MS RE4

edexcel

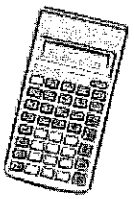
GCSE Mathematics Practice Tests: Set 6

Paper 3F (Calculator)

Time: 1 hour 30 minutes

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

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.

ALWAYS LEARNING PEARSON

Worded Division

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Here is the menu in Sam's cafe.

Sam's Cafe	
cup of tea	£1.20
cup of coffee	£1.40
breakfast: Sausage, eggs, bacon	£4.10
special: Sausage, eggs, bacon and toast	£4.50

Sameena buys some cups of coffee.
She only has £10

Work out the greatest number of cups of coffee she can buy.

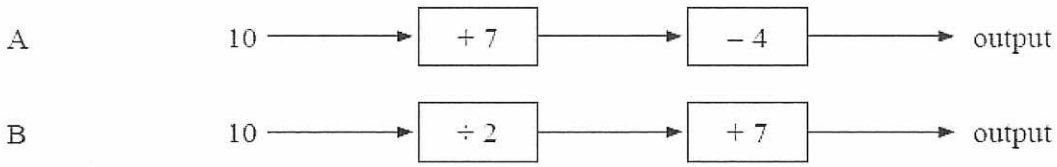
£10 ÷ £1.40 = 7.142857 ∴ 7 cups

.....

(Total 2 marks)

Function Machines

2. (a) Here are two number machines, A and B.



The input for each number machine is 10

Which number machine gives the greater output?
You must show all your working.

A: $10 + 7 = 17$ $\quad 17 - 4 = 13$

B: $10 \div 2 = 5$ $\quad 5 + 7 = 12$

∴ Machine A gives greatest output.

(3)

Here is a different number machine.

(b) Complete this number machine.

$4 \times 2 = 8$ $\quad 8 + ? = 14$

$? = 6$

(1)

(Total 4 marks)

Types of Number

3. Here is a list of numbers.

11 12 13 14 15 16 17 18 19 20

From the list, write down

(*a*) a factor of 24,

3 8
6 4
12 2
24 1

12

(1)

(*b*) a multiple of 7,

7, 14, 21 etc.

14

(1)

(*c*) a square number.

1, 4, 9, 16, 25 etc.

16

(1)

(Total 3 marks)

Worded Division

4. Breakfast cereal is put into packets.
1 kg of the cereal is used to fill 20 packets.

(*a*) Work out the number of **grams** of cereal in each packet.

1000g = 1kg | 1000g ÷ 20g = 50g

..... 50 ..... g
(2)

Here are the weights of the ingredients needed to make 100 kg of the cereal.

oats	28 kg
wheat flakes	19 kg
barley flakes	15 kg
fruit	19 kg
nuts	8 kg
seeds	4 kg
other	7 kg

(*b*) Work out the weight of oats needed to fill 5000 packets of the cereal.
Give your answer in kg.

1kg = 20 packets

Cereal Needed | 250kg = 5000 packets 5000 ÷ 20 = 250

Oats Needed | 28kg × 2.5 = 70kg

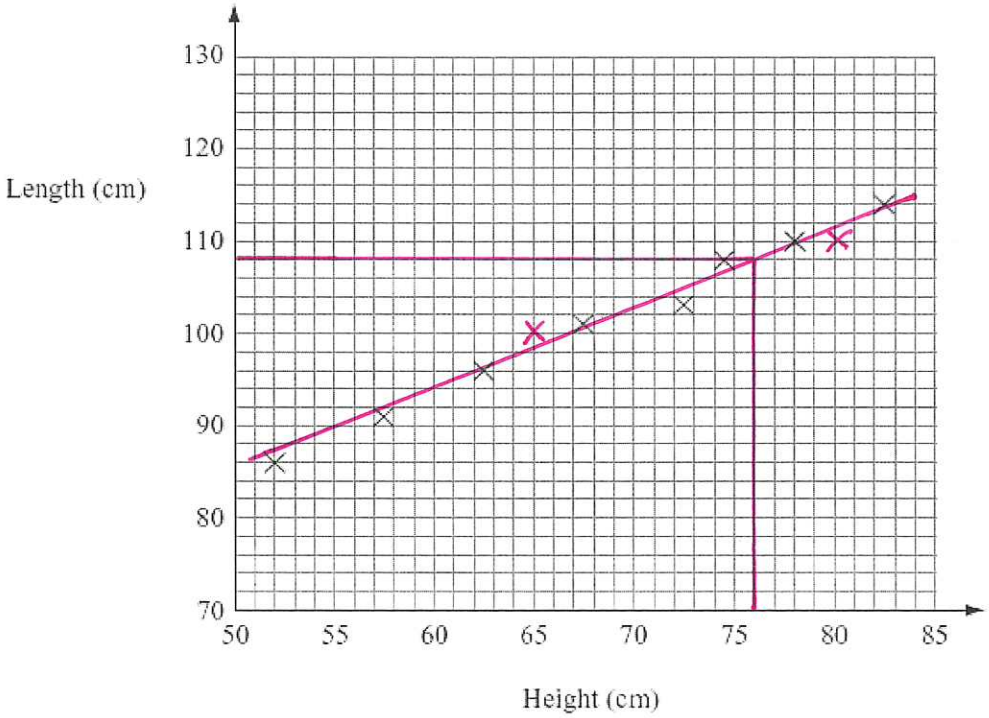
(100kg = 2.5 = 250kg)

..... 70 ..... kg
(3)

(Total 5 marks)

Scatter Graphs

5. The scatter graph shows information about eight sheep.
It shows the height and the length of each sheep.



The table gives the height and the length of two more sheep.

Height (cm)	65	80
Length (cm)	100	110

(a) On the scatter graph, plot the information from the table.

(1)

(b) Describe the relationship between the height and the length of these sheep.

The taller the sheep, the longer it is.

(1)

The height of a sheep is 76 cm.

(c) Estimate the length of this sheep.

108 .....cm

(2)

(Total 4 marks)

Using Formula

6. When you know the length of an adult's foot (i) in inches, you can use the formula

$$S = 3i - 25$$

to calculate their UK shoe size (S).

When you know an adult's UK shoe size (S), you can use the formula

$$E = S + 33$$

to calculate their European shoe size (E).

Tamsin is buying some shoes as a present for her friend Jane.
Jane is an adult with a foot length of 11 inches.

Tamsin orders some shoes.
The shoes are European size 38

Will the shoes fit Jane?
You must show all your working.

UK shoe size

$i = 11$ inches

$S = 3i - 25$

$S = 3(11) - 25 = 33 - 25$

$= 8$

European shoe size

$E = S + 33$

$E = 8 + 33 = 41$

Conclusion

$41 > 38$ ∴ Shoes won't fit.

(Total 3 marks)

Ratio and Proportion

7. There are 165 counters in a bag.

Each counter is either black or white.
There are twice as many black counters as white counters in the bag.

Martine takes 40% of the black counters from the bag.

Work out the ratio of the number of black counters to the number of white counters now in the bag.

Give your ratio in its simplest form.

Black : $2x$ White : x Total : $3x$

Total: $3x = 165$

$(\div 3)$ $x = 55$

B : W Ratio $2x : x$

$110 : 55$

Martine takes 40% of black: $10\% = 11$

$(\times 4)$ $40\% = 44$

$110 - 44$ $110 - 44 = 66$

Ratio $66 : 55$

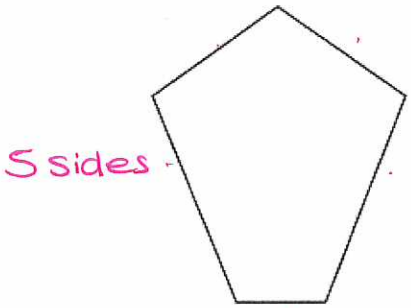
$(\div 11)$ $6 : 5$

$6 : 5$

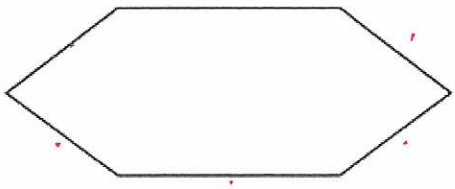
(Total 4 marks)

2D shapes

8. (a) Write down the special names of each of these polygons.



5 sides



6 sides

(i) ..pentagon..... (ii) ..Hexagon.....

(Total 2 marks)

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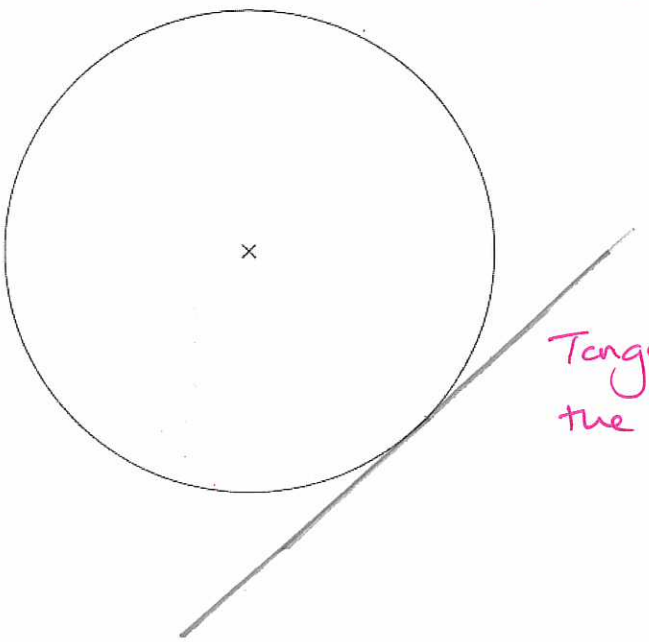
9. Here is a circle.

Circle Properties



Tangent touches the circle once

The circle has a radius of 4 cm.

(a) Write down the length of the diameter of this circle.

diameter = radius x 2 | 4cm x 2 = 8cm ..... cm

(1)

(b) On the diagram, draw a tangent to the circle.

(1)

(Total 2 marks)

FDP Conversion

10. Noah got 8 out of 20 in a test.

Write 8 out of 20 as a percentage.

"8 out of 20" = $\frac{8}{20}$

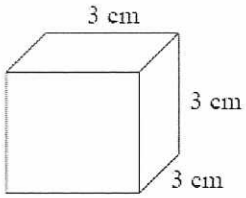
USE YOUR CALCULATOR | $\frac{8}{20} = 0.4$ $= 40\%$

40 ..... %

(Total 2 marks)

Surface Area

11. Here is a solid cube.



(a) Find the surface area of the cube.

Each face: $3cm \times 3cm = 9cm^2$

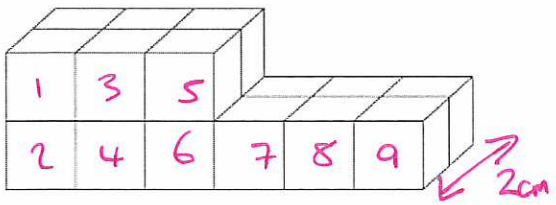
6 square faces $6 \times 9cm^2 = 54cm^2$

54 ..... cm^2

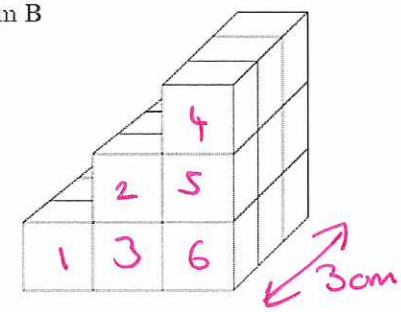
(2)

Here are two solid prisms made from centimetre cubes.

prism A



prism B



"front face"

(b) Compare the volume of prism **A** with the volume of prism **B**.

Volume = CSA × length

Volume A $= 9cm^2 \times 2cm = 18cm^3$

Volume B $= 6cm^2 \times 3cm = 18cm^3$

Conclusion: The volumes are the same.

(3)

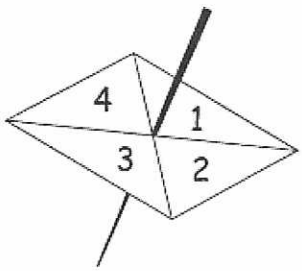
(Total 5 marks)

Single Event Probability

Sum of all Probabilities = 1

Forming and solving Equations

12. Here is a four-sided spinner.
The spinner is biased.



The table shows the probabilities that the spinner will land on 1 or on 3

Number	1	2	3	4
Probability	0.2	x	0.1	x

The probability that the spinner will land on 2 is the same as the probability that the spinner will land on 4

(a) Work out the probability that the spinner will land on 4

Sum of all probabilities = 1

$0.2 + x + 0.1 + x = 1$

collect

$0.3 + 2x = 1$

(-0.3)

$2x = 0.7$

$(\div 2)$

$x = 0.35$

$P(4) = x$

.....

(3)

Shunya is going to spin the spinner 200 times.

(b) Work out an estimate for the number of times the spinner will land on 3

Relative Frequency

$P(3)$

$P(3) = 0.1$

Relative Frequency

$0.1 \times 200 = 20$

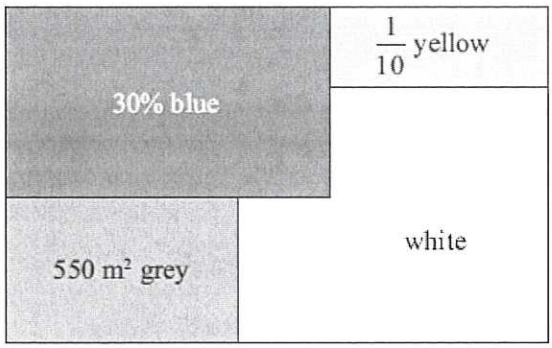
.....20.....

(2)

(Total 5 marks)

Fractions, Percentages of an Amount

13. Here is a shape.



The total area of the shape is 1640 m^2.

30% of the shape is blue.

$\frac{1}{10}$ of the shape is yellow.

550 m^2 of the shape is grey. The rest of the shape is white.

Is the white area more than 400 m^2?

Blue: 30% of $1640m^2 = 0.3 \times 1640m^2 = 492m^2$

Yellow: $\frac{1}{10}$ of $1640m^2 = 164m^2$

Grey: $550m^2$

White: $1640m^2 - 492m^2 - 164m^2 - 550m^2 = 434m^2$

Conclusion: Yes, it is larger than $400m^2$.

(Total 5 marks)

Forming and Solving Equations

14.

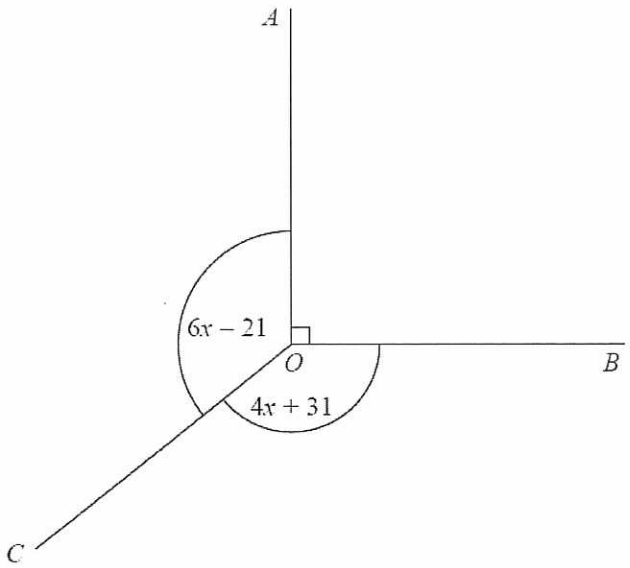


Diagram **NOT** accurately drawn

In the diagram, all angles are in degrees.

Angle AOB is a right angle.
Angle AOC = Angle BOC.

Work out the value of x.

Angles around a point = 360°

$6x - 21 + 4x + 31 + 90° = 360°$

collect $10x + 100° = 360°$

(−100) $10x = 260°$

(÷10) $x = 26°$

$x = 26°$

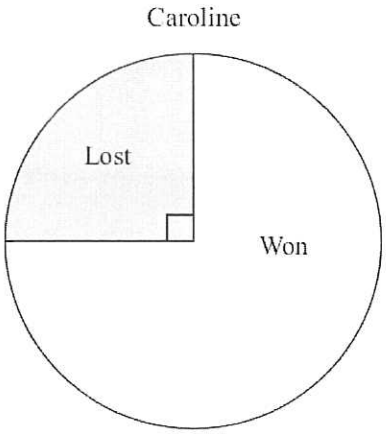
(Total 3 marks)

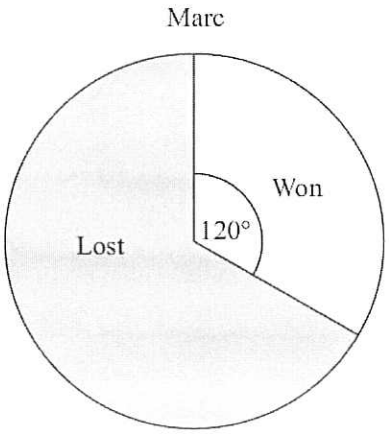
Interpreting Pie Charts

15. Caroline and Marc are in a darts team.

The pie charts show information about the number of games Caroline and Marc each won last year.

They also show information about the number of games Caroline and Marc each lost last year.





$\frac{120}{360} = \frac{1}{3}$

Caroline played 52 games.
Marc played 150 games.

Marc won more games than Caroline.

How many more?

Caroline wins

$\frac{3}{4}$ of $52 = \frac{3}{4} \times 52$

$= 39$

Marc wins

$\frac{1}{3}$ of $150 = \frac{1}{3} \times 150$

$= 50$

Difference

$50 - 39 = 11$

11

(Total 3 marks)

16. Anna is making crumble.

She makes the crumble from flour, sugar and butter.
Anna needs twice as much butter as sugar.
She needs one and a half times as much flour as butter.

Anna is going to make 900 g of crumble.

Calculate the amount of sugar Anna needs.

Butter : Sugar : Flour Total
2 : 1 : 3 6

Ratio B:S:F | 2 : 1 : 3 Total = 6 parts

6 parts = 900g

(÷6) | 1 part = 150g

Sugar = 1 part | ∴ Sugar = 150g

150 .....g

(Total 4 marks)

Repeated Percentage Change

17. Toby invested £4500 for 2 years in a savings account.
He was paid 4% per annum compound interest.

How much did Toby have in his savings account after 2 years?

Start × multiplier^{t} = End
(multiplier = 1 + 4% = 1.04)

£4500 × 1.04^2 = £4867.20

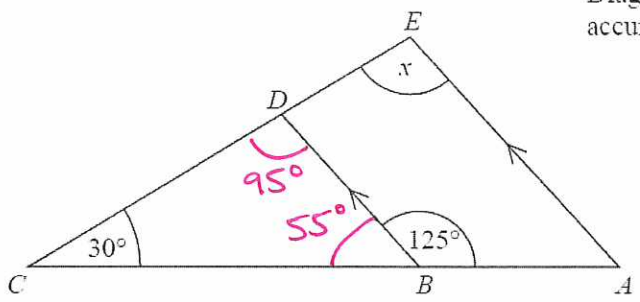
£ 4867.20

(Total 3 marks)

Angles in 2D shapes
Angles in Parallel lines

18.

Diagram **NOT** accurately drawn



ABC and *EDC* are straight lines.
AE and *BD* are parallel.
Angle *ABD* = 125°
Angle *BCD* = 30°

Work out the size of the angle marked *x*.
Give reasons for your answer.

$C\hat{B}D = 180° - 125°$
$= 55°$

Angles on straight lines = 180°

$B\hat{D}C = 180° - 55° - 30°$
$= 95°$

Angles in a triangle = 180°

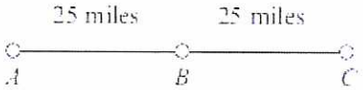
$B\hat{D}C = x° = 95°$

Corresponding angles in parallel lines equal

(Total 4 marks)

Speed Distance Time

3.



A, *B* and *C* are 3 service stations on a motorway.

AB = 25 miles
BC = 25 miles

Aysha drives along the motorway from *A* to *C*.

Aysha drives at an average speed of 50 mph from *A* to *B*.
She drives at an average speed of 60 mph from *B* to *C*.

Work out the difference in the time Aysha takes to drive from *A* to *B* and the time Aysha takes to drive from *B* to *C*.

Give your answer in minutes.

Time A→B | $T = \frac{D}{S} = \frac{25\text{miles}}{50\text{mph}} = \frac{1}{2}\text{hour}$

Time B→C | $T = \frac{D}{S} = \frac{25\text{miles}}{60\text{mph}} = \frac{5}{12}\text{hour}$

$\frac{1}{2}$ hour in mins | $60 \times \frac{1}{2} = 30\text{mins}$

$\frac{5}{12}$ hour in mins | $60 \times \frac{5}{12} = 25\text{mins}$

Difference | $30\text{mins} - 25\text{mins} = 5\text{ minutes}$

..... minutes

(Total 3 marks)

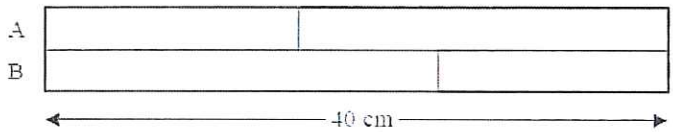
Fractions of an amount

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Here is a rectangle.



The rectangle has been divided into two strips, A and B.
The strips have the same width.

$\frac{2}{5}$ of strip A is shaded.

$\frac{5}{8}$ of strip B is shaded.

The length of the rectangle is 40 cm.

What fraction of the rectangle is **not** shaded?

A Not shaded | $1 - \frac{2}{5} = \frac{3}{5}$ of rectangle A
B Not shaded | $1 - \frac{5}{8} = \frac{3}{8}$ of rectangle B

$\frac{3}{5}$ of 40 | = 24 cm (+)

$\frac{3}{8}$ of 40 | = 15 cm

Total NOT shaded | = 39 cm

As a fraction of total (out of 80) | $= \frac{39}{80}$

.....

(Total 4 marks)

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2. Make w the subject of the formula $P = \frac{w-3}{2}$

Rearranging Formula

$P = \frac{w-3}{2}$

(x2) $2P = w - 3$

(+3) $2P + 3 = w$

$2p + 3 = w$

.....

(Total 2 marks)

Index laws

23. (*a*) Simplify fully $\dfrac{n^7 \times n^3}{n^6}$

$a^m \times a^n = a^{m+n}$ | $n^7 \times n^3 = n^{10}$

$\dfrac{a^m}{a^n} = a^{m-n}$ | $n^{10} - n^6 = n^4$

n^4

(2)

(*b*) Factorise $5y - 15$

Factorising

5 is a factor | $5(y-3)$

$5(y-3)$

(1)

(*c*) Factorise fully $18ab + 27ab^2$

9 is a factor | $9(2ab + 3ab^2)$

a is a factor | $9a(2b + 3b^2)$

b is a factor | $9ab(2+3b)$

$9ab(2+3b)$

(2)

(Total 7 marks)

TOTAL FOR PAPER IS 80 MARKS