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 outsides 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 $1^3/_4$ minutes. How many kilometres will he have covered from 8.1 am to 9.08 am?
   A. 28
   B. 84
   C. 147
   D. $257^1/_4$

The correct answer is B (84)

On the answer sheet:

9 [A ▉] [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.

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1. Which one of the following is 60400502 in words?
   A. Six million four hundred thousand five hundred and two.
   B. Sixty million four thousand five hundred and two.
   C. Sixty million forty thousand five hundred and two.
   D. 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

2. What is the number 5826.3407 rounded off to 3 decimal places.
   A. 5826.34   B. 5826.340
   C. 5826.341   D. 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

3. How many days are there <u>between</u> 15ᵗʰ July and 15ᵗʰ September?
   A. 60   B. 61   C. 62   D. 63

   Solution
   Note the keyword is "<u>between</u>"
   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

4. What is the place value of digit 6 in the number 706053?
   A. Six hundreds   B. Hundreds
   C. Six thousands   D. 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

5. What is the value of : $\dfrac{3(4^2 + 2^2) - 5 \times 6 \div 2}{3 \times 5}$

   A. 59   B. 17   C. 11   D. 3

   Solution
   $\dfrac{3(4^2 + 2^2) - 5 \times 6 \div 2}{3 \times 5}$ ...Use BODMAS solve brackets first

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

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

   $\dfrac{60 - 5 \times 6 \div 2}{3 \times 5}$ ...solve division next

   $\dfrac{60 - 5 \times 3}{3 \times 15}$ ...solve multiplication

   $\dfrac{60 - 15}{15}$

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

   Choice D

6. 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?
   A. sh.228   B. sh.377
   C. sh.551   D. sh.623

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

3kg of sugar @ sh.68 $\cdots$ 3kg×sh.68 = sh.204
250g of tea leaves for sh.85$\cdots$ = sh. 85
2 bars of soap @ sh.38$\cdots$ 2×sh.38 = sh. 76
1kg of cooking fat for sh.109$\cdots$ = sh.109
2kg packet of rice for sh.149$\cdots$ = sh.149
Total amount paid $\cdots$ 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°.
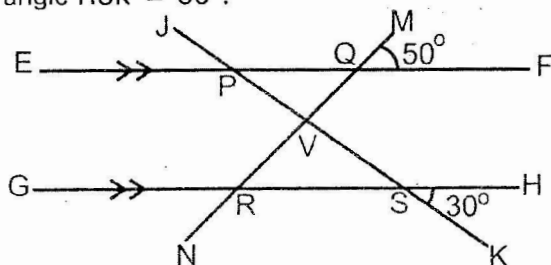
What is the size of angle QVS?
A. 150°　　　　　　　　B. 130°
C. 100°　　　　　　　　D. 80°

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

$$= \left(\frac{14}{5}\right)^2$$

$$= \frac{14 \times 14}{5 \times 5}$$

$$= \frac{196}{25}$$

$$= 7\frac{21}{25}$$

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

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

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

$5x + 2x - \frac{1}{2}$...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

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.
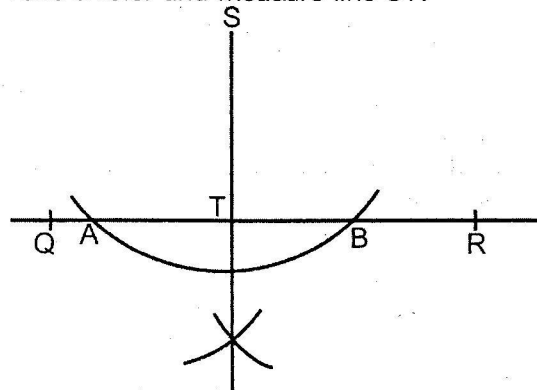
.S

Q   R

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'

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

$\frac{2}{5} \div \left(\frac{5}{\cancel{3}_1} \times \frac{\cancel{3}^1}{4}\right)$

$\frac{2}{5} \div \frac{5}{4}$ ... replace division by multiplying by the reciprocal of $^4/_5$

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

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%
∴ 85% = sh.10,200
100% = ? ······ cross multiply

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

= 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 × 2 × 3 × 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 × W × h
→ = 2m × 0.9m × 2.5m
→ = 4.5m³ ······ Convert volume to capacity
1m³ = 1000L
Capacity of container = 4.5m³ × 1000
                = 4,500L
Volume of water in container = L×W×depth
= 2m ×0.9m×1.5m
= 2.7m³ ···Convert volume to capacity
Capacity of water in container = 2.7m³×1000
= 2700L
To fill the container = 4500L – 2700L
= 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.
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How long did the bus take to travel from town K to town N?

A. 3h 10min   B. 3h 20min
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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
Length = $\frac{160}{2} m$

Length = 80 m

Choice B.

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Q ———————————— R

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'

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

$\frac{2}{5} \div \left(\frac{5}{3_1} \times \frac{3^1}{4}\right)$

$\frac{2}{5} \div \frac{5}{4}$ ... replace division by multiplying by the reciprocal of $^4/5$

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

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

= 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 × 2 × 3 ×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 × W × h
→ = 2m × 0.9m × 2.5m
→ = 4.5m³ ······ Convert volume to capacity
1m³ = 1000L
Capacity of container = 4.5m³ × 1000
                  = 4,500L
Volume of water in container = L×W×depth
= 2m ×0.9m×1.5m
= 2.7m³ ···Convert volume to capacity
Capacity of water in container = 2.7m³×1000
= 2700L
To fill the container = 4500L – 2700L
= 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 ás 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

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

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

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

$$\frac{July + August}{2} = \frac{118 + 94}{2} = 106$$
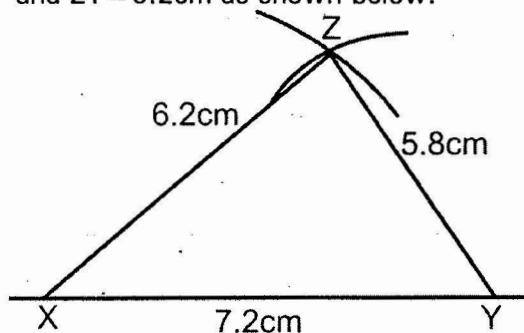
The highest mean of two consecutive months = 106

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

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

$$\frac{(x+1)}{2} + \frac{(2x-1)}{3} = \frac{5}{1} \quad \text{... multiply every}$$

fraction by the L.C.M of 2 and 3
= 6

$$\overset{3}{\cancel{6}} \times \frac{(x+1)}{\underset{1}{\cancel{2}}} + \overset{2}{\cancel{6}} \frac{(2x-1)}{\underset{1}{\cancel{3}}} = \frac{5}{1} \times 6$$

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

$$7x = 29$$
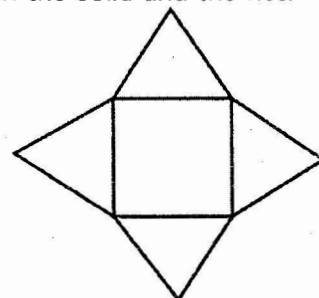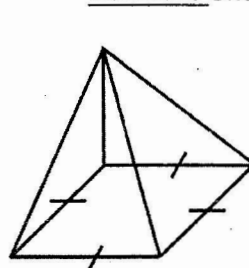   ...divide both sides by 7

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

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

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
6	?

... 3 people did not turn 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.

$$Thus \ 22\frac{1}{2} \text{ hours} - 15 \text{ hours}$$

$$= 7\frac{1}{2} \text{ hours}$$

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 ×250g = 24000 grams or 24kg
Total mass of flour = 720 packets ×2kg = 1,440kg
Total mass of empty cartons = 4 cartons × 500g = 2000g or 2kg
Total load = mass of fat + mass of flour + mass of cartons.
= 24kg + 1440kg + 2kg = 1466kg ... but 1 tonne = 1000kg
$$= \frac{1466}{1000} = 1.466 \text{ tonnes}$$
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 = $\frac{20}{100}$ × 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.
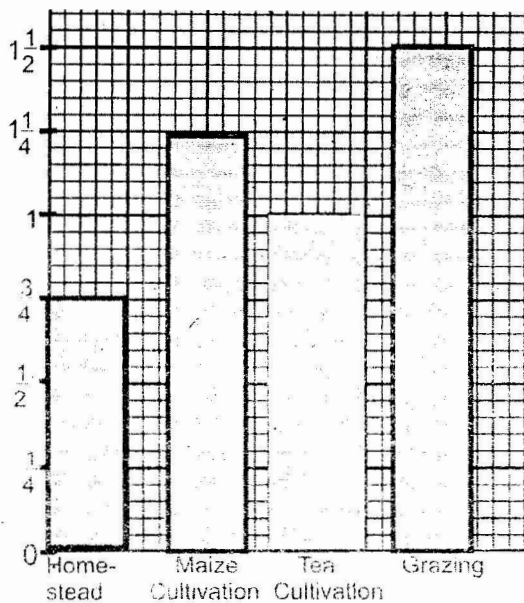   ∴ 1 plot was sold for $= \frac{sh.2,400,000}{25}$

   = sh.96,000
   Choice B

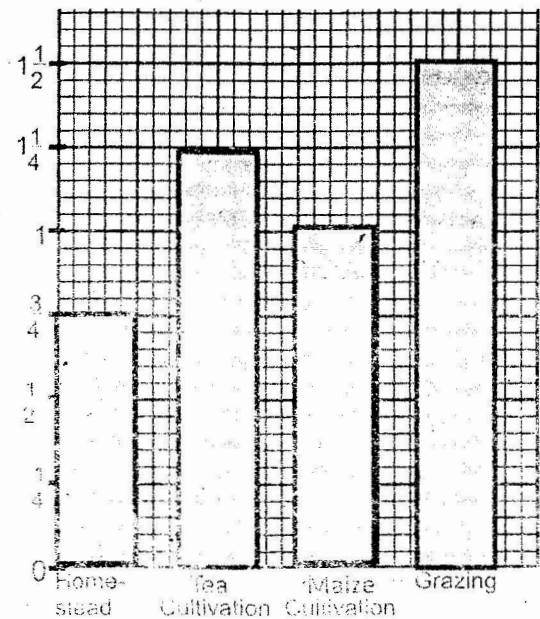28. The table below shows how Kigen utilizes his piece of land.

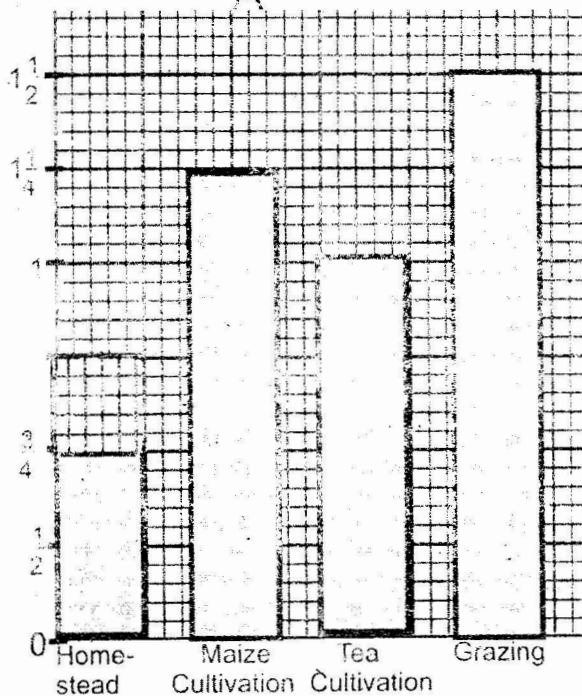| Purpose	Homestead	Maize Cultivation	Tea Cultivation	Grazing
Number of Hectares	$\frac{3}{4}$	$1\frac{1}{4}$	1	$1\frac{1}{2}$

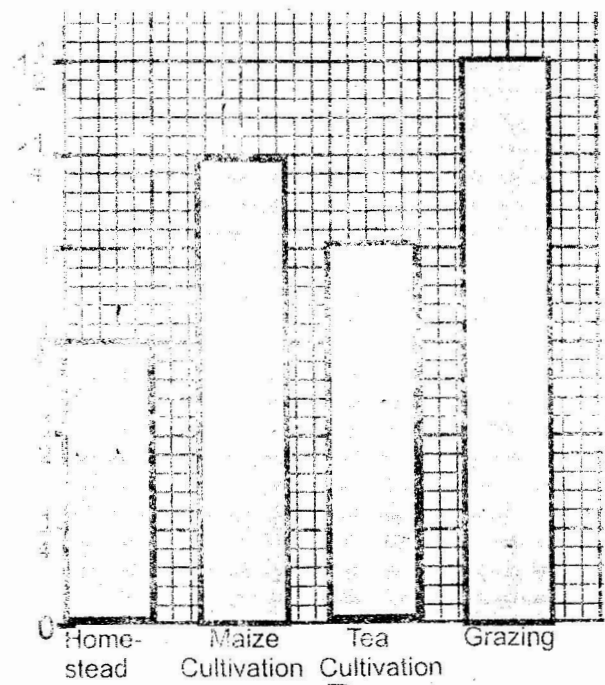Which one of the bar graphs below correctly represents the information above.

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)

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

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

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

$SI = sh.1,000$

Ndege (Compound Interest)

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

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

$= sh.500$

Amount =
$sh.10,000 + sh.500 = sh.10,500$

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

$= sh.525$

Therefore Compound Interest for 2 yrs

$= sh.500 + 525$
$= sh.1,025$

Therefore difference in interest $= sh.1025$
          $- sh.1,000$
          $= \underline{sh.25}$

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 × 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

Cash price = sh.4,500

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

Hire Purchase = sh.7,200

Hire Purchase = Deposit + Total Monthly Instalments.

Sh.7,200 = deposit + (12 × sh.540)

Sh.7,200 = deposit + sh.6,480 ···but deposit = HP − T.M.I

Deposit = sh.7200 − sh.6480
     = 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

Area of rectangle = Length × Width

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

But Length × Width = $\frac{1}{2}$b×h

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

$300cm^2 = 5 \times bcm$

Base = $\dfrac{300cm^2}{5cm}$

$= \underline{60cm}$

Choice C

33. What is the value of:
0.77 + 5.00 of (0.57 − 0.33) + 0.88x 0.4?

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

Solution

Apply BODMAS solve bracket first

0.77 + 5.00 of 0.24 + 0.88 × 0.4 ···

Solve 'of' next.

0.77 + 1.2 + 0.88×0.4 ··· solve multiplication next.

0.77+1.2+0.352 ······ 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
    Interpret the scale 1:50,000
    1cm rep 50 000cm
    1cm rep 500m
    Therefore, length 3cm will be 3 ×500m = 1500m
    Width 2cm will be 2 ×500m = 1000m
    Actual area = L × W = 1500m × 1000m
    = 1500 000m² ··· but 1ha = 10,000m²
    $$\therefore 1500000m^2 = \frac{1500000\,m^2}{10,000\,m^2}$$
    = 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. 1½m + 12 = 165
C. 3m + 12 = 165   D. 3m – 12 = 165
Solution
Mwangaza - M books
Kivuli – (M + 8) books ··· 8 more than Mwangaza.
Nuru - $\frac{1}{2}$(2m + 8) books ··· half the total of Mwangaza and Kivuli
$$\underline{\quad\quad 165 \quad\quad}$$
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 $\nearrow$ Boys $\frac{55}{100}$ ×800
    $\searrow$ Girls $\frac{45}{100}$ ×800
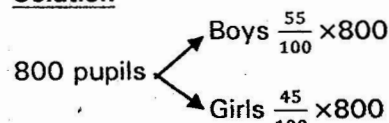
    In 2005 Boys were $\frac{55}{100}$ ×800 = 440
    Girls were $\frac{45}{100}$ ×800 = 360
    Increase girls by 20% thus $\frac{120}{100}$ ×360 = 432
    Decrease boys by 10% thus
    $\frac{90}{100}$ ×440 = 396
    Total number of pupils now = 432 + 396 = 828 pupils
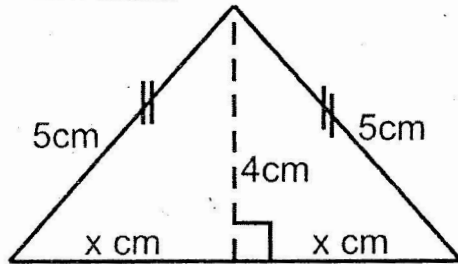   **Choice A**

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. 6cm²   B. 12cm²
    C. 15cm²   D. 24cm²
    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.
$x^2 = 5^2 - 4^2$
$x^2 = 9$
$x = 3cm$
thus the whole base $= 2x = 6cm$
area of triangle $= \frac{1}{2}b \times h$
$= \frac{1}{2} \times 6cm \times 4cm$
$= 12cm^2$
Choice B

39. The table below shows the number of creates 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

Find crates sold on Friday i.e
$84 - (8+10+11+18+16+8)$
$= 84 - 71$
$= 13$

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

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

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

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

$\frac{3}{8}b = 18$ books $b = 18 \times \frac{8}{3}$
$b = 48 \ books$

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

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

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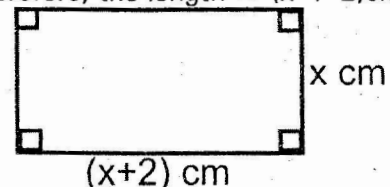
A. 15cm²   B. 20cm²
C. 35cm²   D. 143cm²

Solution

Let the width of the rectangle be x.
Therefore, the length $= (x + 2)$cm

(x+2) cm

Note: Length + Width = half the perimeter

$(x + 2) + x = 12$cm

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

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

$X = 5$

Therefore the width = x = 5cm

The length = $x + 2 = 5 + 2 = 7$cm.

Area = length × width

= 7cm × 5cm

= 35cm²

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 ⇒ 15 min or $\frac{1}{4}$hr

Speed ⇒ 18km/hr

Distance = Speed × Time

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

= 4.5km

Coming back; Distance = 4.5km

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

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

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

= 4ha

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

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

share 192 bags among 3 miller equally.

i.e $\frac{192}{3}$ bags = 64 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× W×H

= 1.5m × 0.5m× 1m

= 0.75m³   but 1m³ ≐ 1000L

Therefore 0.75m³ = (0.75×1000)L

= 750 Litres

Now, 1 container = 50 Litres

Therefore 750 litres $= \frac{750}{50} = 15$ 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 (10×30sec)

It loses 300 seconds = 5 minutes

Correct watch after 10 hrs will be

11.30pm (Sunday)+10 hours

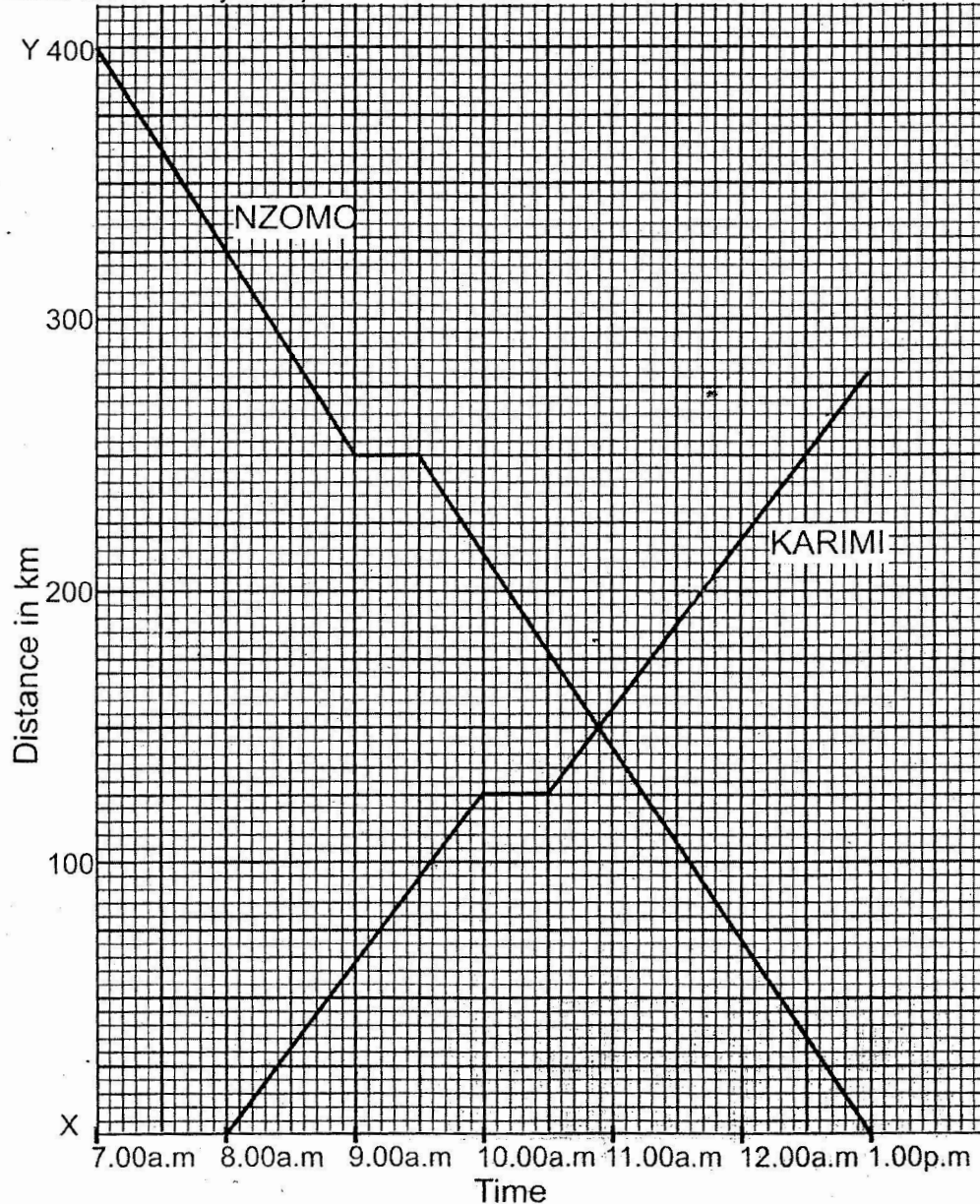= 9.30a.m. Monday.

But the faulty watch will have lost 5 minutes

i.e 9.30a.m – 5 minutes

= 9.25a.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
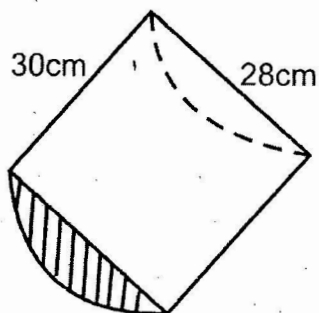Note: Vertical scale is 1cm rep. 25km.
At 10a.m Nzomo was (on the graph) 8.6cm from point x.
Thus 8.6cm × 25km
= 215km
Choice C

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 $\times -$ section
$= $ (Area of $\times -$ section $\times 2$) + (Perimeter of $\times -$section $\times$ length)

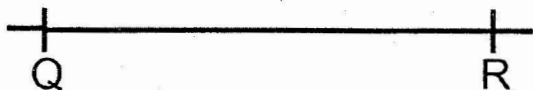$= (\frac{1}{2}\Pi r^2 \times 2) + \left(\left[\frac{1}{2}\Pi d \times d\right] \times \text{length}\right)$

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

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

$= 616cm^2 + 2160cm^2$

$= 2,776cm^2$

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.
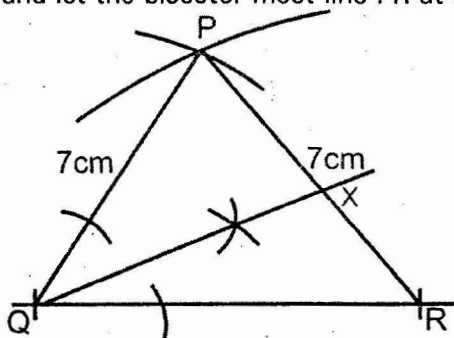

What is the size of angle QXR?

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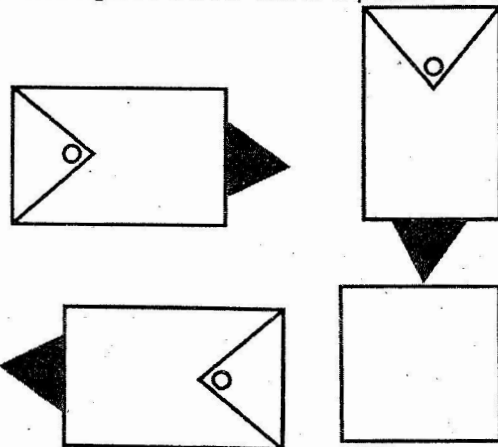
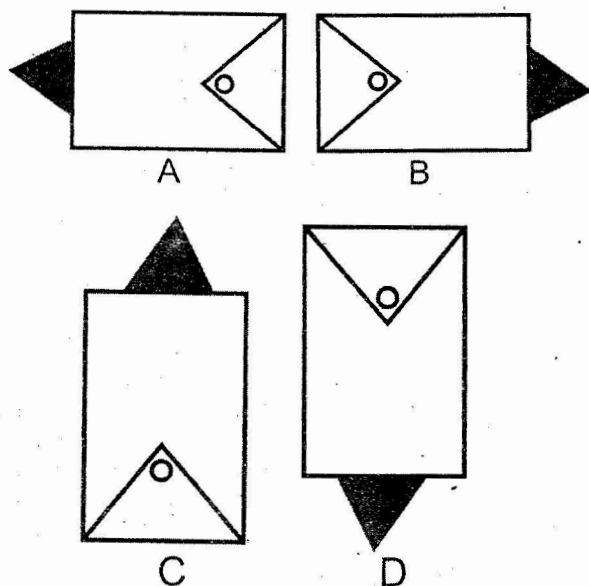Choose a suitable radius and bisect angle PQR and let the bisector meet line PR at X.

- Measure angle QXR
- Angle QXR is 78°

Choice A

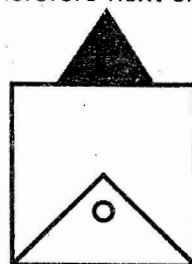50. The figures below show a pattern of shapes.

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