Year 9 Mathematics
Practice Exam #2

Time: 2 hours

Sections

It is expected that working is shown for all questions.

Number

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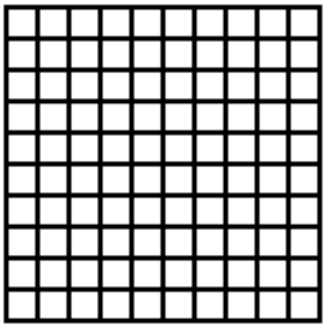
QUESTION ONE

a) Shade 41% of the boxes below.



b) Convert that % to a

i) a decimal _____

ii) a fraction _____

c) s _____

QUESTION TWO

Complete with an appropriate >, < or = sign between the pairs of numbers below

a) −6 _____ −5

b) 7.2 _____ 7.15

c) $\frac{3}{5}$ _____ 0.6

d) $\frac{1}{5}$ _____ $\frac{1}{8}$

e) 0.7 _____ 7%

f) $\frac{6}{15}$ _____ $\frac{2}{5}$

QUESTION THREE

a) Convert to simplest improper fractions:

i) $2\frac{5}{6}$ = _____

ii) 1.8 = _____

b) Convert to decimals:

i) $\frac{19}{4}$ = _____

ii) 9.2% = _____

QUESTION FOUR

a) What is 44% of 135?

_____

b) A tablet costs $440. If the price rises by 12.5%, what will it now cost?

_____

c) In a group of 230 people there are 38 who are left-handed. What % are left-handed?

_____

d) A farmer increases his herd from 165 to 220 cows. What is the percentage increase?

_____

QUESTION FIVE

a) What is the Highest Common Factor of 24 and 32?

_____

b) What is the Lowest Common Multiple of 50 and 25?

_____

QUESTION SIX

Timothy owes Samantha $200 and Megan $400. He has $120 in the bank.

Timothy earns $80 per week.

He promises to pay Samantha and Megan what he has, then the rest in equal payments over 25 weeks.

Devise a payment scheme that is fair to both girls and will pay off the money owed in the 25 weeks.

What percentage of the money he earns will he need to save to give to them?

_____

_____

_____

_____

_____

_____

QUESTION SEVEN

After a 20% discount a pair of shoes costs $160.What was the price before the discount?

_____

_____

QUESTION EIGHT

Timmy knows his car's petrol tank holds 50 litres and it takes him 7.8 L to drive it every 100 km.

If his tank is two-thirds full, will it hold enough for a 450 km drive?

_____

_____

_____

_____

QUESTION NINE

Alberto typically needs 87 minutes to download a 5 GB file.

He looks at updating his internet connection to one that promises to be 40% faster.

With that new connection, how long would it then take to download an 8.5 GB file?

_____

_____

_____

_____

_____

_____

_____

_____

Algebra and Graphs

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QUESTION ONE

Calculate the following expressions if $a = 6$, $b = 8$ and $c = -5$

a) $2p + q =$ _____

b) $a - c =$ _____

c) $c^2 =$ _____

d) $a(b + c) =$ _____

_____

QUESTION TWO

Solve these equations (find the value of the unknown number). Show your working.

a) $x - 10 = 2$

$x =$ _____

b) $2.4x = 18$

$x =$ _____

c) $4n + 6 = 21$

_____

_____

$n =$ _____

d) $3 - 5x = 28$

_____

_____

_____

$x =$ _____

e) $9(k + 2) = 7k$

_____

_____

_____

$k =$ _____

QUESTION THREE

A number has five added, and the total is multiplied by six. The result is fifteen.

a) Write that situation as an <u>equation</u>, with n as the number.

_____

b) Solve the equation in part a) to work out the starting number.

_____

_____

QUESTION FOUR

a) Gavin has three times as much money as Wendy. After Gavin spends $100 and Wendy spends $10 they have the same.

Write an equation to represent this situation in terms of how much Wendy starts with, W.

_____

_____

b) Solve your equation for part a) to find how much Wendy starts with.

_____

_____

QUESTION FIVE

Simplify the following expressions:

a) $5d - d =$ _____

b) $5k \times 4 + h =$ _____

c) $8x + 5y^2 - 6x + 5y^2 =$ _____

_____

d) $a \times a \times a \times a =$ _____

e) $20x - 3 - 5x \times 2 =$ _____

_____

QUESTION SIX

If n represents a number, write an expression for:

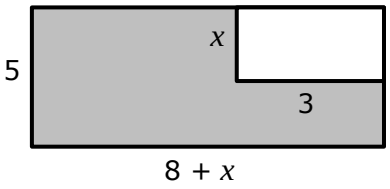
a) Half of that number:

_____

b) That number has six added to it, then the result multiplied by two:

_____

QUESTION SEVEN



A rectangle has a rectangle taken from it.

Write and simplify expressions for:

a) The area of the small rectangle

_____

b) The perimeter of the large rectangle

_____

_____

c) The area shaded grey.

_____

_____

_____

QUESTION EIGHT

Expand these sets of brackets. Simplify if need be:

a) $5(x - 2) =$ _____

b) $2n(3 - n) =$ _____

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

_____

QUESTION NINE

Fully factorise these expressions (write using brackets).

a) $5x + 25$

_____

b) $8x - 12$

_____

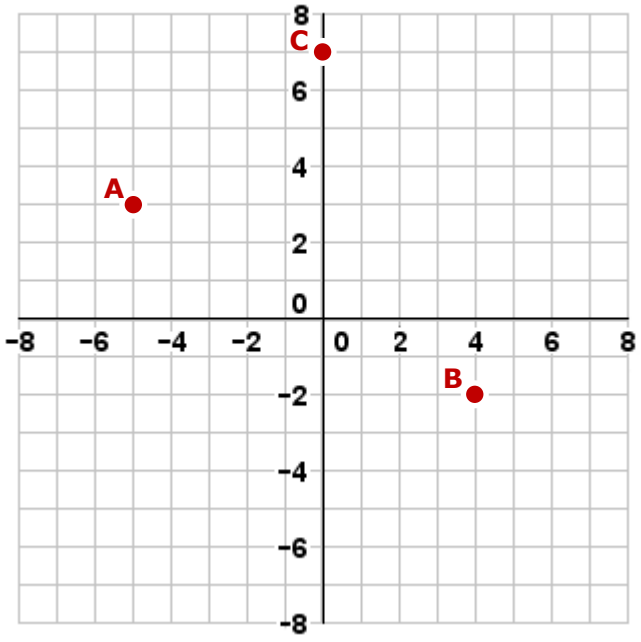
c) $7b + ab$

_____

d) $5x^2 + 15x^3$

_____

QUESTION TEN



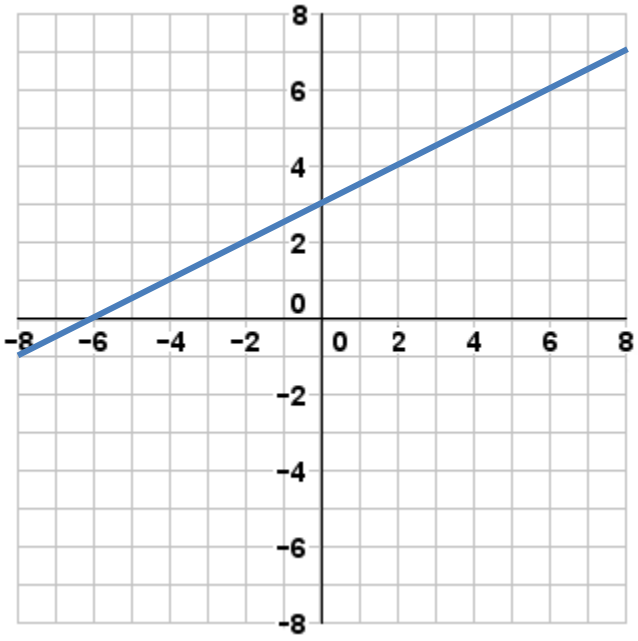
Write the co-ordinates for the points above:

A = _____

B = _____

C = _____

QUESTION ELEVEN



Give the line's:

a) y intercept _____

b) gradient _____

c) equation _____

QUESTION TWELVE

A pattern is made of horizontal and vertical lines.

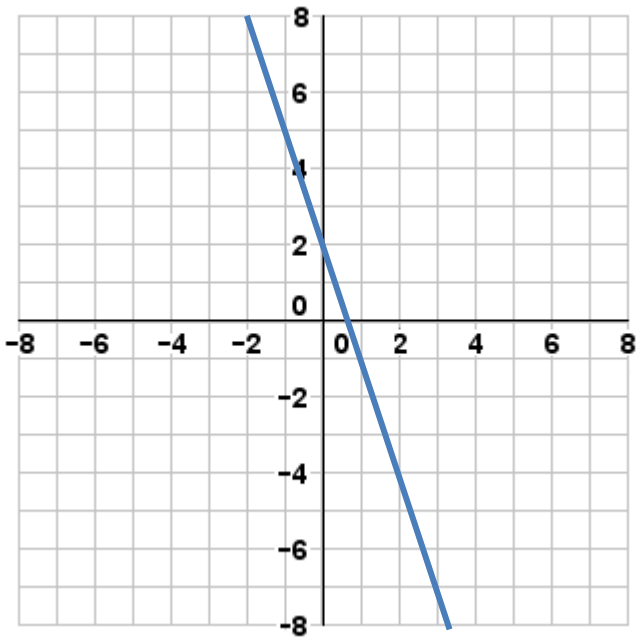
For the pattern above

Number of Vertical (V)	Number of Horizontal (H)
1	0
2	2
3	4
4	6

Write a rule linking V and H.

H = _____

QUESTION THIRTEEN



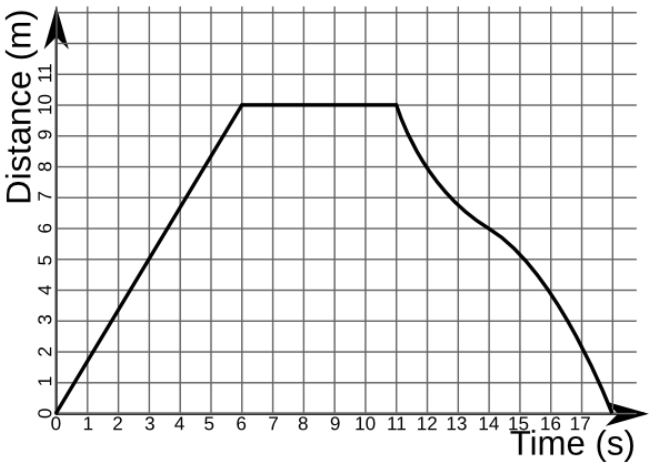
a) Give the equation of the line shown.

_____

b) On the graph draw the line of equation

$y = 2x - 3$

QUESTION FOURTEEN



a) How long is the object stationary?

_____

b) How fast is it going at 5 seconds.

_____

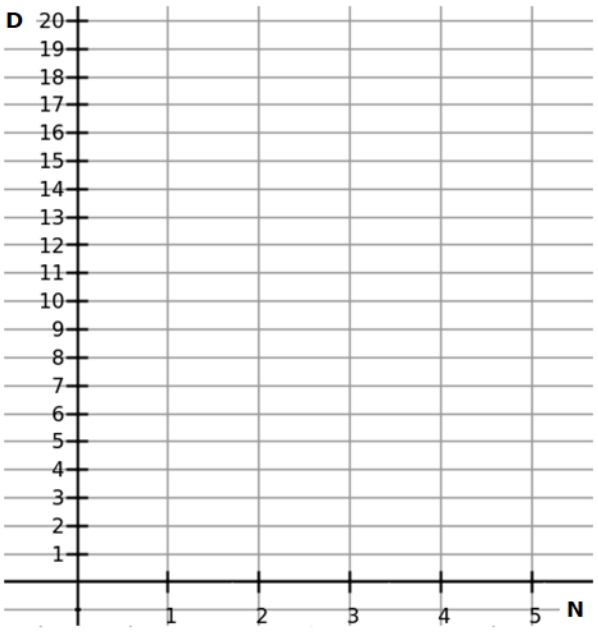
QUESTION FIFTEEN

A pattern is made from a series of dots. The first three shapes in the pattern are shown.

a) Complete the table to show how many dots are used in each shape.

Shape Number (N)	Dots (D)
1	6
2	
3	
4	
5	

b) Plot the values from the table as points on the graph below



c) Write a rule linking N and D

_____

d) Use that rule to find what shape number

_____

_____

Measurement

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QUESTION ONE

Complete the following conversions:

a) 45,000 m = _____ km

b) 0.75 m = _____ mm

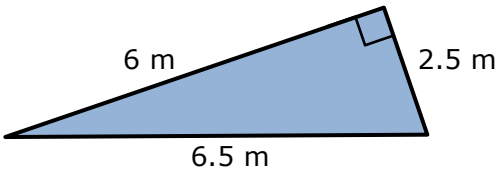
c) 700 L = _____ m^3

d) 2¼ minutes = _____ seconds

e) 2,640 seconds = _____ minutes

QUESTION TWO

Abby has a triangular garden as shown:



a) How long would a perimeter fence be?

_____

b) What is the garden's area?

_____

c) If Aby wants to put 5 cm deep of wood chips over the whole garden. What volume of chips will she need?

_____

_____

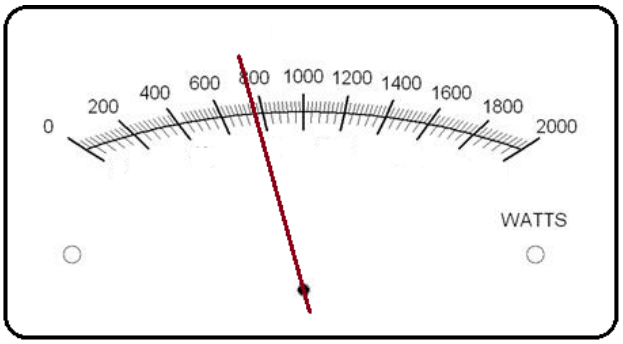
QUESTION THREE

a) This device is measuring the weight of a person.

The person is 148.8 pounds.

The reading in the <u>metric</u> system is:

_____ (number) _____ (unit)



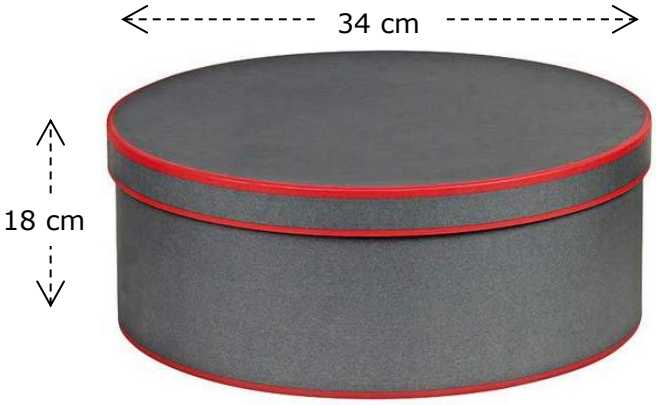
b) This device measures electrical power.

The reading is:

_____ (number) _____ (unit)

QUESTION FOUR

The formulas $A = \pi r^2$ and $C = \pi d$ may help

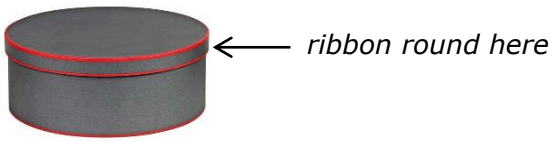


Emily makes hats. She packs them in cylindrical boxes like the one shown above.

The boxes are 34 cm in diameter and 18 cm high.

a) What is the volume of a box?

b) How long would a ribbon need to be to wound once around the lid's edge?



c) What area of material does it take to cover a whole box? (including base)

QUESTION FIVE

a) Ben goes for a jog one afternoon.

He starts at 3:45 p.m.

He finishes at 4:10 p.m.

i) Give his start time in 24 hour form.

ii) How long does he jog for?

iii) If he runs 3 km in that time. What is his speed, in km per hour?

b) Ben is a truck driver doing the overnight run from Auckland to Wellington.

He starts at 9:30 p.m. in Auckland.

It takes 8 hours 45 minutes.

When does he arrive in Wellington?

c) Betty is a delivery driver. She averages one delivery every 25 minutes. How many deliveries can she complete in an 8 hour working day?

QUESTION SIX

The internal (inside) dimensions of a standard shipping container are shown above.

Sasha's company pack its saucepans in cartons that are 30 cm wide, 30 cm high and 60 cm long.

Each carton weighs 16 kg when fully packed with saucepans.

a) i) How many cartons can be fit inside a container?

_____

_____

_____

_____

ii) Will a full load of saucepans be over the maximum 21.5 tonnes weight for a container of cargo?

_____

_____

_____

_____

b) People have started to build houses out of shipping containers

The floor area of a small house is about 120 m^2.

How many containers would it take to make a house that size?

_____

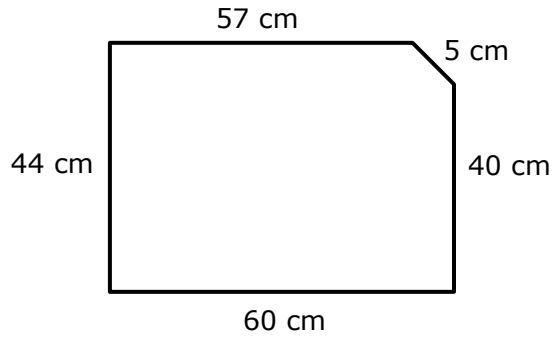
_____

_____

_____

QUESTION SEVEN

This is a rectangle with one corner sliced off.



What is its area?

_____

_____

_____

_____

Geometry

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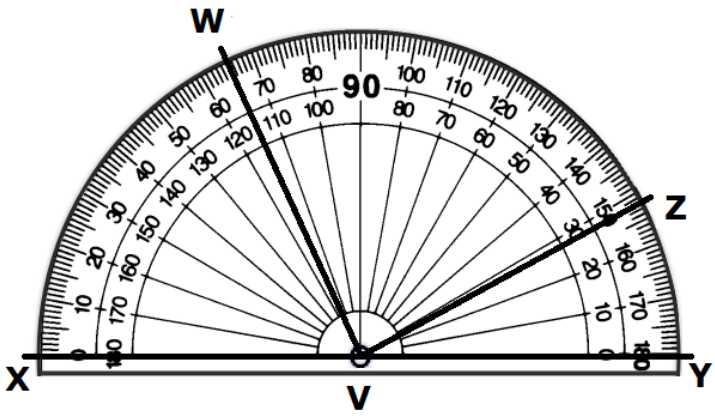
QUESTION ONE



Give the **size** in degrees and whether they are **acute**, **obtuse** or **reflex** for the following angles:

∠ XVW = _____ Type _____

∠ XVZ = _____ Type _____

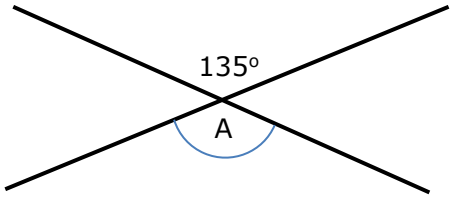
∠ YVZ = _____ Type _____

∠ WVZ = _____ Type _____

QUESTION TWO

Give the unknown angles in these situations, along with the reason or reasons used to calculate them.

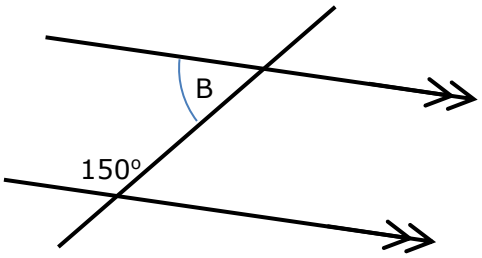
a) Two lines cross



A = _____

Reason: _____

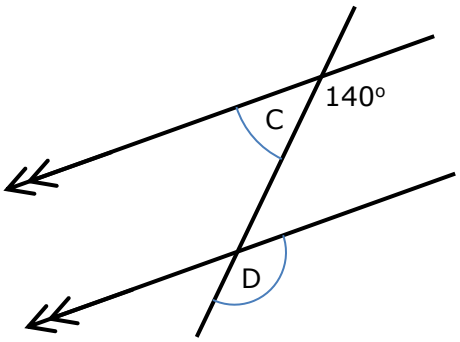
b) Two parallel lines are crossed by another line



B = _____

Reason: _____

c) Two parallel lines are crossed by another line



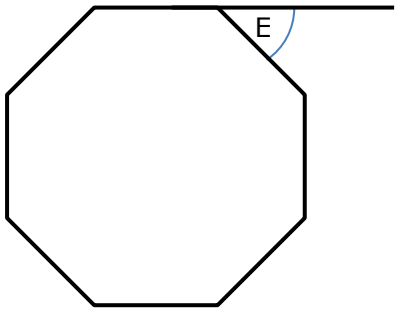
C = _____

Reason: _____

D = _____

Reason: _____

d) An exterior angle of a regular octagon.



E = _____

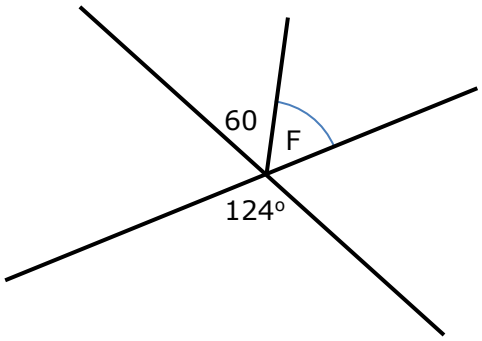
Reasons: _____

_____

_____

_____

e) A triangle is raised above a straight line.



F = _____

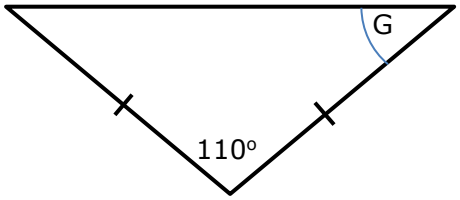
Reasons: _____

_____

_____

_____

f) An isosceles triangle.



G = _____

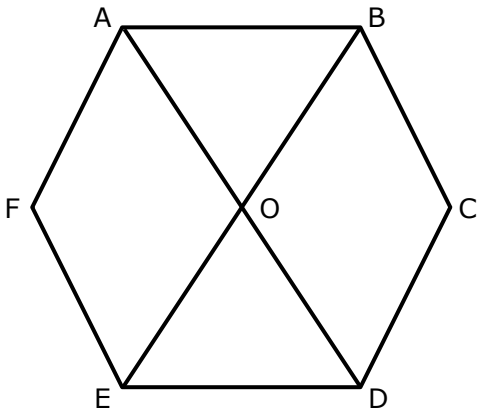
Reasons: _____

_____

_____

QUESTION THREE

A regular hexagon ABCDEF has two diagonals, that pass through the centre, O.



Show that AOEF is a rhombus.

Reasons: _____

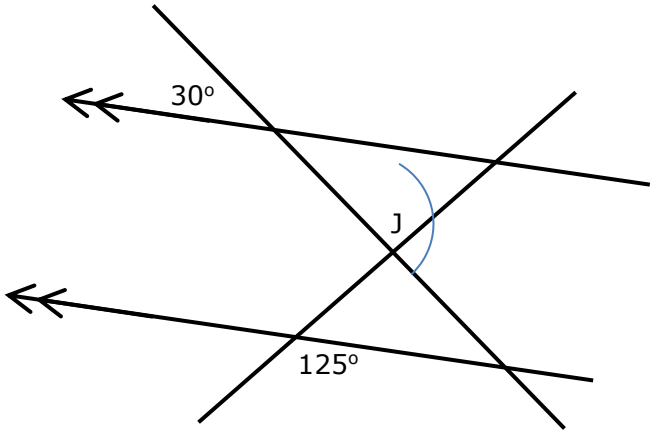
_____

_____

_____

_____

b) A pair of parallel lines has two transverse lines.



J = _____

Reasons: _____

_____

_____

_____

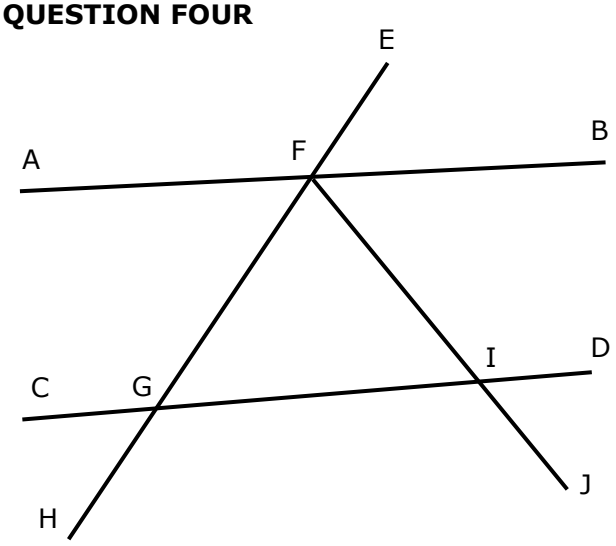
_____

_____

_____

_____

QUESTION FOUR



∠AFE = 130°, ∠GFI = 70° and ∠DIJ = 60°.

Show that the lines AB and CD are parallel.

_____

_____

_____

_____

_____

_____

_____

_____