

# GCSE Mathematics Practice Tests: Set 5

## Paper 2F (Calculator)

**Time: 1 hour 30 minutes**

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- **Calculators may be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**



### Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

*Rounding*

1. 34 608 people watched a cricket match.

(a) Write 34 608 to the nearest thousand.

*Round up ... 35000*

*35000*

(1)

431 of these people were children.

(b) Write 431 to the nearest ten.

*1 rounds down ... = 430*

*430*

(1)

(Total 2 marks)

2. A film starts at 1830.  
The film ends at 2050.

*Timing Calculations*

(a) How long does the film last?

$$20:50 - 2 \text{ hours} = 18:50$$

$$18:50 - 20 \text{ mins} = 18:30$$

$$\therefore 2 \text{ hours } 20 \text{ minutes}$$

(2)

Jan watches this film and then catches a bus home.

The bus leaves the bus stop 18 minutes after the film ends.

The bus takes 24 minutes to get to Jan's home.

(b) Will Jan be home before 2130?  
You must show all your working.

*Film ends at 20:50*

*18 mins (+18)*

*24 mins (+24)*

*Conclusion*

*20:50*

$$20:50 + 18 \text{ minutes} = 21:08$$

$$21:08 + 24 \text{ minutes} = 21:32$$

*No since he arrives at 21:32*

(3)

(Total 5 marks)

3. Harry puts sweets into bags.  
He then puts the bags of sweets into boxes.

Harry puts 25 sweets into each bag.  
He then puts up to 60 bags of sweets into each box.

Harry has 4200 sweets.

Work out the least number of boxes he needs.

25 per bag

How many boxes?

Conclusion:

$$25 \times 60 = 1500 \text{ per box}$$

$$4200 \div 1500 = 2.8 \text{ boxes}$$

$\therefore$  He must have 3 boxes

3.

(Total 3 marks)

# 2D shape perimeter

4. Here is an equilateral triangle.

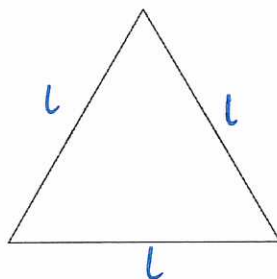
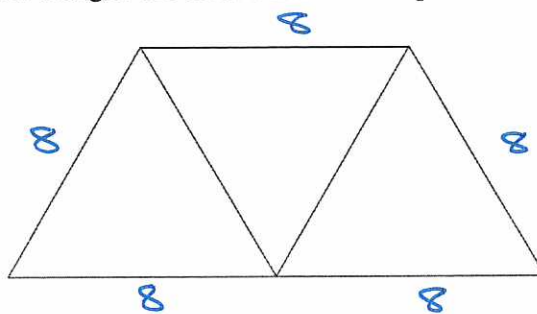


Diagram **NOT** accurately drawn

The equilateral triangle has a perimeter of 24 cm.

Three of these equilateral triangles are used to make this trapezium.



Work out the perimeter of the trapezium.

Equilateral		All sides are the same $\therefore 3l = 24$	
( $\div 3$ )		$l = 8$	
New shape perimeter		$8 + 8 + 8 + 8 + 8$	$= \underline{40}$
			..... cm
			(Total 3 marks)

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## Two Way Tables

5. 100 people played sport on Sunday.  
Each person played only one sport.

The two-way table shows some information about which sport they played.

	Football	Tennis	Rugby	Netball	Total
Men	① = 24	② = 12	10	8	54
Women	20	9	③ = 6	⑤ = 11	④ = 46
Total	44	⑦ = 21	16	⑥ = 19	100

- (a) Complete the two-way table.
- ①  $44 - 20 = 24$                       ④  $= 100 - 54 = 46$   
 ②  $54 - 24 - 10 - 8 = 12$             ⑤  $= 46 - 20 - 9 - 6 = 11$   
 ③  $16 - 6 = 10$                          ⑥  $= 8 + 11 = 19$   
     ⑦  $12 + 9 = 21$

- (b) How many women played football?

$$\begin{array}{r} 20 \\ \hline \end{array} \quad (1)$$

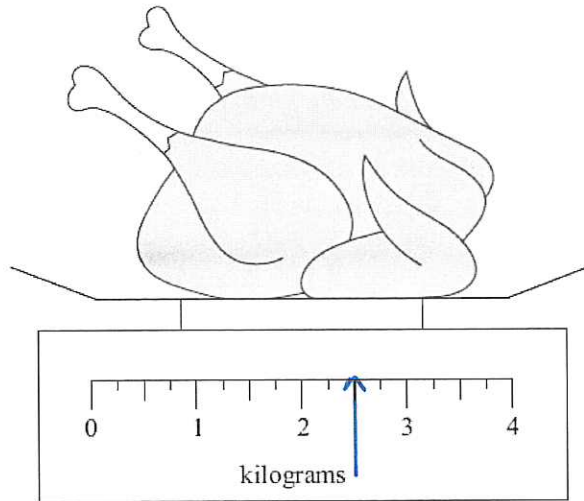
- (c) How many people did **not** play rugby?

$$\begin{aligned} \text{Not Rugby} &= \text{Football} + \text{Tennis} + \text{Netball} \\ &= 44 + 21 + 19 \\ &= \underline{84} \end{aligned} \quad \begin{array}{r} 84 \\ \hline \end{array} \quad (1)$$

(Total 5 marks)

# Scales and Measures

6. Here is a chicken on some scales.



The chicken weighs 2.5 kilograms.

(i) On the scales, mark with an arrow the weight 2.5 kilograms

*Halfway between 2 and 3.*

(ii) Change 2.5 kilograms to grams.

$$1 \text{ kg} = 1000 \text{ g} \\ (\times 1000)$$

$$2.5 \times 1000 = \underline{\underline{2500}}$$

..... 2500 ..... grams  
(2)

Hafiz is going to cook the chicken.

The weight of the chicken is 2.5 kilograms.

The chicken has to be cooked for 20 minutes for each 0.5 kilograms of its weight.

He wants the chicken to finish cooking at 1 pm.

(b) At what time should Hafiz start cooking the chicken?

*Cooking Time:*  $2.5 \text{ kg} \div 0.5 \text{ kg} = 5 \therefore 5 \text{ lots of } 20 \text{ minutes}$

$3 \text{ lots of } 20 \text{ mins} = 1 \text{ hour}$

$\therefore 5 \text{ lots of } 20 \text{ mins} = 1 \text{ hour } 40 \text{ mins}$

*Finish at 1pm...  
Work backwards!*

$1 \text{ pm} - 1 \text{ hour } 40 \text{ mins} = 12 \text{ pm} - 40 \text{ mins} = \underline{\underline{11:20 \text{ am}}}$

(3)

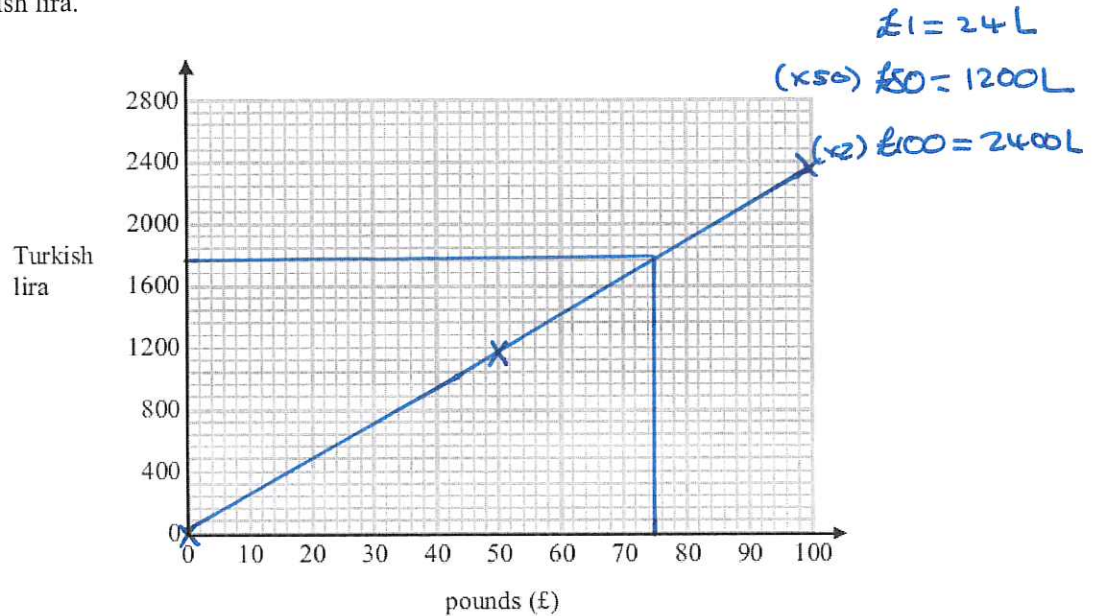
(Total 5 marks)

# Conversion Graphs

7. Mary goes on holiday to Turkey.  
Mary needs to change between pounds (£) and Turkish lira.

$\pounds 1 = 24 \text{ Turkish lira}$

- (a) On the grid, draw a conversion graph Mary can use to change between pounds and Turkish lira.



(2)

Mary changes 1800 Turkish lira into pounds.

- (b) Use your graph to change 1800 Turkish lira into pounds. *Draw on GRAPH*

£ 75 ..... (2)

(Total 4 marks)

## Percentage Change

8. The cost of living index has increased by 30% from the year 2004 to the year 2014.

In 2004, Shola's wage was £340 a week.

In 2014, his wage was £450 a week.

Show that Shola's wage has increased by more than the increase in the cost of living index.

$$\% \text{ change} = \frac{\text{change}}{\text{original}} \times 100$$

$$\text{change} = £450 - £340 = £110$$

$$\text{original} = £340$$

$$\therefore \% \text{ change} = \frac{110}{340} (\times 100) = 32.4\% (\text{to 1 p})$$

Conclusion

$$32.4\% > 30\% \quad \square$$

(Total 3 marks)



## 3D Shape properties

9. The diagram shows a solid prism.

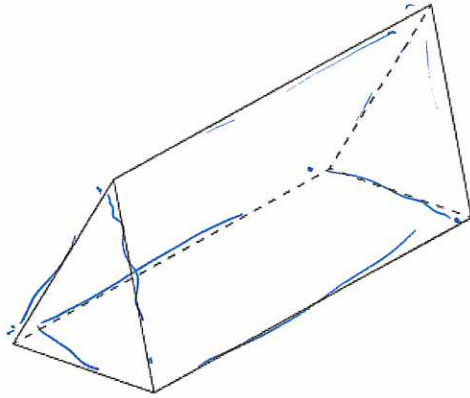


Diagram NOT  
accurately drawn

Write down

- (i) the number of vertices

6

- (ii) the number of faces

5

- (iii) the number of edges

9

(Total 3 marks)

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## Averages from Raw Data

10. Vicky counts the number of birds in her garden at 8 am on each of 10 days.

5    3    3    2    0    2    4    2    4    15

(a) Write down the mode.

↓  
most frequent = 2

$$\frac{2}{\dots\dots\dots}$$

(1)

(b) Work out the mean.

$$\begin{aligned} \text{mean} &= \frac{\text{add all numbers}}{\text{how many numbers}} = \frac{5+3+3+2+0+2+4+2+4+15}{10} \\ &= \frac{40}{10} = \frac{4}{\dots\dots\dots} \end{aligned}$$

(2)

Vicky counts the number of birds in her garden at 5 p.m. on each of 20 days. *Averages from tables*  
She records the information in a frequency table.

Number of birds		Frequency
0		3
1	X	2
2	X	3
3	X	4
4	X	5
5	X	3

*Total birds*

0  
2  
6  
12  
20  
15  

---

55

(c) Work out the total number of birds Vicky records in the frequency table.

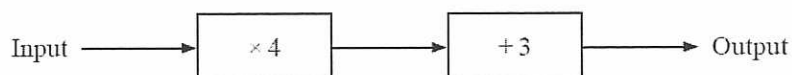
$$\frac{55}{\dots\dots\dots}$$

(2)

(Total 5 marks)

# Function Machines

11. Here is a number machine.



(a) Work out the output when the input is 5.

$$5 \rightarrow \begin{array}{l} \times 4 \\ = 20 \end{array} \rightarrow \begin{array}{l} + 3 \\ = \underline{\underline{23}} \end{array}$$

$$\begin{array}{r} 23 \\ \hline \end{array} \quad (1)$$

(b) Work out the input when the output is -5.

Opposites!

$$\begin{array}{l} \div 4 \leftarrow -3 \leftarrow -5 \\ = \underline{\underline{-2}} \qquad = -8 \end{array}$$

$$\begin{array}{r} -2 \\ \hline \end{array} \quad (2)$$

The input is  $x$  and the output is  $y$ .

(c) Write  $y$  in terms of  $x$ .

$$x \text{ is multiplied by } 4 = 4x$$

$$\text{Then we add } 3 = \underline{\underline{4x+3}}$$

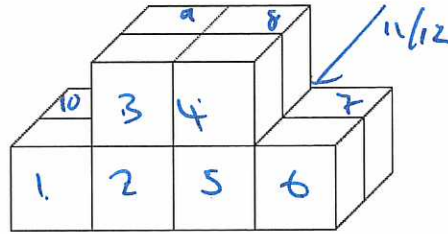
$$\therefore y = \underline{\underline{4x+3}}$$

(2)

(Total 5 marks)

## Volume of prisms

12. Here is a solid prism made from centimetre cubes.



- (a) Find the volume of the solid prism.

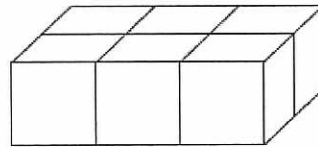
$$CSA = 6$$

$$V = CSA \times \text{depth} : V = 6 \times 2 = 12$$

$$\dots\dots\dots 12 \dots\dots\dots \text{cm}^3$$

(1)

A cuboid is also made from centimetre cubes.  
The diagram shows the bottom layer of cubes in the cuboid.



Volume Missing Dimensions

The volume of the cuboid is  $96 \text{ cm}^3$ .

- (b) Find the height of the cuboid.

$$\text{Volume} = \text{length} \times \text{width} \times \text{height} \dots\dots\dots 16 \text{ cm}$$

$$\text{length} = 3 \dots\dots\dots (2)$$

width = 2 (Total 3 marks)

$$96 = 3 \times 2 \times \text{height}$$

$$96 = 6 \times \text{height}$$

$$96 \div 6 = \text{height} = \underline{\underline{16}}$$

## Forming and Solving Equations

13. There were 60 votes in an election.

There were two candidates, Jared and Beth.  
Jared had 18 more votes than Beth.

$$\text{Beth} = x$$

$$\text{Jared} = x + 18$$

How many votes did Beth get?

Total = 60	Beth + Jared = 60
	$x + x + 18 = 60$
collect	$2x + 18 = 60$
$(-18)$	$2x = 42$
$(\div 2)$	$x = \underline{\underline{21}} = \text{Beth}$

21

.....  
(Total 2 marks)

## Forming and Solving Equations Money problem.

14. Bill has some models of meerkats.

He has models of meerkat children and models of meerkat adults.

Bill has twice as many models of meerkat children as models of meerkat adults.

He has a total of 30 models.

Each model meerkat child has a value of £2.80

Bill's models have a total value of £98.00

Each model meerkat adult has the same value.

Work out the value of a model of a meerkat adult.



meerkat

meerkat adults	$= x$	
meerkat children	$= 2x$	
Total	$= 30$	
	$\therefore x + 2x = 30$	
collect	$3x = 30$	
( $\div 3$ )	$x = 10$	$\therefore \text{adults} = 10, \text{Children} = 20$
Price of all children	$20 \times \pounds 2.80 = \pounds 56$	
Total price = £98	$\pounds 98 - \pounds 56 = \pounds 42$	
Price of all adults = £42	$\pounds 42 \div 10 = \pounds \underline{\underline{4.20 \text{ per adult}}}$	

£ 4.20 .....

(Total 4 marks)

## Speed Distance Time

15. Sue is driving home from her friend's house.

Sue drives

10 miles from her friend's house to the motorway  
 240 miles on the motorway  
 5 miles from the motorway to her home



Sue

takes 20 minutes to drive from her friend's house to the motorway  
 drives at an average speed of 60 mph on the motorway  
 takes 25 minutes to drive from the motorway to her home

Sue stops for a 30 minute rest on her drive home.

Sue leaves her friend's house at 9.00 am.

What time does Sue get home?

You must show all your working.

Journey 1	Journey 2	Journey 3
$S = ?$	$S = 60 \text{ mph}$	$S = ?$
$D = 10 \text{ miles}$	$D = 240 \text{ miles}$	$D = 5 \text{ miles}$
$T = 20 \text{ mins}$	$T = ?$	$T = 25 \text{ mins}$

We just need the total time for all journey parts!

$$\begin{array}{l}
 ? = \frac{D}{S} \\
 ? = 4 \text{ hours} \\
 (+30 \text{ min rest}) \\
 \text{Home Time} =
 \end{array}
 \left|
 \begin{array}{l}
 T = 20 \text{ mins} + ? + 25 \text{ mins} \\
 ? = \frac{240 \text{ miles}}{60 \text{ mph}} = 4 \text{ hours} \\
 T = 20 \text{ mins} + 4 \text{ hours} + 25 \text{ mins} = 4 \text{ hours } 45 \text{ mins} \\
 T = 4 \text{ hours } 45 \text{ mins} + 30 \text{ mins} = 5 \text{ hours } 15 \text{ mins} \\
 \text{Home Time} = 9:00 \text{ am} + 5 \text{ hours } 15 \text{ mins} = \underline{\underline{14:15}} \quad (\text{Total 3 marks})
 \end{array}
 \right.$$

# LCM in Context

## Money Problem

16. Lisa wants to buy some cola for a party.

She is also going to buy some burgers and some buns.  
Cola, burgers and buns are all sold in packs.

There are

- 8 cans of cola in a pack
- 12 burgers in a pack
- 10 buns in a pack

- A pack of cola costs £3.95
- A pack of burgers costs £4.95
- A pack of buns costs £1.95

Lisa is going to buy the same number of cans of cola, and burgers, and buns.  
Lisa sees this special offer for cola.



Work out the cheapest total price Lisa pays for the cola, the burgers, and the buns.  
You must show all your working.

LCM of 8, 10 and 12

8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
10	20	30	40	50	60	70	80	90	100	110	120			
12	24	36	48	60	72	84	96	108	120					

∴ LCM = 120

Packs needed

$120 \div 8 = 15$  packs of cola  
 $120 \div 12 = 10$  packs of burgers  
 $120 \div 10 = 12$  packs of buns

Price for each:  
Burgers  
Buns  
Cola

$10 \times \pounds 4.95 = \pounds 49.50$   
 $12 \times \pounds 1.95 = \pounds 23.40$   
 2 packs + 1 free = 3 packs for price of 2.

(Total 6 marks)

$15 \text{ packs} \div 3 = 5$  sets of the offer = 10 packs to pay for

Total cost

$\pounds 49.50 + \pounds 23.40 + \pounds 39.50 = \underline{\underline{\pounds 112.40}}$



# Converting Units of Area

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Change  $4.5 \text{ km}^2$  to  $\text{m}^2$ .

$$\begin{array}{l} \text{km} = 1000 \text{ m} \\ \therefore \text{km}^2 = (1000)^2 \text{ m}^2 \\ \quad \quad \quad (\times 4.5) \end{array} \quad \left| \quad \begin{array}{l} \text{so } 1 \text{ km}^2 = 1,000,000 \text{ m}^2 \\ 4.5 \text{ km}^2 = 4,500,000 \text{ m}^2 \\ \\ \underline{\hspace{1.5cm}} 4,500,000 \text{ m}^2 \\ \hspace{1.5cm} (2) \end{array} \right.$$

(Total 4 marks)

2. Carol and Delia share some money in the ratio 3 : 8  
Delia gets £325 more than Carol gets.

Ratio and Proportion

Work out how much Carol gets.

$$\begin{array}{l} \text{Ratio} \\ \text{Proportion} \\ \\ (\div 5) \\ \text{Carol} = 3 \text{ parts} \end{array} \quad \left| \quad \begin{array}{l} \text{Difference in parts} = 5 \text{ parts} \\ \text{Difference in money} = \pounds 325 \\ \therefore \pounds 325 = 5 \text{ parts} \\ \pounds 65 = 1 \text{ part} \\ \underline{\pounds 195} = 3 \text{ parts} \end{array} \right. \quad \begin{array}{l} \pounds \underline{195} \text{ .....} \\ \text{(Total 2 marks)} \end{array}$$

## Compound Interest

5. Viv wants to invest £2000 for 2 years in the same bank.

<p><b>The International Bank</b></p> <p>Compound Interest</p> <p>4% for the first year 1% for each extra year</p>
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<p><b>The Friendly Bank</b></p> <p>Compound Interest</p> <p>5% for the first year 0.5% for each extra year</p>
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At the end of 2 years, Viv wants to have as much money as possible.

Which bank should she invest her £2000 in?

International Bank

$$\begin{aligned}\text{End of first year: } & \pounds 2000 \times 1.04 = \pounds 2080 \\ \text{End of Second year: } & \pounds 2080 \times 1.01 = \underline{\underline{\pounds 2100.80}}\end{aligned}$$

Friendly Bank

$$\begin{aligned}\text{End of first year: } & \pounds 2000 \times 1.05 = \pounds 2100 \\ \text{End of Second year: } & \pounds 2100 \times 1.005 = \underline{\underline{\pounds 2110.50}}\end{aligned}$$

Conclusion: Friendly Bank should be the bank Viv selects.

(Total 4 marks)

# Simultaneous Equations

3. One day Sadie and Gohil both buy petrol and oil from the same petrol station.

Sadie buys 30 litres of petrol and 4 litres of oil.  
Sadie pays a total £46.00

Gohil buys 24 litres of petrol and 8 litres of oil.  
Gohil pays a total of £45.20

Find the cost of one litre of petrol and the cost of one litre of oil.

Sadie: ①	$30p + 4o = £46$	
Gohil: ②	$24p + 8o = £45.20$	
① $\times 2$ : ③	$60p + 8o = £92$	①
③ - ②	$24p + 8o = £45.20$	
	<hr style="border: 0.5px solid black;"/>	
	$36p = £46.80$	
( $\div 36$ )	$p = £1.30$	
Put $p = £1.30$ in ②:	$24p + 8o = £45.20$	
	$24(1.30) + 8o = £45.20$	
	$31.20 + 8o = £45.20$	
( $-31.20$ )	$8o = £14$	
( $\div 8$ )	$o = £1.75$	

Same Take Opposite Plus

Petrol £.....1.30.....

Oil £.....1.75.....

(Total 5 marks)

# Reverse Percentages

7. In a sale the normal price of a book is reduced by 10%.  
The sale price of the book is £4.86

Calculate the normal price of the book.

	$100\% - 10\% = 90\%$	
	£4.86	= 90%
( $\div 90$ )	£0.054	= 1%
( $\times 100$ )	£5.40	= 100%

£5.40

(Total 3 marks)

4. The diagram shows 3 sides of a regular polygon.

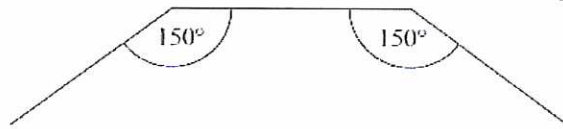


Diagram **NOT**  
accurately drawn

Each interior angle of the regular polygon is  $150^\circ$ .

Work out the number of sides of the regular polygon.

$$\begin{array}{l|l}
 \text{Exterior} + \text{Interior} = 180^\circ & \text{Exterior} + 150^\circ = 180^\circ \\
 (-150^\circ) & \text{Exterior} = 30^\circ \\
 \text{Sum of exterior angles} = 360^\circ & \therefore \frac{360^\circ}{30^\circ} = n = \underline{\underline{12}}
 \end{array}$$

12

~~12~~  
(Total 3 marks)