table below shows the number of crates of soda Mutuma sold in one week. The number of crates sold on Friday was not recorded.

DAY OF WEEK	MON	TUE	WED	THUR	FRI	SAT	SUN
NUMBER OF CRATES	8	10	11	18		16	8

If the total number of crates of soda sold in seven days was 84. What was the median sale?

- A. 13 B. 12 C. 11 D. 8

Solution

$$\begin{aligned} &\text{Find crates sold on Friday i.e} \\ &84 - (8 + 10 + 11 + 18 + 16 + 8) \\ &= 84 - 71 \\ &= 13 \end{aligned}$$

To get median, arrange in ascending or descending order.

8, 8, 10, 11, 13, 16, 18

Pick the number in the middle which is 11.

Choice C

40. A teacher had a certain number of books.

She gave $\frac{1}{3}$ of the books to John and $\frac{1}{4}$ to Lucy. She also gave $\frac{1}{10}$ of the remaining books to Patel. If the teacher was left with 18 books, how many books had she given to Lucy?

- A. 48 B. 16 C. 12 D. 2

solution

Arrange your work as shown below:

Let b represent the number of books

John	—	$\frac{1}{3}b$	
Lucy	—	$\frac{1}{4}b$	
Patel	—	$\frac{1}{10}$ of the remaining	books

$$\text{John + Lucy} = \frac{1}{3}b + \frac{1}{4}b = \frac{4b+3b}{12} = \frac{7}{12}b$$

Remainder is $\frac{5}{12}b$

Therefore Patel received $\frac{1}{10}$ of $\frac{5}{12}b = \frac{1}{24}b$

Fraction left with teacher

$$= \frac{24}{24}b - (\frac{1}{3}b + \frac{1}{4}b + \frac{1}{24}b)$$

$$= \frac{24}{24}b - \frac{15}{24}b$$

$$= \frac{9}{24}b \text{ or } \frac{3}{8}b$$

$$\frac{3}{8}b = 18 \text{ books} \quad b = 18 \times \frac{8}{3}$$

$$b = 48 \text{ books}$$

Lucy got $\frac{1}{4}b$ i.e $\frac{1}{4}$ of 48 = 12 books

Choice C

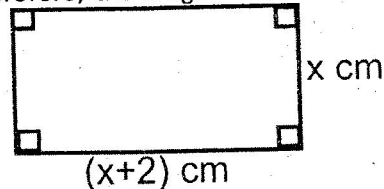
41. The perimeter of a rectangle is 24cm. The length of the rectangle is 2cm more than the width. What is the area of the rectangle?

- A. 15cm² B. 20cm²
C. 35cm² D. 143cm²

Solution

Let the width of the rectangle be x.

Therefore, the length = (x + 2)cm



Note: Length + Width = half the perimeter

$$(x + 2) + x = 12\text{cm}$$

$2x + 2 = 12$... subtract 2 from both sides

$2x = 10$... divide by 2 on both sides

$$x = 5$$

Therefore the width = $x = 5\text{cm}$

The length = $x + 2 = 5 + 2 = 7\text{cm}$.

Area = length \times width

$$= 7\text{cm} \times 5\text{cm}$$

$$= 35\text{cm}^2$$

42. A cyclist took 15 minutes to travel from his home to town at a speed of 18km/h. He took 24 minutes to travel back from town to his home. What was his speed, in km/h from town to his home?

- A. $1\frac{4}{5}$ B. $4\frac{1}{2}$ C. $11\frac{1}{4}$ D. $14\frac{8}{13}$

Solution

Time \Rightarrow 15 min or $\frac{1}{4}$ hr

Speed \Rightarrow 18km/hr

Distance = Speed \times Time

$$= 18\text{km/h} \times \frac{1}{4}$$

$$= 4.5\text{km}$$

Coming back; Distance = 4.5km

Time = 24min or $\frac{2}{5}$ hr

$$\text{Speed} = \frac{0}{T} 4.5\text{km} \times \frac{5}{2} = 11\frac{1}{4}\text{km/h}$$

Choice C

43. Sera shared part of her land among her four children. Their shares were 0.29, 0.26, 0.21 and 0.14 of the land. If the part that was shared was 36 hectares, how many hectares of the land remained?

- A. 3.6 B. 40 C. 0.1 D. 4

Solution

Children's total share

$$= 0.29 + 0.26 + 0.21 + 0.14$$

$$= 0.9 \text{ or } \frac{9}{10}$$

Therefore Remaining Share

$$= \frac{10}{10} - \frac{9}{10} = \frac{1}{10}$$

Part shared = $\frac{9}{10}$... but $\frac{9}{10}$ represents

36ha

Therefore if $\frac{9}{10}$ represents 36ha,

Then $\frac{1}{10}$ represents ?

$$= \frac{1}{10} \times 36\text{ha} \times \frac{10}{9}$$

$$= 4\text{ha}$$

Choice D

44. A farmer harvested 144 bags of maize in one season. In the second season the yield increased in the ratio 4:3. The farmer supplied all the bags of maize harvested in the second season equally to three millers. How many bags of maize did each miller get?

- A. 192 B. 64 C. 48
D. 36

Solution

Increase 144 bags in the ratio 4:3

$$\text{i.e. } \frac{4}{3} \times 144 \text{ bags} = 192 \text{ bags}$$

share 192 bags among 3 miller equally.

$$\text{i.e. } \frac{192}{3} \text{ bags} = 64 \text{ bags each}$$

Choice B

45. A rectangular water tank whose base is 1.5m by 0.5m is to be filled with water using 50 litre containers. How many such containers will be required to fill the tank to a height of 1 metre?

- A. 15 B. 1.5 C. 150 D. 1500

Solution

Volume of tank = $L \times W \times H$

$$= 1.5\text{m} \times 0.5\text{m} \times 1\text{m}$$

$$= 0.75\text{m}^3 \text{ but } 1\text{m}^3 = 1000\text{L}$$

Therefore $0.75\text{m}^3 = (0.75 \times 1000)\text{L}$

$$= 750 \text{ Litres}$$

Now, 1 container = 50 Litres

$$\text{Therefore } 750 \text{ litres} = \frac{750}{50} = 15 \text{ containers}$$

Choice A

46. A watch loses 30 seconds every hour. If the watch was set right on Sunday at 11.30 p.m. what day and time did it show after 10 hours?

- A. Monday 9.25 a.m.
B. Monday 9.30 a.m.
C. Monday 9.35 a.m.
D. Monday 9.25 p.m.

Solution

Loses 30 seconds in every hour.

Therefore in 10 hrs it loses $(10 \times 30\text{sec})$

It loses 300 seconds = 5 minutes

Correct watch after 10 hrs will be

11.30pm (Sunday) + 10 hours

$$= 9.30\text{a.m. Monday.}$$

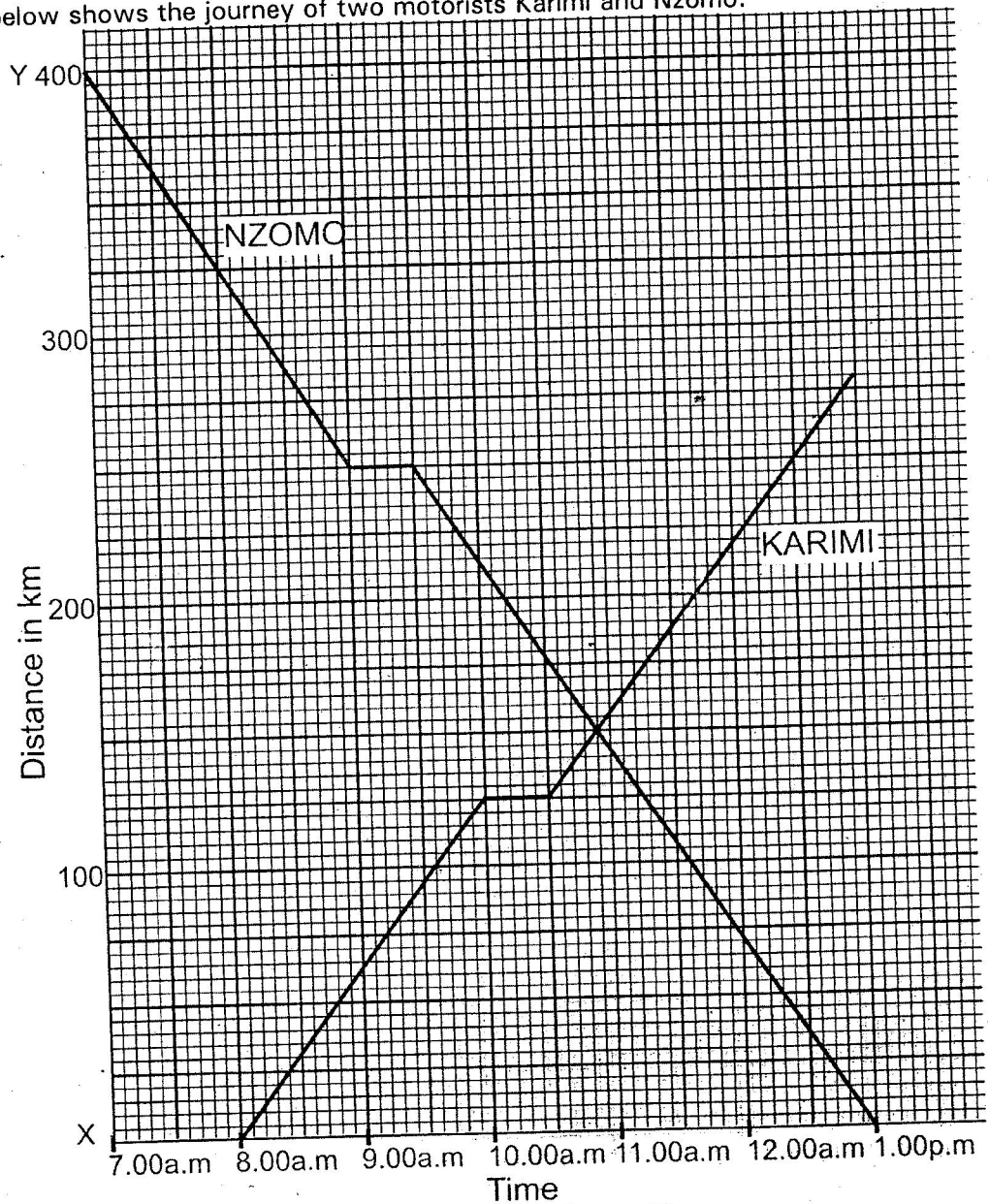
But the faulty watch will have lost 5 minutes

i.e. 9.30a.m - 5 minutes

$$= 9.25\text{a.m Monday}$$

Choice A

47. The graph below shows the journey of two motorists Karimi and Nzomo.



How far from town X was Nzomo when Karimi stopped to rest?

- A. 60km
- B. 185km
- C. 215km
- D. 250km

Solution

Karimi stopped to rest at 10a.m

At 10a.m, Nzomo was 215km from x

Note: Vertical scale is 1cm rep. 25km.

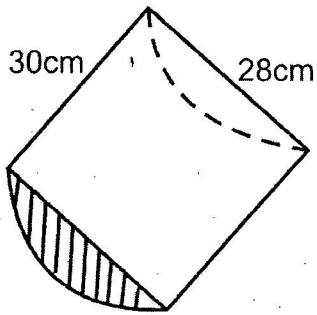
At 10a.m Nzomo was (on the graph) 8.6cm from point x.

Thus $8.6\text{cm} \times 25\text{km}$

$= 215\text{km}$

Choice C

48. The figure below represents a half of a cylindrical piece of wood of diameter 28cm and a length of 30cm.



What is the surface area of the solid in cm²?

(Take $\pi = \frac{22}{7}$)

- A. 4096
- B. 2776
- C. 2468
- D. 1936

Solution

Surface area of solid with uniform x – section
 = (Area of x – section $\times 2$) + (Perimeter of x – section \times length)

$$= \left(\frac{1}{2}\pi r^2 \times 2\right) + \left(\left[\frac{1}{2}\pi d \times d\right] \times \text{length}\right)$$

$$= \left(\frac{1}{2} \times \frac{22}{7} \times 14 \times 14 \times 2\right) \text{cm}^2 + \left(\left[\frac{1}{2} \times \frac{22}{7} \times 28 + 28\right] \times 30\text{cm}\right)$$

$$= 616\text{cm}^2 + (72\text{cm} \times 30\text{cm})$$

$$= 616\text{cm}^2 + 2160\text{cm}^2$$

$$= 2,776\text{cm}^2$$

49. On the line QR given below, construct a triangle PQR such PQ=PR=7cm. Construct a bisector of angle PQR to meet line PR at X.



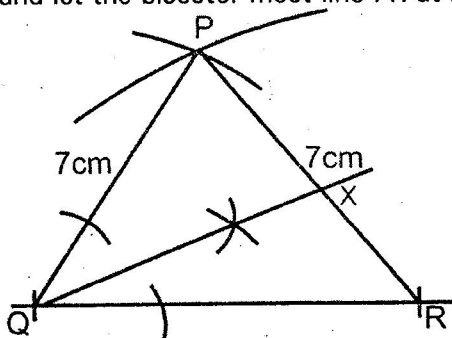
What is the size of angle QXR?

- A. 78°
- B. 44°
- C. 68°
- D. 102°

Solution

Using a pair of compass and ruler, measure 7cm. Make an arc from Q and repeat the same from R as shown.

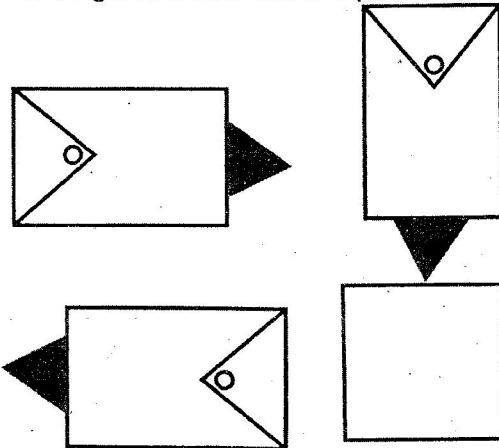
Choose a suitable radius and bisect angle PQR and let the bisector meet line PR at X.



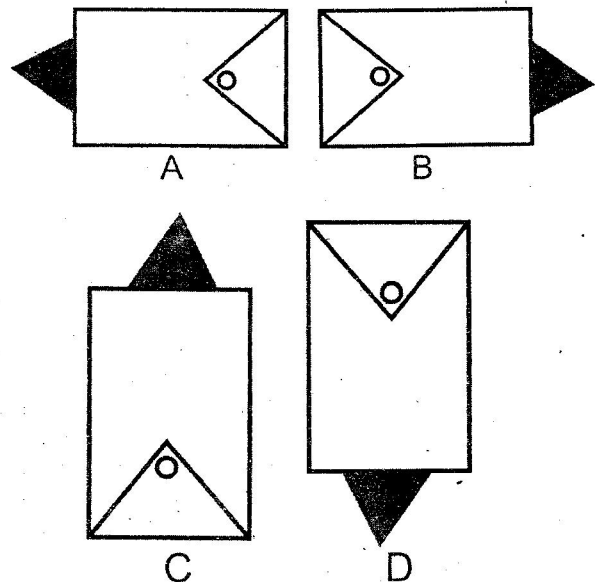
- Measure angle QXR
- Angle QXR is 78°

Choice A

50. The figures below show a pattern of shapes.

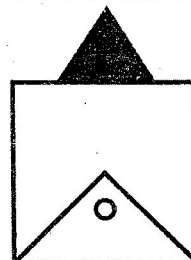


Which one of the shapes below should be drawn in the blank box to continue with the pattern?



Solution

Observe the patter is turning clockwise at an of 45°. Therefore next shape is



Choice C