

THE E-LEARN EXAMINATIONS BOARD

PRE NATIONAL MOCK 2024

SET THREE / FOUR

MATHEMATICS GUIDE

Time Allowed: 2 hours 15 minutes



Index No.

EMIS No.						Personal No.		

COMPILED: **TR. ARNOLD MARK LUGOLOOBI** 0701619504

Read the following instructions carefully:

1. Do not forget to write your **school** or **district name** on the paper.
2. This paper has two sections: **A** and **B**. Section **A** has **20** questions and section **B** has **12** questions. The paper has **12** printed pages altogether.
3. Answer **all** questions. **All** working for both sections **A** and **B** must be shown in the spaces provided.
4. **All** answers **must** be written using a **blue** or **black** ball point pen or ink. Any work written in pencil will **not** be marked.
5. Unnecessary **changes** in your work and handwriting that cannot be read easily may lead to **loss of marks**.
6. Do not fill anything in the table indicated: **"For Examiners' use only"** and boxes inside the question paper

FOR EXAMINERS' USE ONLY		
Qn. No.	MARKS	EXR'S NO.
1 – 5		
6 – 10		
11 – 15		
16 – 20		
21 – 22		
23 – 24		
25 – 26		
27 – 28		
29 – 32		
TOTAL		

SECTION A: 40 MARKS

Answer **all** the questions in this section.

Questions **1** to **20** carry two marks each.

1. Work out 105×3

$$\begin{array}{r} 105 \\ \times 3 \\ \hline 315 \end{array}$$

$$\begin{array}{l} 5 \times 3 = 15 \\ 3 \times 0 = 0 + 1 = 1 \\ 3 \times 1 = 3 \end{array}$$

B₂ for 315

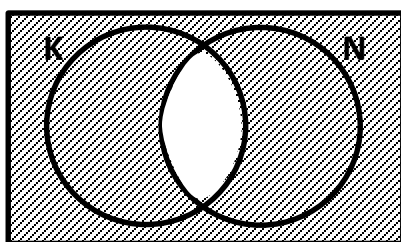
2. Write 93,242 in words

Thousands	Units
93	242
Ninety three	Two hundred forty two

*B₂ for correct numbers
with hyphens*

Ninety-three thousand, two hundred forty-two

3. Describe the un-shaded part



Set $K \cap N$

B₂ for Set $K \cap N$

4. Find the square of the next number in the sequence

1, 2, 6, 15, 31, 56

+1 +4 +9 +16 +25

$$1+1=2$$

$$2+4=6$$

$$6+9=15$$

$$15+16=31$$

$$31+25=56$$

Square

$$56^2 = 56 \times 56$$

$$= \underline{\underline{3,136}}$$

*B₁ for 56 from a correct
working.*

B₁ for 3136

5. Round off 39.95 to the nearest tenths.

T	O		Ths	Hths
3	9	.	9	5

39.9

+ 0.1

40.0

M₁ for correct working.

A₁ for 40.0

6. Simplify $9y + 3k - 4y - 2k$.

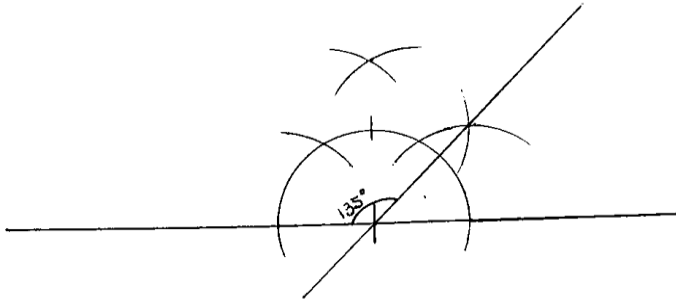
$$9y - 4y + 3k - 2k$$

$$\underline{5y + k}$$

M₁ for collecting like terms

A₁ for $5y+k$

7. Using a pair of compasses, a sharp pencil and a ruler only. Construct angle of 135°



B₁ for construction

A₁ for identification of 135°

8. Convert a square metres to square centimetres.

$$1\text{m}^2 = (100 \times 100)\text{cm}^2$$

$$1\text{m}^2 = 10,000\text{cm}^2$$

$$9\text{m}^2 = (9 \times 10,000)\text{cm}^2$$

$$\underline{= 90,000\text{cm}^2}$$

M₁ for multiplication of $9 \times 10,000\text{cm}^2$

A₁ for $= 90,000\text{cm}^2$

9. Write 243 in Roman Numerals.

H	T	O
2	4	3

$$(2 \times 100) + (4 \times 10) + (3 \times 1)$$

$$200 + 40 + 3$$

$$200 = \text{CC}$$

$$40 = \text{XL}$$

$$\underline{+3 = \text{III}}$$

$$\underline{243 = \text{CCXLIII}}$$

M₁ for expanding.

A₁ for $243 = \text{CCXLIII}$

10. Bwegombwe covered 40km of her journey. She left $\frac{3}{5}$ of the whole journey.

Find the distance which was left.

Fraction she covered

$$\begin{array}{r} \frac{5}{5} - \frac{3}{5} \\ \hline \frac{5-3}{5} \\ \hline = \frac{2}{5} \end{array}$$

Whole journey

Let the whole journey be k

$$\frac{2}{5} \text{ of } k = 40\text{km}$$

$$5 \times \frac{2}{5} \text{ of } k = 40\text{km} \times 5$$

$$\frac{2k}{2} = \frac{40 \times 5}{2}$$

$$K = 20\text{km} \times 5$$

$$\underline{K = 100\text{km}}$$

Distance left

$$100\text{km} - 40\text{km}$$

$$\underline{= 60\text{km}}$$

B₁ for 100 km

A₁ for 60 km

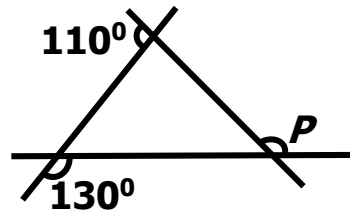
11. Find the size of angle P in the diagram below.

$$P + 110^\circ + 130^\circ = 360^\circ$$

$$P + 240^\circ = 360^\circ$$

$$P + 240^\circ - 240^\circ = 360^\circ - 240^\circ$$

$$P = 120^\circ$$



M₁ for correct equation

formed

A₁ 120°

12. Find the square root of $1\frac{7}{9}$

$$\begin{aligned} \sqrt{1\frac{7}{9}} &= \sqrt{\frac{16}{9}} \\ &= \frac{\sqrt{16}}{\sqrt{9}} \\ &= \frac{4^{1 \times 1}}{3} \\ &= 1\frac{1}{3} \end{aligned}$$

M₁ for correct prime factorisation

A₁ for $1\frac{1}{3}$

Reject $\frac{4}{3}$

Reject the use of non-prime factors

When prime factorizing.

13. In a line of 37 trees, eucalyptus is in the middle. Find its position.

$$\text{No of trees} = (\text{position} \times 2) - 1$$

$$37 = (p \times 2) - 1$$

$$37 = 2p - 1$$

$$37 + 1 = 2p - 1 + 1$$

$$38 = 2p$$

$$\frac{38}{2} = \frac{2p}{2}$$

$$19 = P \quad \underline{P = \text{nineteenth position}}$$

M₁ for correct equation

A₁ for 19th/nineteenth position

14. Convert 142_{ten} to quinary base.

B	No	R
5	142	2
5	28	3
5	5	0
5	1	1
	0	



1032_{five}

M₁ for correct working

A₁ for 1032_{five}

15. A motorist moves at a speed of 12 m/sec. Find the distance he covered in 15 minutes

$$D = S \times T$$

$$= (12 \times 15 \times 60) \text{m}$$

$$= \underline{10800 \text{m}}$$

$$\text{Time in seconds}$$

$$1 \text{ minute} = 60 \text{ mins}$$

$$15 \text{ mins} = 15 \times 60 \text{seconds}$$

$$D = S \times T$$

$$D = 12 \text{m/sec} \times 900 \text{sec}$$

$$= \underline{10800 \text{m}}$$

M₁ for (12x15x60)m

A₁ for 10800m

16. The least number that can be divided by either 18 or K leaving 4 as the remainder is 40. The greatest common factor of 18 and K is 6. Find the value of K.

$$\begin{aligned} \text{LCM} &= 40 - 4 \\ &= 36 \\ K &= \frac{\text{LCM} \times \text{GCF}}{18} \end{aligned} \quad \left| \quad \begin{aligned} K &= \frac{36^2 \times 6}{18} \\ K &= 2 \times 6 \\ K &= 12 \end{aligned} \right.$$

B₁ for LCM

A₁ for 12

17. The volume of a cylindrical tank below is 3234cm^3 , its diameter is 14cm. Find the height. (use $\pi = \frac{22}{7}$)

$$V = \pi r^2 h$$

$$3234\text{cm}^3 = \frac{22}{7} \times \frac{14^2\text{cm}}{2} \times \frac{14^2\text{cm}}{2} \times h$$

$$3234\text{cm}^3 = \frac{22}{7} \times 7 \times 7\text{cm} \times h$$

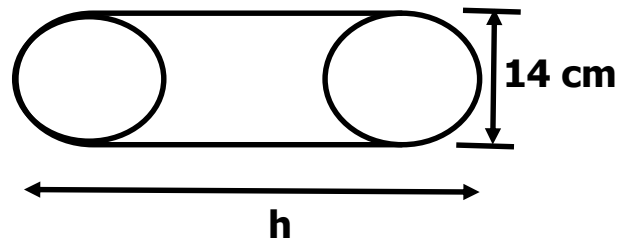
$$3234\text{cm}^3 = 22 \times 1\text{cm} \times 7\text{cm} \times h$$

$$\frac{3234\text{cm}^3}{154\text{cm}} = \frac{154\text{cm}h}{154\text{cm}}$$

$$\underline{h = 21\text{cm}}$$

M₁ for correct substitution

A₁ for 21cm



18. Work out $(326 \div 6) - (284 \div 6)$ using distributive property.

$$(326 - 284) \div 6$$

$$42 \div 6$$

$$= \underline{7}$$

M₁ for correct application of distributive property.

A₁ for 7

19. A business lady bought a pair of shoes at shs 55,000. She sold it making a loss of 2500. Find her selling price.

$$\text{S.P} = \text{CP} - \text{L}$$

$$= \text{shs. } 55,000 - \text{sh. } 2500$$

$$= \underline{\text{sh. } 52,500}$$

M₁ for correct subtraction.

A₁ for sh. 52,500

20. Solve for y: $2^3 \times 3^y = 72$

$$\begin{array}{r} 2 \overline{) 72} \\ 2 \overline{) 36} \\ 2 \overline{) 18} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

$$2^3 \times 3^y = 72$$

$$2^3 \times 3^y = 2 \times 2 \times 2 \times 3 \times 3$$

$$2^3 \times 3^y = 2^3 \times 3^2$$

$$\frac{2^3 \times 3^y}{2^3} = \frac{2^3 \times 3^2}{2^3}$$

$$3^y = 3^2$$

$$\underline{y = 2}$$

M₁ for factorizing 72

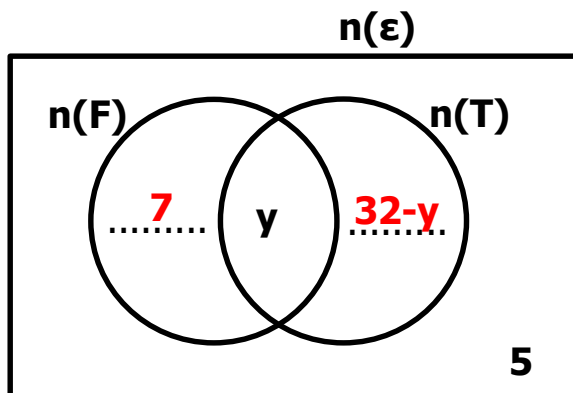
A₁ for 2

SECTION B: 60 MARKS

Answer **all** questions in this section.

Marks for each question are indicated in brackets.

21. In a group of players, 32 players like playing Tennis (T), 7 like playing football only, y like playing both games and 5 do not play any of the two games
- a) Complete the venn diagram below (2 marks)



B_1 for each correct entry.

- b) If 27 players like playing football, How many players are in the group (2 marks)

Value of y

$$7 + y = 27$$

$$7 - 7 + y = 27 - 7$$

$$\underline{y = 20}$$

Players in the group

$$7 + y + 32 - y + 5$$

$$7 + 20 + 32 - 20 + 5$$

$$7 + 20 + 32 + 5 - 20$$

$$64 - 20$$

$$\underline{44 \text{ players}}$$

B_1 for correct equation.

B_1 for 44 **players**

- c) Find the probability of selecting a player who does not play any of the two games. (1 mark)

$$\text{Probability} = \frac{D.C}{T.C}$$

$$= \frac{5}{44}$$

B_1 for $\frac{5}{44}$

22. (a) Work out $\frac{1}{2} - \frac{1}{3} + \frac{5}{6}$ (2 marks)

BODMAS

$$\left(\frac{1}{2} + \frac{5}{6}\right) - \frac{1}{3}$$

$$\frac{(3 \times 1) + (1 \times 5)}{6} - \frac{1}{3}$$

$$\frac{3 + 5}{6} - \frac{1}{3}$$

$$\frac{8}{6} - \frac{1}{3}$$

$$\frac{(1 \times 8) - (2 \times 1)}{6}$$

$$\frac{8 - 2}{6}$$

$$\frac{6}{6}$$

$$= \underline{1}$$

M_1 for application of BODMAS.

A_1 for **1**

(b) Express 54.666... as a rational number (3 marks)

Let the fraction be k

K=54.666... eqn 1

k×100 = 54.666×100

100k = 5466.666...eqn 2

- k= 54.666...

99k= 5412.000...

Equation 2 – Equation 1

$$\frac{99k}{99} = \frac{5412.000}{99}$$

$$k = \frac{164.54r2}{3}$$

$$k = 54\frac{2}{3}$$

M₁ for k=54.666....(I)

M₁ for 99k= 5412.0...(II)

A₁ for k = 54 $\frac{2}{3}$

23. Julian has 32 roses and 48 tulips, she wants to make flower arrangements with the same number of each flower in each arrangement.

a) What is the highest number of arrangement can she make? (3 marks)

$$\begin{array}{r|rr} 2 & 32 & 48 \\ \hline 2 & 16 & 24 \\ \hline 2 & 8 & 12 \\ \hline 2 & 4 & 6 \\ \hline 2 & 2 & 3 \end{array}$$

Highest number of arrangement

(2×2) ×(2x2)

4×4

16

M₁ for prime factorization.

M₁ for multiplication.

A₁ for 16

b) How many roses will be in each arrangement? (1 mark)

$$\left(\frac{32}{16} \text{ roses}\right)$$

= 2 roses

B₁ for 2 roses

c) How many tulips will be in each arrangement?

$$\frac{48}{16} = \underline{\underline{3 \text{ tulips}}}$$

A₁ for 3 tulips

24. The table shows a motorist's journey from town A to town E

Town	Arrival	Departure
A		9:00am
B	9:35am	10:00am
C	10:45am	11:00am
D	11:30am	12 noon
E	12:55pm	

a) How long did the motorist take travelling from Town A to E (2 marks)

Hrs : Minutes

12 : 55

- 9 : 00

3 : 55

He took 3 hours and 55 minutes

M₁ for subtraction

A₁ for 3hrs 55 minutes

Emphasize the use of units

b) How long did the motorist stay at town C? (1 mark)

Hrs : Minutes

11 : 00 am

-10 : 45 am

15 minutes

B₁ for 15 mins

c) Find the average speed of the motorist for the whole journey if distance covered was 200km (2 marks)

$$\text{Average speed} = \frac{TDC}{TTT}$$

$$= 200\text{km} \div 3 \frac{55}{60} \text{hrs}$$

$$= 200\text{km} \times \frac{235}{60} \text{hrs}$$

$$200^{40} \text{km}$$

$$\times \frac{60}{235_{47}} \text{hrs}$$

$$40\text{km} \times \frac{60}{47} \text{hrs}$$

$$2400^{51r3}$$

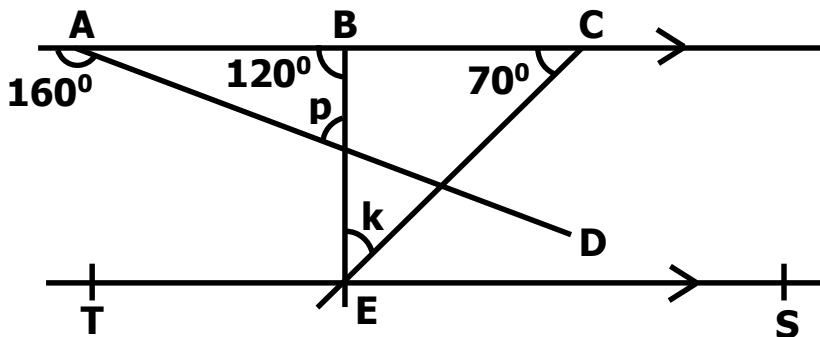
$$47$$

$$= 51 \frac{3}{47} \text{km/hr}$$

M₁ for division

A₁ for $51 \frac{3}{47} \text{km/hr}$

25. In the diagram below, line AC is parallel to TS. Angle ABC is 120° and angle ECA is 70° . Study it and answer the questions that follow



a) Find the size of $\angle CKB$ (2 marks)

$$K + 70^\circ = 120^\circ \text{ (two interior } \angle\text{s equal to one opposite exterior } \angle\text{)}$$

$$K + 70^\circ - 70^\circ = 120^\circ - 70^\circ$$

$$\underline{K = 50^\circ}$$

M₁ for correct equation

A₁ for 50°

b) Find $\angle APB$ (2 marks)

$$P + 120^\circ = 160^\circ \text{ (two int } \angle\text{s equal to 1 opp ext } \angle\text{)}$$

$$P + 120^\circ - 120^\circ = 160^\circ - 120^\circ$$

$$\underline{P = 40^\circ}$$

M₁ for correct equation

A₁ for 40°

26. Kikonyogo went with 15 notes of ten thousand to the town and bought 4kg of meat at shs 10,000 per kg, 2 bunches of matooke at shs. 18,000, 3kg of rice at shs 5000 per kg and 500gm of Kimbo at shs 15000 per 200g.

How much change did he get after paying for all the items (5 marks)

Meat

Sh 10,000

$\times \quad 4$

Sh 40,000

Kimbo

500

$\frac{500}{200} \times sh\ 15000^{7500}$

Sh 37,500

Total expenditure

Sh. 37,500

Sh. 15,000

Sh. 40,000

+sh. 18,000

Sh. 110,500

Matooke

Sh 18000

Rice

Sh 5,000

$\times \quad 3$

Sh15,000

Change

Sh. 150,000

-sh. 110,500

Sh. 39,500

B₁ for Sh 40,000

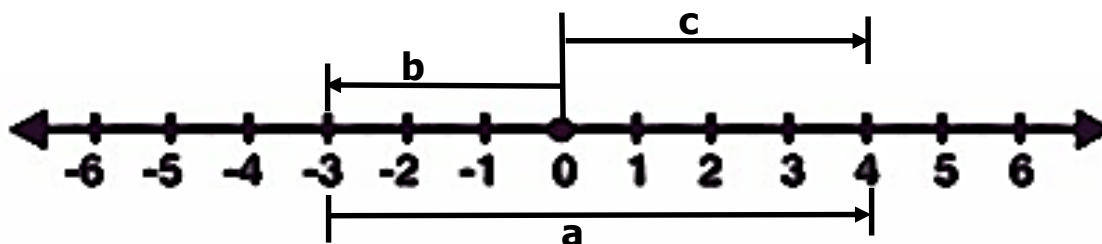
B₁ for 37,500

B₁ for Sh. 110,500

B₁ for Sh15,000

B₁ for Sh. 39,500

27. Use the number line to answer the questions that follow.



- a) Name the integers represented by the arrows. (@1 mark)

a = +7 b = -3

B₁ for +7

B₁ for +4

c = +4

B₁ for -3

- b) Work out the difference between b and a (2 marks)

-3 - +7

-3 - (+7)

-3 - 7

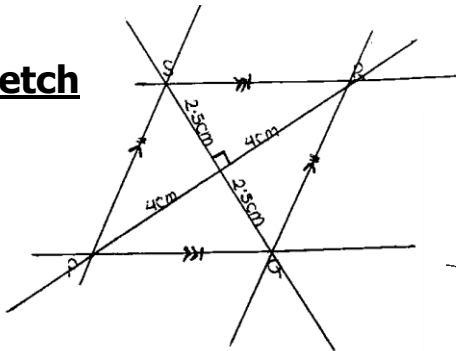
- 10

M₁ for subtraction

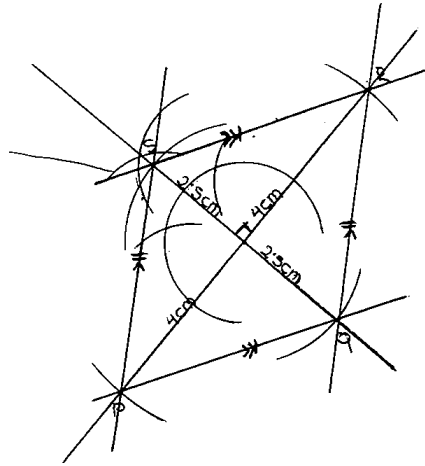
A₁ for -10

28. (a) Using a ruler, pencil and a pair of compasses, construct a quadrilateral PQRS in which diagonals $PR = 8\text{cm}$ and $QS = 5\text{cm}$ (3 marks)

Sketch



Accurate



S₁ for Sketch

L₁ for diagonal PR

L₁ for diagonal QS

- (b) Measure $\angle QPR$ (1 mark)

30°

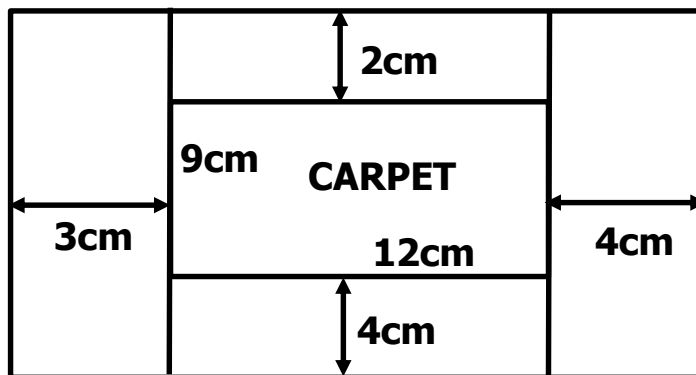
B₁ for 30°

- (c) Measure length SR

4.8cm

B₁ for 4.8CM

29. A rectangular carpet of 12cm by 9cm was placed in a room. The room was not fully covered. Study it and answer the questions that follow.



Find the area which was not covered by the carpet (6 marks)

Length of the room

$$4\text{cm} + 12\text{cm} + 3\text{cm}$$

19cm

Width of the room

$$4\text{cm} + 9\text{cm} + 2\text{cm}$$

15cm

Area of the room

$$\begin{aligned} A &= L \times W \\ &= 19\text{cm} \times 15\text{cm} \\ &= \mathbf{285\text{cm}^2} \end{aligned}$$

Area of the carpet

$$\begin{aligned} A &= L \times W \\ &= 12\text{cm} \times 9\text{cm} \\ &= \mathbf{108\text{cm}^2} \end{aligned}$$

10

Area uncovered

$$\begin{aligned} &285\text{cm}^2 \\ &\mathbf{-108\text{cm}^2} \\ &= \mathbf{177\text{cm}^2} \end{aligned}$$

B₁ for 19cm

B₁ for 15cm

B₁ for 285cm²

B₁ for 108cm²

M₁ for 285-107

A₁ for 177cm²

30. A trader bought four trays of eggs at shs 350 an egg, on his way back home, 3 eggs got broken from each tray. The trader sold the remaining eggs at shs 400 each. Calculate the profit the trader made after selling all eggs if a tray holds 30 eggs. (5 marks)

<u>Buying price</u>	<u>Remaining eggs</u>	<u>Selling price</u>	<u>Profit</u>
$4 \times 30 \times \text{shs } 350$	$(4 \times 30) - (4 \times 3)$	$108 \times \text{sh } 400$	Sh 43, 200
$= \text{shs } 42,000$	$120 - 12$	$= \text{shs } 43,200$	-Sh 42, 000
	<u>108 eggs</u>		<u>Sh 1,200</u>

B₁ for shs 42,000

B₁ for shs 43,200

M₁ for subtraction(43,200-42,000)

B₁ for 108 eggs

A₁ for Sh 1,200

31. The exterior angle of a regular polygon is 30°

- a) How many right angles has the polygon? (3 marks)

<u>No of sides</u>	<u>No of right angles</u>	
$\frac{360^{12}}{30}$	$2n - 4$	<i>B₁ for 12 sides</i>
<u>12 sides</u>	$(2 \times 12) - 4$	<i>M₁ for (2x12)-4</i>
	<u>20 right angles</u>	<i>A₁ for 20 right angles.</i>

- b) Find the interior angle sum of the polygon. (2 marks)

$\text{Int } \angle \text{ sum} = 180^\circ (n - 2)$	<i>M₁ for correct substitution.</i>
$= 180^\circ (12 - 2)$	
$= 180^\circ \times 10$	<i>A₁ for 1800°</i>
<u>$= 1800^\circ$</u>	

32. Given that $2x - 1 = y$. Complete the table (5 marks)

x	-1	1	3	$\frac{1}{2}$	$\frac{5}{2}$	6
y	0	1	5	0	4	11

$$\begin{aligned}
 2x - 1 &= y \\
 2x - 1 &= 1 \\
 2x - 1 + 1 &= 1 + 1 \\
 2x &= 2 \\
 \frac{2x}{2} &= \frac{2}{2} \\
 \underline{\underline{X = 1}}
 \end{aligned}$$

$$\begin{aligned}
 2x - 1 &= y \\
 (2 \times 3) - 1 &= y \\
 6 - 1 + y & \\
 \underline{\underline{5 = y}} \\
 2x - 1 &= y \\
 \left(2 \times \frac{1}{2}\right) - 1 &= y \\
 (1 \times 1) - 1 &= y \\
 1 - 1 &= y \\
 \underline{\underline{0 = y}}
 \end{aligned}$$

$$\begin{aligned}
 2x - 1 &= y \\
 2x - 1 &= 4 \\
 2x - 1 + 1 &= 4 + 1 \\
 2x &= 5 \\
 \frac{2x}{2} &= \frac{5}{2} \\
 x &= \frac{5}{2}
 \end{aligned}$$

$$\begin{aligned}
 2x - 1 &= y \\
 (2 \times 6) - 1 &= y \\
 12 - 1 & \\
 \underline{\underline{11 = y}}
 \end{aligned}$$

B₁ for each correct entry

END