STEP-UP EXAMINATIONS BOARD

NATIONAL PRE-PLE SET TWO

2024

MATHEMATICS

Time allowed : 2 hours 30minutes

Random No.						Personal No.		

Pupil`s Name .....

Signature: .....

School Name.....

District Name.....

Read the following instructions carefully;

1. This paper has **two** sections: **A** and **B**. Section **A** has **20** questions and Section **B** has 1**2** questions.
2. Answer **all** the questions. **All** the answers for both sections **A** and **B** must be shown in the spaces provided.
3. All working must be done using a **blue** or **black** ball-point pen or fountain pen. Any work done in pencil other than graphs, pictures and diagrams will **not** be marked.
4. Unnecessary changes of work may lead to **loss** of marks.
5. Any handwriting that cannot easily be read may lead to **loss of marks.**
6. Do **not** fill anything in the boxes indicated: **"FOR EXAMINERS' USE ONLY"** and boxes inside the question paper.

FOR EXAMINERS' USE ONLY		
QN. NO.	MARK	EXR`S NO.
1 – 5		
6-10		
11 - 15		
16-20		
21 – 22		
23-24		
25 – 26		
27-28		
29-30		
31-32		
TOTAL		

SECTION A

1. Add 5+10

$$\begin{array}{r} 1\ \ 0 \\ +\ \ 5 \\ \hline 1\ \ 5 \end{array}$$

Learner should arrange according to the place value.

2. Simplify $^{-}8 - {}^{-}10$

$= {}^{-}8 - {}^{-}10$

$= {}^{-}8 - ({}^{-}10$

$= 8 + 10$

$= {}^{+}2$

Maid map method

Accept the use of a number line.

3. Write in short $4x+5-2(x-6)$

$4x+5-2x+12$

$4x+5-2x+12$

$4x-2x+5+12$

$2x+17$

Emphasize opening brackets

4. Express **CDXLIV** in Hindu Arabi numerals.

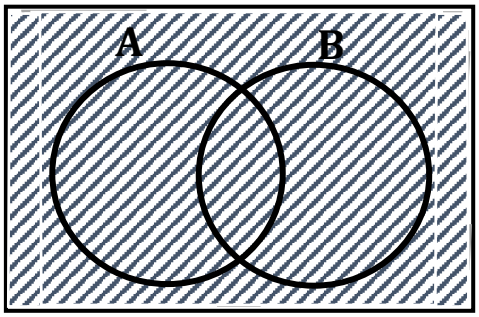
CDXLIV = CD XL IV

=400+40+4

=444

Addition sign is not put in the Romans.

5. Describe the shaded part in the Venn diagram.



The universal set

Or

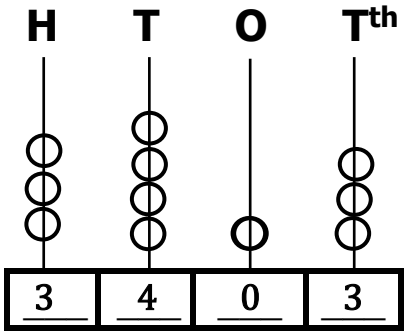
(Ɛ)

Give more examples on regions of Venn diagrams.

6. Add

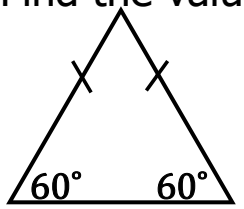
	Hours	Minutes	
	4	45	45+25=70
+	3	25	70÷60=40
	8	10	

7. Write the number on the abacus below in words.



Three hundred and forty and three tenths.

8. 60° is one of the base angle of a triangle with one folding symmetry. Find the value of **Y**.



$Y+60^\circ+60^\circ=180^\circ$

$Y+120^\circ=180^\circ$

$Y+120^\circ-120^\circ=180^\circ-120^\circ$

$Y=60^\circ$

NOTICE: Two base angles of an isosceles triangle are equal.

The sum of all interior angles of any triangle is 180°.

9. Write $(8 \times 10^2) + (7 \times 10^2) + (8 \times 10^2)$ as a single numeral.

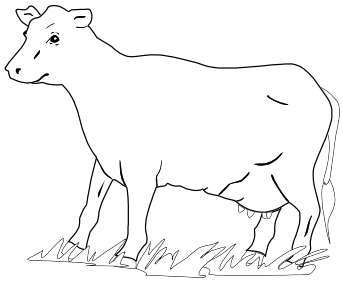
$= (8 \times 10^2) + (7 \times 10^2) + (8 \times 10^2)$

$= (8 \times \frac{1}{10}) + (7 \times 1) + (8 \times 100)$

$= 0.08 + 7 + 800$

$= 807.08$

10. How many folding symmetries has the shape below.



1 line of folding symmetry

11. Solve for me

Cats	Cows	Hens	Goats
2m%	25%	4 x%	15%

$2m + 25\% + 4m + 15\% = 100\%$

$2m + 4m + 255 + 15\% = 1005$

$6m + 40\% - 40\% = 100\% - 40\%$

$$\frac{6m}{6} = \frac{60\%}{6}$$

$$\underline{m = 10\%}$$

12. Workout $\frac{3}{5} + 1\frac{1}{2}$

$= \frac{3}{5} + 1\frac{1}{2}$

$= \frac{3}{5} + \frac{3}{2}$

$$= \frac{\left(\frac{3}{5_1} \times 10_2\right) + \left(\frac{3}{2_1} \times 10_5\right)}{10}$$

$$= \frac{6 + 15}{10}$$

$$= \frac{21}{10}$$

$= 2.1$ or $2\frac{1}{10}$

13. Convert 72km/hr to m/s.

$1km = 1000m$

$72km = (72 \times 1000)\ m$

$= 72000m$

Time

$1\ hour = 3600s$

$$Speed = \frac{72000^{20}m}{3600_1 s}$$

$= 20m/s$

14. Workout $45_{ten} \div 101_{two}$

$= 45_{ten} \div 101_{two}$

$= 45 \div (1 \times 2^2)\ 0 + (1 \times 1^0)$

$= 45 \div 4 + 1$

$= \underline{9}$

15. Find the area of a square garden whose perimeter is 30cm.

Perimeter $= S + S + S + S$

$30\text{ cm} = 4S$

$\frac{\overset{15}{\cancel{30}}\text{ cm}}{\cancel{4}_{2}} = \frac{4S}{\cancel{4}}$

$15\text{ cm} = S$

Area $= L^2$

$= \frac{15\text{ cm}}{2} \times \frac{15\text{ cm}}{2}$

$= \frac{\overset{56\text{ r }1}{225}\text{ cm}^2}{\cancel{4}_{1}}$

Area $= 56\frac{1}{4}\text{ cm}^2$

16. The ratio of three Supplementary angle is 2:3:5. Find the value of X,Y and Z respectively.

Total ratio

$= 2 + 3 + 5$

$= \underline{10}$

$Lx = \frac{2}{\cancel{10}} \times 18\cancel{0}^\circ$

$= \underline{36^\circ}$

$Ly = \frac{3}{\cancel{10}} \times 18\cancel{0}^\circ$

$= \underline{54^\circ}$

$Lz = \frac{5}{\cancel{10}} \times 18\cancel{0}^\circ$

$= \underline{90^\circ}$

17. Given the sequence below, find the next diagram.

$\frac{2}{4}$ $\frac{3}{6}$ $\frac{4}{8}$ $\frac{5}{10}$

$\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$

$\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$

$\frac{1}{2} \times \frac{4}{4} = \frac{4}{8}$

$\frac{1}{2} \times \frac{5}{5} = \frac{5}{10}$

$\frac{1}{2} \times \frac{6}{6} = \frac{6}{12}$

18. Solve $2^{2x} \times \frac{1}{25} = 10^2$

$\frac{1}{2^{2x}} \times \frac{1}{25} = \frac{1}{100}$

$2^{-2x} \times 25^{-2} = 100^{-1}$

$2^{-2x} \times 5^{-2} = 100^{-1}$

$2^{-2x} \times 5^{-2} = 2^{-2} \times 5^{-2}$

$2^{-2x} = 2^{-2}$

$\frac{-2x}{-2} = \frac{-2}{-2}$

$x = 1$

19. Jackson's circular garden has an area of $38.5cm^2$. Find is radius.

$\pi r^2 = \text{Area}$

$\frac{22r^2}{7} = 38.5\text{cm}^2$

$\frac{7}{22} \times \frac{22r^2}{7} = 38.5\text{cm}^2 \times \frac{7}{22}$

$r^2 = \frac{35}{\cancel{38.5}} \times \frac{7}{\cancel{22}_2}\ \text{cm}^2$

$r^2 = \frac{49}{4}\ \text{cm}^2$

$\sqrt{r^2} = \sqrt{\frac{49}{4}}$

$r = \frac{7}{2}$

$r = 3\frac{1}{2}cm$

20. Chiplimo who is an athlete covered a distance of 3600 metres during a race within 5 minutes. If each step he made had an interval of 2 metres.

$$\text{Number of intervals} = \frac{\text{Distance}}{\text{Interval}}$$

$$= \frac{3600^{1800}}{\cancel{2}_{1}}$$

$$= 1800$$

Number of foot marks

$$= 1800 + 1$$

$$= 1801 \text{ marks}$$

SECTION B

21. (a) Express $0.1777\_\_\_$ to a rational number in its simplified form.

Let the fraction be x

$x += 0.1777...$ (I)

$100 \times x = 0.1777... \times 100$

$100x = 17.777...$ (II)

$x = 0177...$

$99x = 17.6$

$\frac{99x}{99} = \frac{17.6}{99}$

$x = \frac{176}{10} \div 99$

$x = \frac{\cancel{176}^{\cancel{88}^{8}}}{\cancel{10}_{5}} \times \frac{1}{\cancel{99}_{9}}$

$x = \frac{8}{45}$

(b) Simplify $\frac{0.75+(o.5)^2}{0.45-0.25}$

$$\frac{0.75 + (o.5)^2}{0.45 - 0.25}$$

$$\begin{array}{r} {}^{1}\cancel{0}.{}^{1}7\,5 \\ +\,0.2\,5 \\ \hline 1.0\,0 \end{array}$$

$$\begin{array}{r} 0.4\,5 \\ -\,0.2\,5 \\ \hline 0.2\,0 \end{array}$$

$1 \div 2$

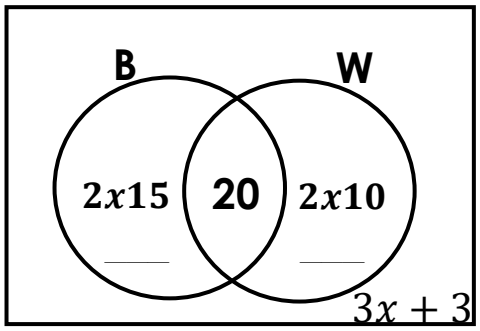
$\frac{}{10}$

$1 \times \frac{\cancel{10}^{5}}{\cancel{2}_{1}}$

$= 5$

22. At a wedding party, 20 guests took both beer (B) and water (W). $2x$+ 10 took water but not beer. 5 more guests took beer than those who took water but not beer. $3x + 3$+ took neither of the drinks.

(a) Complete the Venn diagram below.



$2x10 + 10 + 5$

$2x15$

(b) If the guests who took $(B - W)$ are half those who took $(W - B)$ and $(BUW)'$. Find $n(BUW)'$

$2x+15 = ½ (2x + 3x+10 + 3)$

$2x+ 15 = ½ (5x+13)$

$2(2x+15) = \frac{5x+13\times 2}{2}$

$4x+30 = 5x+13$

$4x-5x+30= 5x-5x+13$

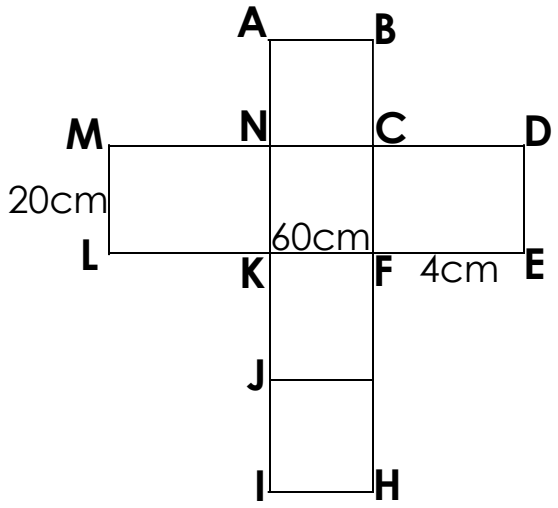
$-x+30 = 13$

$-x+30-30 = 13-30$

$\frac{-x}{-1} = \frac{-17}{-1}$

$x = 17$

23. The figure is of a 3 dimensional shape, study it carefully and use it to answer the questions that follow.



(a) Find the capacity of fuel which can fill the container above.

$\text{Volume} = L \times W \times H$

$\text{Volume} = 60\text{cm} \times 20\text{cm} \times 40\text{cm}$

$\text{Volume} = 48000\text{cm}^2$

$\text{Capacity} = \frac{48\cancel{000}\ \text{cm}^2}{1\cancel{000}\text{cm}^2}$

$\text{Capacity} = 48\text{L}$

(b) If one sells 2 litres of petrol at Shs 3000. How much money can he get by selling 20% of the petrol?

20% of petrol

$\frac{20\%}{100} \times 48$

$\frac{48\text{L}}{5}$

$2\text{L} = \text{sh. } 3000$

$1\text{L} = \frac{\text{sh. } \overset{1500}{\cancel{3000}}}{\cancel{2}_1}$

$\frac{48\text{L}}{5} = \frac{48}{\cancel{5}} \times \text{sh. } \overset{300}{\cancel{1500}}$

$= 48 \times \text{sh. } 300$

$= \text{sh. } 14400$

24. The two consecutive odd numbers are $5x - 2$ and $3x + 3 = 2$.

(a) Find the value of x.

$(3x+3) - (5x-2) = 2$

$3x+3-5x+2 = 2$

$3x-5x+3+2 = 2$

$-2x+5 = 2$

$-2x+5-5 = 2-5$

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

$x = 1\frac{1}{2}$

(b) Find the sum of the third odd number the first odd number.

$n\left(\frac{n+1}{2}\right)$

$11\left(\frac{11+11}{2}\right)$

$11 \times \frac{12^{6}}{2_{1}}$

11×6

66

Square $= 66 \times 66$

$= 4356$

25. Jane spent Shs 59600 to buy the following items as shown below;

2kg of Rice at sh 3000 per kg.

$1\frac{1}{2}$litres of Milk for Sh 3600 per quarter litre.

3 bars of soap for Sh **Y** per bar.

2 trays of eggs at Sh 20000.

(a) Find the value of **Y.**

Rice $= 2 \times$ sh. 3000

$=$ sh. 6000

Soap $= 3 \times y$

$= 3y$

Milk $= \frac{1}{4}$L $=$ sh. 3600

1L $=$ sh. 300×4

$=$ sh. 14400

$\frac{3}{2}$L $=$ sh. $\frac{72}{14400} \times \frac{3}{2_{1}}$

$=$ sh. 21600

Subtotal

Sh. 21600

Sh. 6000

Sh. 20000

Sh. 47600

Soap $=$ sh. 59600 – sh. 47600

$=$ sh. 12000

$\frac{3Y}{3} = \frac{\text{sh. } 12000}{3_{1}}$ (4)

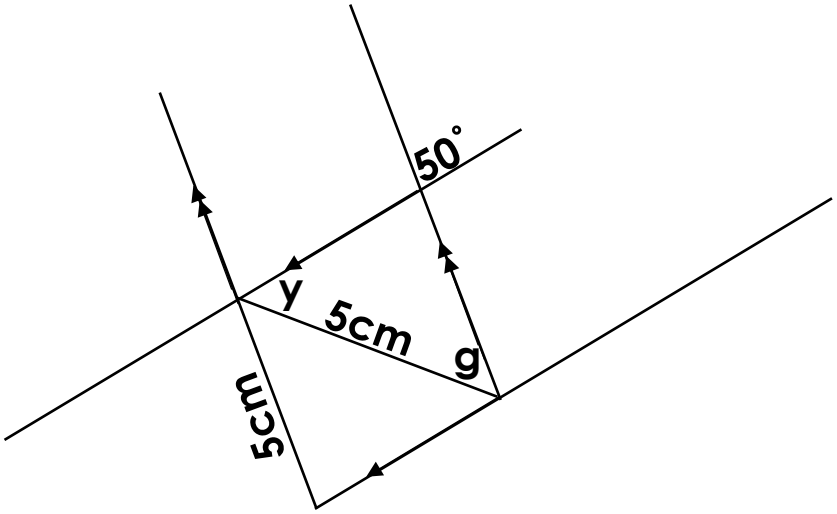
Y $=$ sh. 4000

(a) If he was given a discount of Sh 2000. How much was he supposed to pay?

Sh. 59600 – sh. 2000

Sh. 57600

26. Study the figure below and answer the following questions.



(b) Find the value of y.

$y+50^\circ+50^\circ = 180^\circ$

$y+100^\circ = 180^\circ$

$y+100^\circ-100^\circ = 180^\circ-100^\circ$

$y = 80^\circ$

(b) Calculate the value of g.

$50^\circ+80^\circ = g + 50^\circ$

$130^\circ = g + 50^\circ$

$130^\circ-50^\circ = g + 50^\circ-50^\circ$

$80^\circ = g$

$\angle g = 80^\circ$

27. Rat A takes 6 minutes to dig a hole of 2 metres deep, Rat M takes 8 minutes to dig the same hole of 2 metres deep while Rat D takes only x minutes to fill the 2 metre hole with soil. If all the three Rats working together at the same time take 24 minutes to dig the same 2 metre hole deep. Find the value of x.

$\frac{1}{6}+\frac{1}{8}-\frac{1}{x}$

$\frac{4x+3x-24}{24x}$

$=\frac{7x-24}{24x}$ of the hole

Time they take

$=1\times\frac{7x-24}{24x}$

$=1\times\frac{24x}{7x-24}$

$=\frac{1\times 24x}{7x-24}$

$=\frac{24x}{7x-24}$

$24x=\frac{24x}{7x-24}$

$24(7x-24)=24x$

$168x-576=24x$

$168x-24x-576=24x-24x$

$144x-576=0$

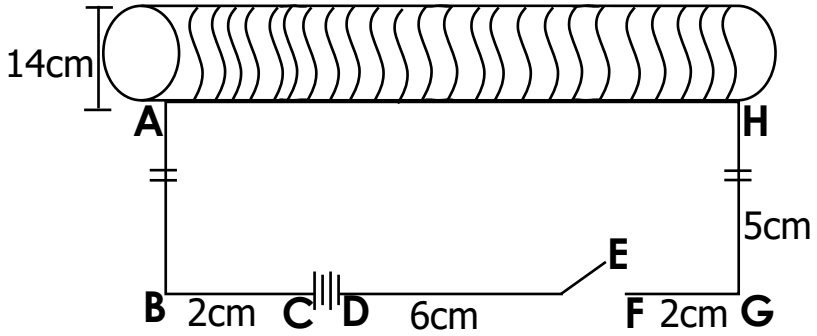
$144x-576+576=576$

$\frac{144x}{144}=\frac{576}{144}^{4}_{1}$

$x = 4$ minutes

28. Using a sharp pencil, a pair of compass and a ruler, construct a quadrilateral PQRS. Where P.Q =8cm, <SPQ=<PQR=60° and QR=PS=8cm. Drop a perpendicular from point S to meet PQ at point M.

29. A P.7 candidate carried out an experiment of making a temporary magnet (electrical method). Study it carefully and answer the questions that follow.



(a) If the candidate wound the wire in the solenoid 200 turns. Find the total length of the wire the candidate used in the experiment in metres.

Length of the wire in the solenoid.

No. of Revolution × Circumference

$200\times\frac{22}{\cancel{7}_{1}}\times\frac{\cancel{14}^{2}}{1}\text{cm}$

30800cm

Total length

=30800cm+2cm+6cm+2cm+5cm+5cm

$=\frac{30820\cancel{0}\text{m}}{10\cancel{0}}$

=30.82m

(b) If each metre of the wire used costed the candidate Sh 1,000. How much did the candidate spend?

$1\text{m} = \text{sh. } 1000$

$30.82 = 30.82 \times 1000$

$= \text{sh. } \frac{3082 \times 1000}{100}$

$= \text{sh. } 30820$

30. (a) Find the inverse of 9.

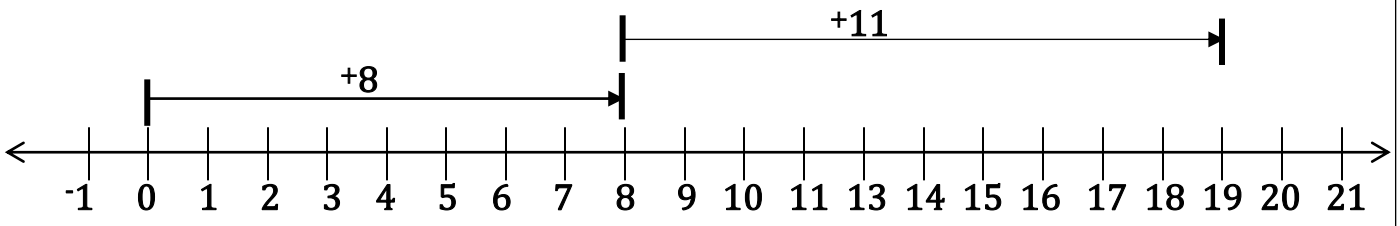
Let it be x

$x + 9 = 0$

$x + 9 - 9 = 0 - 9$

$x = {}^{-}9$

(b) (i) During a dancing practice, Martha was asked by the trainer to move forward 8 steps and 11 steps. With the aid of a number line. Find the new position for Martha after the movement.

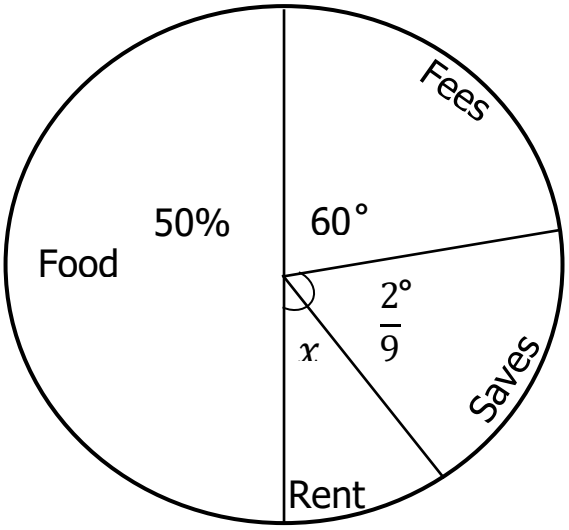


$= {}^{+}9$

(ii) write the Mathematical statement for Martha's movement.

${}^{+}8 + {}^{+}11 = 19$

31. Below is a pie chart showing how Mr. English spent his monthly salary. Use it to answer the questions that follow.



(a) Find the value of x.

Food

$\frac{50}{100}\times 360^\circ$

$=180^\circ$

Slaves

$\frac{2^\circ}{9_1}\times \frac{40}{360^\circ}$

$=80^\circ$

$x+180^\circ+60^\circ+80^\circ=360^\circ$

$x+320^\circ=360^\circ$

$x+320^\circ-320^\circ=360^\circ-320^\circ$

$x=40^\circ$

(b) If he spends sh 30000 more on fees than rent. How much is his monthly salary?

$\frac{60}{360}^\circ=\frac{1}{6}$

$\frac{1}{6}=$ sh. 30000

Q÷F

Sh.$30000\div\frac{1}{6}$

Sh. $30000\times\frac{6}{1}$

Sh. 180000

32. Denis was asked to the instructions by his teacher as follows;

Instruction 1

(i) Multiply 3 by x, subtract 2 from the result and finally get ½ of the result.

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

$\overset{3}{\cancel{6}} \times \frac{1}{\cancel{2}_1}(3x-2) = \overset{2}{\cancel{6}} \times \frac{2}{\cancel{3}_1}(2x+3)$

$3(3x-2) = 4(2x+3)$

$9x - 6 = 8x+12$

$9x - 8x - 6 = 8x - 8x\ 12$

$x - 6 = 12$

$x - 6 + 6 = 12 + 6$

$x = 18$

Instruction 2

(ii) Multiply 2 by x, add the results to 3 and finally get two thirds of the results.

If the two expressions formed are equal. Find the value of x.

$x + 3000 = \frac{2}{5}(3x+3000)$

$5(x+3000) = \frac{2}{5}(3x+3000)$

$5x15000 = 6x+6000$

$5x - 6x + 15000 = 6x + 6000$

$-x + 15000 = 6000$

$-x + 15000 - 15000 = 6000 - 15000$

$\frac{-x}{-1} = \frac{-9000}{-1}$

$x = \text{sh. } 9000$

(b) The cost of a book is Sh 3000 more than the cost of a fountain pen and the cost of a school bag is more than the cost of a book by the cost of a fountain pen.

If the cost of a book is equal to the two fifth of the sum of the fountain pen and school bag. Find the cost of a school bag.

Book	Fountain pen	Bag	School bag
$3000+x$	x	$2x+3000$	$2x+3000$
Book $\frac{2}{5}$	(Pen+Bag)		$2\times9000+3000$
			Sh. 21000

$3000+x=\frac{2}{5}(x+3000)$

END.