Edexcel GCSE

Mathematics

Foundation/Higher Tier

Number: Four operations

Information for students

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 66 questions in this selection.

Advice for students

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

Information for teachers

The questions in this document are taken from the 2009 GCSE Exam Wizard and include questions from examinations set between January 2003 and June 2009 from specifications 1387, 1388, 2540, 2544, 1380 and 2381.

Questions are those tagged as assessing "Four operations" though they might assess other areas of the specification as well. Questions are those tagged as "Foundation/Higher" so could have (though not necessarily) appeared on either a Foundation, Intermediate or Higher tier paper.

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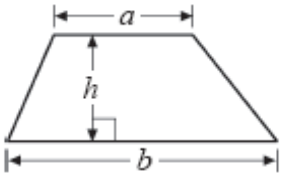
GCSE Mathematics

Formulae: Foundation Tier

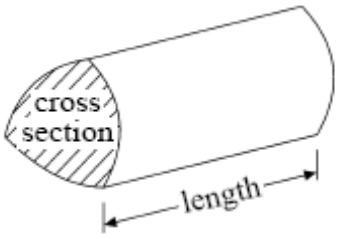
You must not write on this formulae page.

Anything you write on this formulae page will gain NO credit.

Area of trapezium = $(a + b)h$



Volume of prism = area of cross section × length



1. (a) Use your calculator to work out

$$(2.3 + 1.8)^2 \times 1.07$$

Write down all the figures on your calculator display.

.....

(2)

(b) Put brackets in the expression below so that its value is 45.024

1.6 + 3.8 × 2.4 × 4.2

(1)
(Total 3 marks)

2. This table is used to find numbers of rolls of insulation material needed for lofts of different floor areas.

Floor area of loft (A square feet)	Number of rolls (n)
300	6
350	7
400	8
450	9
500	10
550	11

The floor of a rectangular loft is 30 feet long and 15 feet wide.

(a) (i) Work out the floor area of this loft.

…… square feet

(ii) Write down the number of rolls of insulation material needed for this loft.

……..……

(3)

n is the number of rolls of insulation material needed for a loft with a floor area of A square feet.

(b) Express n in terms of A.

n = ……

(2)
(Total 5 marks)

3. Use your calculator to work out the value of

$$\frac{(7.91 - \sqrt[3]{81}) \times 4.32}{6.23 + 1.491}$$

Give your answer correct to 3 significant figures.

……

(Total 3 marks)

4. Use your calculator to work out the value of $\dfrac{6.27 \times 4.52}{4.81 + 9.63}$

(a) Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) to an appropriate degree of accuracy.

.....

(1)
(Total 3 marks)

5. On average, Nick walks 18 000 steps every day.
He walks 1 mile approximately every 3500 steps.

Work out an estimate for the average distance, in miles, that Nick walks **in one year.**

..... miles

(Total 3 marks)

6. Mary's floor is a rectangle 8 m long and 5 m wide.

She wants to cover the floor completely with carpet tiles.
Each carpet tile is square with sides of length 50 cm.
Each carpet tile costs £4.19

Work out the cost of covering Mary's floor completely with carpet tiles.

£ .....

(Total 3 marks)

7. (a) Work out the value of $3.8^2 - \sqrt{75}$
Write down all the figures on your calculator display.

…….

(2)

(b) Write your answer to part (a) correct to 1 significant figure.

…….

(1)

(Total 3 marks)

8. The cost of a compact disc holder is 25p.
John has £15 to spend.

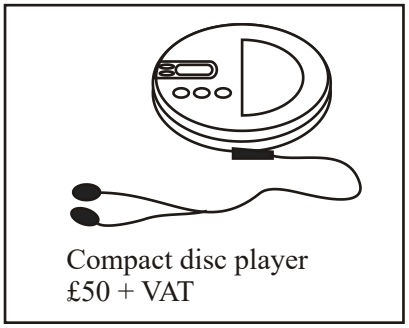
(a) What is the greatest number of compact disc holders that John can buy for £15?

.....

(3)

A compact disc player costs £50 plus 17½% VAT.

(b) Calculate the total cost of the compact disc player.



£ .....

(3)
(Total 6 marks)

9.

Canal boat for hire **£1785.00** **for 14 days**

What is the cost **per day** of hiring the canal boat?

£ .....

(Total 3 marks)

10. A museum has these charges.

Adult Ticket	£2.50
Child Ticket	£1.25
Family Ticket (2 adults and 3 children)	
£6.50	

Mr and Mrs Iqbal and their three children visit the museum.

Work out how much they will save by buying one family ticket rather than 5 separate tickets

£……

(Total 4 marks)

11. A ream of paper costs £2.69

(a) Work out the cost of 34 reams of paper.

£ .....

(3)

The weight of a ream of paper is 2.5 kg.
There are 500 sheets of paper in a ream.

(b) Work out the weight, in grams, of one sheet of paper.

..... g

(3)
(Total 6 marks)

12. (a) Use your calculator to work out $\frac{\sqrt{19.2 + 2.6^2}}{2.7 \times 1.5}$

Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 3 significant figures.

.....

(1)
(Total 3 marks)

13. A full glass of water holds $\frac{1}{6}$ of a bottle of water.

How many glasses of water can be filled from $2\frac{1}{2}$ bottles of water?

.....

(Total 3 marks)

14. Using the information that

$19 \times 24 = 456$

write down the value of

(a) 19×240

.....

(1)

(b) 19×2.4

.....

(1)

(c) $456 \div 190$

.....

(1)

(Total 3 marks)

15. Use your calculator to work out $\dfrac{4.7}{9.4 - 3.5}$

Write down all the figures on your calculator display.

.....

(Total 2 marks)

16. Work out 3.15×24

.....

(Total 3 marks)

17. (a) Use your calculator to work out $\dfrac{4.7}{9.4 - 3.5}$

Write down all the figures on your calculator display.

.....

(2)

(b) Write these numbers in order of size.
Start with the smallest number.

$0.82 \qquad \dfrac{4}{5} \qquad 85\% \qquad \dfrac{2}{3} \qquad \dfrac{7}{8}$

.....

(2)

(Total 4 marks)

18. (a) Work out £3.75 × 24

£ .....

(3)

(b) Divide £135 by 20

£ .....

(3)

(Total 6 marks)

19. The cost of 1.5 kg of peaches is £0.84

The total cost of 3 kg of peaches and 2 kg of apples is £2.34

Work out the cost of 1 kg of apples.

……...

(Total 3 marks)

20. Plain tiles cost 28p each.
Patterned tiles cost £9.51 each.

Julie buys 450 plain tiles and 15 patterned tiles.

(a) Work out the total cost of the tiles.

£ ……...

(3)

(b) Express 15 as a fraction of 450
Give your answer in its simplest form.

……...

(2)

Fred lays the tiles.
He charges £360 plus VAT at 17.5%.

(c) Work out the total amount that Fred charges.

£ ……...

(3)
(Total 8marks)

21. Use your calculator to work out the value of $\sqrt{20.25} + 1.65^2$

(a) Write down all the figures on your calculator display.

……...

(2)

(b) Write your answer to part (a) correct to one significant figure.

……...

(1)
(Total 3 marks)

22. Use your calculator to work out the value of $\sqrt{20.25} + 1.65^2$

(a) Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 1 decimal place.

.....

(1)
(Total 3 marks)

23. Kaysha has a part-time job.
She is paid £5.40 for each hour she works.
Last week Kaysha worked for 24 hours.

Work out Kaysha's total pay for last week.

£ .....

(Total 3 marks)

24. David buys some stamps.
Each stamp costs 25p.
The total cost of the stamps is £3

(a) Work out the number of stamps David buys.

.....

(2)

Adam, Barry and Charlie each buy some stamps.
Adam buys x stamps.
Barry buys three times as many stamps as Adam.

(b) Write down an expression, in terms of x, for the number of stamps Barry buys.

.....

(1)

Charlie buys 5 more stamps than Adam.

(c) Write down an expression, in terms of x, for the number of stamps Charlie buys.

.....

(1)
(Total 4 marks)

25.

Eiffel Tower

The table shows the cost of two different models of the Eiffel Tower.

Small	£2.40
Large	£4.50

Pierre buys

10 Small models,
and 5 Large models.

He pays with a £50 note.

(a) Work out how much change he should get.

£ .....

(3)

A different model of the Eiffel Tower is made to a scale of 2 millimetres to 1 metre.

The width of the base of the real Eiffel Tower is 125 metres.

(b) Work out the width of the base of the model.
Give your answer in millimetres.

..... mm

(2)

The height of the model is 648 millimetres.

(c) Work out the height of the real Eiffel Tower.
Give your answer in metres.

..... m

(2)

(Total 7 marks)

26. Use a calculator to work out

$$\sqrt{\frac{21.6 \times 15.8}{3.8}}$$

(a) Write down all the figures on your calculator display.

.....

(2)

(b) Give your answer to part (a) correct to 3 significant figures.

.....

(1)
(Total 3 marks)

27. Use the information that

$$322 \times 48 = 15\,456$$

to find the value of

(a) 3.22×4.8

.....

(1)

(b) 0.322×0.48

.....

(1)

(c) $15\,456 \div 4.8$

.....

(1)
(Total 3 marks)

28. Tania went to Italy.
She changed £325 into euros (€).

The exchange rate was £1 = €1.68

(a) Change £325 into euros (€).

€ .....

(2)

When she came home she changed €117 into pounds.

The new exchange rate was £1 = €1.50

(b) Change €117 into pounds.

£ .....

(2)
(Total 4 marks)

29. (a) Work out $\dfrac{4.6 + 3.85}{3.2^2 - 6.51}$

Write down all the numbers on your calculator display.

.....

(2)

(b) Give your answer to part (a) correct to 1 significant figure.

.....

(1)
(Total 3 marks)

30. (a) Find the value of $2.56 + \sqrt{39.69}$

.....

(1)

(b) Use your calculator to work out

$$(2.3 + 1.8)^2 \times 1.07$$

Write down all the figures on your calculator display.

.....

(2)
(Total 3 marks)

31. A group of adults and children go to a concert.

COST OF TICKETS	
Adult	£5.60
Child	£2.30

The **total** cost of tickets for the group was £75.00
Each adult bought 1 adult ticket and 3 child tickets.
Work out the number of **adults** in the group.

.....

(Total 3 marks)

32. (a) Use your calculator to work out

$$(2.3 + 1.8)^2 \times 1.07$$

Write down all the figures on your calculator display.

.....

(2)

(b) Put brackets in the expression below so that its value is 45.024

$$1.6 + 3.8 \times 2.4 \times 4.2$$

(1)
(Total 3 marks)

33. Work out the value of

$$\frac{5.4 - 6.3^2}{0.3}$$

……
(Total 2 marks)

34. Use your calculator to work out the value of

$$\frac{5.4 \times 8.1}{12.3 - 5.9}$$

Write down all the figures on your calculator display.

.....
(Total 2 marks)

35. Alex has a mobile phone.
Each month he pays

13.4p for each minute he uses his mobile phone
and
a fixed charge of £18.75

In January Alex uses his mobile phone for 405 minutes.

Work out the **total amount** Alex pays.

£ .....

(Total 3 marks)

36. Use your calculator to work out the value of $\frac{1}{2.73^2 - 3.86}$

(a) Write down all the figures on your calculator display.

……..

(2)

(b) Give your answer to an appropriate degree of accuracy.

……..

(1)
(Total 3 marks)

37. Use your calculator to work out

$$\frac{15.1+4.82}{6.2-3.7}$$

Write down all the figures on your calculator display.

.....

(Total 2 marks)

38. (a) Write the number 0.00821 correct to 2 significant figures.

.....

(1)

(b) Use your calculator to work out

$$\frac{15.1+4.82}{6.2-3.7}$$

Write down all the figures on your calculator display.

.....

(2)

(Total 3 marks)

39. Use your calculator to work out

$$\sqrt{\frac{6.32 - 2.8}{8.7 + 9.2}}$$

Write down all the figures on your calculator display.

.....

(Total 2 marks)

40. Work out $\dfrac{\sqrt{2.56 + 3.50}}{8.765 - 6.78}$

(a) Write down all the figures on your calculator display.

.....

(2)

(b) Give your answer to part (a) to an appropriate degree of accuracy.

.....

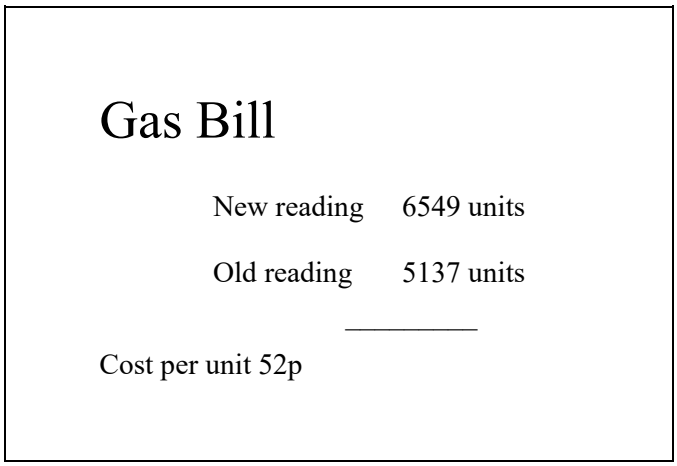
(1)
(Total 3 marks)

41. Work out 25.6 × 1.6
You **must** show **all** your working.

.....

(Total 3 marks)

42. Here is part of Mrs Cook's gas bill.



Gas Bill

New reading 6549 units

Old reading 5137 units

Cost per unit 52p

Work out the **total** cost of the units of gas she used.

£ .....

(Total 4 marks)

43. Adult cinema tickets cost £3.50.
Child cinema tickets cost £2.20.
Mr Brown buys some cinema tickets for £14.90.
He buys 2 child cinema tickets.

How many adult cinema tickets does he buy?

1	2	3	4	5
☐	☐	☐	☐	☐
A	**B**	**C**	**D**	**E**

(Total 1 mark)

44. Work out 1572 ÷ 0.3

5.24	52.4	524	5240	52400
☐	☐	☐	☐	☐
A	**B**	**C**	**D**	**E**

(Total 1 mark)

45. Which fraction is the largest?

$\frac{11}{15}$	$\frac{4}{5}$	$\frac{9}{10}$	$\frac{13}{20}$	$\frac{53}{60}$
A	**B5**	**C**	**D**	**E**

(Total 1 mark)

46. 487 is divided by 23

What is the remainder?

16	4	3	6	0
A	**B**	**C**	**D**	**E**

(Total 1 mark)

47. The diagram shows a rectangular floor.
The length of the floor is 3 m.
The width of the floor is 2 m.

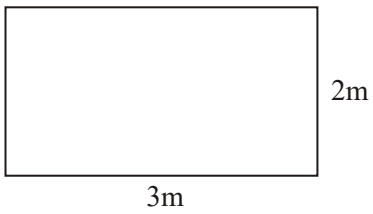


Diagram **NOT** accurately drawn

Jane is going to cover the floor with tiles.
Each tile is a square of side 50 cm.
Jane wants to cover the floor completely.

How many tiles does she need?

24	12	10	20	6
A	**B**	**C**	**D**	**E**

(Total 1 mark)

48. Given that $37 \times 234 = 8658$

what is the value of 3.7×23.4 ?

865.8	86.58	8.658	0.8658	86580
A	**B**	**C**	**D**	**E**

(Total 1 mark)

49. Which is the best estimate for the value of $\frac{410 \times 6.9}{0.23}$?

14000	7000	1230	1400	2800
A	**B**	**C**	**D**	**E**

(Total 1 mark)

50.

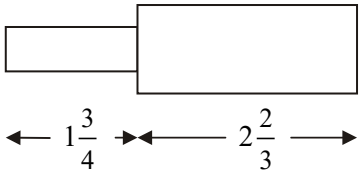


Diagram **NOT** accurately drawn

A machine tool is made from two parts.

One part has a length of $1\frac{3}{4}$ inches.

The other part has a length of $2\frac{2}{3}$ inches.

What is the total length, in inches, of the machine tool?

$3\frac{5}{7}$	$4\frac{5}{12}$	$4\frac{2}{3}$	$\frac{15}{7}$	$3\frac{5}{12}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

51. Use your calculator to work out the exact value of $\dfrac{15.6}{1.18+2.07}$

.....

(Total 2 marks)

52. A train ticket to the city centre costs £2.85
A teacher buys 26 of these tickets for a school group.
What is the total cost of the 26 tickets?

£74.10	£22.80	£64.10	£51.40	£71.25
A	**B**	**C**	**D**	**E**

(Total 1 mark)

53. (a) Use your calculator to work out

$$(3.4 + 2.1)^2 \times 5.7$$

Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 1 significant figure.

.....

(1)
(Total 3 marks)

54. Work out 5.4×0.24
You **must** show **all** your working.

.....

(Total 3 marks)

55. (a) Use your calculator to work out the value of $2.58 \times \sqrt{2}$

Write down all the figures on your calculator display.

.....

(1)

(b) Write your answer to part (a) correct to 1 decimal place.

.....

(1)
(Total 2 marks)

56. Esther went to France.

She changed £300 into Euros (€).
The exchange rate was £1 = €1.25

(a) How many Euros did she get?

€ .....

(2)

Esther went shopping in France.
She bought

2 necklaces for €2.60 **each**
1 hat for €6.40
1 bag for €9.80

The exchange rate was £1 = €1.25

(b) Work out her **total** bill in pounds (£).

£ .....

(4)
(Total 6 marks)

57. (a) Change $\frac{5}{8}$ to a decimal.

.....

(2)

(b) Work out $\frac{2}{5} + \frac{1}{7}$

.....

(2)

(c) Work out $2\frac{1}{2} \times 1\frac{3}{5}$

.....

(3)

(Total 7 marks)

58. Given that 4.5 × 5.5 = 24.75

What is the value of 0.45 × 550?

0.2475	2.475	24.75	247.5	2475
A	**B**	**C**	**D**	**E**

(Total 1 mark)

59. Use your calculator to work out

$$\sqrt{12.63+18^2}$$

Write down all the figures on your calculator display.

.....

(Total 2 marks)

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

$\frac{3}{8}$	$\frac{2}{15}$	$\frac{13}{15}$	$\frac{3}{15}$	$\frac{11}{15}$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

61. (a) Use your calculator to work out $\frac{26.4+8.2}{\sqrt{5.76}}$ as a decimal.

Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part (a) correct to 2 decimal places.

.....

(1)

(Total 3 marks)

62. $0.64 \div 0.2 =$

3.2	0.032	0.32	12.8	1.28
A	**B**	**C**	**D**	**E**

(Total 1 mark)

63. Work out $\frac{3.4^2 - 2.6^2}{1.6}$

.....

(Total 2 marks)

64. Work out $\frac{1}{8} + \frac{3}{4}$

.....

(Total 2 marks)

65. Work out $\frac{3}{5} \times \frac{1}{4}$

.....

(Total 2 marks)

66. Alan bought 20 melons for £15

$\frac{1}{5}$ of the melons were bad so he threw them away.

He sold the remaining melons for £1.50 each.

Work out Alan's profit.

£ .....

(Total 4 marks)

01. (a) 17.9867 2

$4.1^2 \times 1.07 = 16.81 \times 1.07$

M1 for (4.1) followed by squaring, or sight of 16.81
A1 cao
SC: B1 for 18 or better with no working

(b) $(1.6 + 3.8 \times 2.4) \times 4.2$ 1

B1 cao
Allow additional brackets if they give an expression with value 45.024

[3]

02. (a) (i) 450 3

30×15

M1 for 30 × 15
A1 cao

(ii) 9

A1 ft from "450"

(b) $\frac{A}{50}$ 2

B2 $\frac{A}{50}$ *oe*
(B1 for 50n seen)

[5]

03. 2.00 3

$7.91 - \sqrt[3]{81} = 3.583251$
$3.583251\ldots\ldots \times 4.32 = 15.47964\ldots\ldots$
$6.23 + 1.491 = 7.721$
$15.47964\ldots \div 7.721 =$

B3 for 2 to 2.005
or
B1 for 3.58(3251) (× 4.32) or 15.5 or better
B1 for 7.721 seen

[3]

04. (a) 1.9626… 2

$$\frac{6.27\times4.52}{4.81+9.63}=\frac{28.3404}{14.44}=1.962631579$$

B2 for 1.9626…
(B1 for 28.34… or 14.44)

(b) 1.96 1

B1 ft from (a) as rounded to 1dp or 2dp.
Do not accept 2, 2.00, but accept 2.0

[3]

05. 2000 3

$$\frac{18000\times365}{3500}$$
$$\frac{20000\times400}{4000}$$

M1 for – 3500 or – 4000 or 5 seen
M1 for × 365 or × 400 or × 7 × 4 × 12
A1 for answer in range 1800 - 2300

[3]

06. £670.40 3

8 × 5 × 4 = 160 tiles
160 × £4.19 = £670.40

M1 for 8 × 5 × 4 or 8 × 5 ×2 or 8 × 5 or 16 × 10 or 800 – 50 oe or 500 – 50 oe
M1 (indep) for × 4.19; can be implied
A1 for 670.40 or 670.4

[3]

07. (a) 5.77974(…) 2

14.44 – 8.660254038

M1 for 14.44 seen or 8.66(…) or 5.7 or 5.8 or better rounded or truncated

(b) 6 1

A1 cao
B1 ft

[3]

08. (a) £1 ÷ 25p = 100 ÷ 25 = 4
15 × 4 = 60 3

M1 Conversion of £ to p eg × 100 or 1500
M1 (indep) 15 ÷ 25, 100 ÷ 25 = 4 (or 4 as a digit seen)
A1 cao

(b) eg 10%+5%+2.5%= £5 + £2.50 + £1.25
So VAT = £8.75
Total cost is £50 + £8.75
= £58.75 3

M1 5, 2.5(0), 1.25 or 17.5 ÷ 2, 50×17.5÷100 oe
M1 "£8.75" + £50 where the "£8.75"has been derived from a percentage calculation
OR M2 for 50 × 1.175 oe
A1 cao

[6]

09. $14\overline{)17^{3}8^{10}5.^{7}00}$ = 127.50

= £127.50 3

B1 for 1,2
B1 for 7
Accept 127.5
B1 cao
OR
M1 for ÷2 and ÷7
A1 for 255 or 892.5
B1 cao

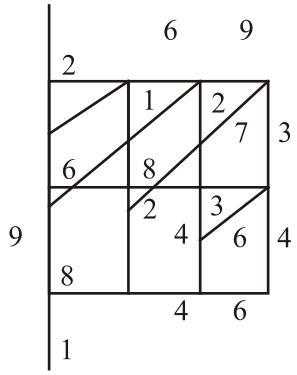
[3]

10. 2 × 2.50 + 3 × 1.25 = 8.75
"8.75" – 6.50
2.25 4

M1 for 2 × 2.50 or 3 × 1.25
A1 for 8.75
M1 (dep on 1st M1) for "8.75" – 6.50
A1 ft for 2.25

[4]

11. (a) 1076 3
807×
9146
= 91.46



200	60	9	
6000	1800	270	30
800	240	36	4

6000 + 1800 + 270 + 800 + 240 + 36 = 9146

M1 for a complete method with relative place value correct, condone 1 multiplication error, addition not necessary
A1 for 9146
A1 (dep on M1) for correct conversion of their total into £s
or
M1 for a completed grid with not more then 1 multiplication error, addition not necessary
A1 for 9146
A1 (dep on M1) for correct conversion of their total into £s
or
M1 for sight of a complete partitioning method, condone 1 multiplication error, final addition not necessary
A1 for 9146
A1 (dep on M1) for correct conversion of their total into £s

(b) 2.5 × 1000 or 2500 = 5 3

B1 for 2.5 × 1000 or 2500
M1 for weight ÷ 500
A1 cao

[6]

12. (a) $\frac{\sqrt{25.96}}{4.05} = \frac{5.09509...}{4.05}$ 2

1.258048316

M1 for 5.09... or 4.05 or 25.96 seen
A1 for at least 4 sf rounded or truncated:
1.258(048316...) or 1.26

(b) 1.26 1

B1 for 1.26 or ft from (a); 1.260 gets B0

[3]

13. 6 + 6 + 3 or $2\frac{1}{2} \times 6$

= 15 3

M1 for realizing 6 glasses in one bottle
M1 for realizing 3 glasses in 1/2 a bottle
A1 cao

(M2 for attempt to find $2\frac{1}{2} \times 6$) oe

[3]

14. (a) 4560 1

B1 cao

(b) 45.6 1

B1cao

(c) 2.4 1

B1 cao

[3]

15. 4.7 ÷ 5.9 = 0.796610169
= 0.7966.. 2

B2 for 0.7966 or better
(B1 for 0.8, 0.80, 0.79, 0.796, 0.797 or digits 59 seen

[2]

16.

315	24
24	315
1260	120
6300	240
7560	7200
	7560

3	**1**	**5**	
0 / 6	0 / 2	1 / 0	**2**
1 / 2	0 / 4	2 / 0	**4**
7 5	6	0	

300	**10**	**5**	
6000	200	100	**20**
1200	40	20	**4**

6000 + 200 + 100 + 1200 + 40 + 20 = 7560

3	**0.1**	**0.05**	
60	2	1	**20**
12	0.4	0.2	**4**

60 + 2 + 1 + 12 + 0.4 + 0.2 = 75.6

= 75.6(0) 3

M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary.

or

M1 for a complete grid with not more than 1 multiplication error, addition not necessary.

or

M1 for sight of a complete partitioning method, condone 1 multiplication error, final addition not necessary.

A1 for 7560 or digits 756(0)

A1 (dep on M1, but not previous A1) for correct placement of decimal point.

[3]

17. (a) $4.7 \div 5.9 = 0.796610169$
$= 0.7966..$ 2

B2 for 0.7966 or better

(B1 for 0.8, 0.80, 0.79, 0.796, 0.797 or digits 59 seen)

(b) 0.82, 0.8, 0.85, 0.66, 0.875
0.66, 0.8, 0.82, 0.85, 0.875
2/3, 4/5, 0.82, 85%, 7/8
2/3, 4/5, 0.82, 85%, 7/8 2

B2 correct order (oe decimals in order)

(B1 correct order reversed, or one error in ordered listing) with or without decimal equivalents.

NB Accept 0.67 or 0.66

[4]

18. (a)

$$\begin{array}{r} 375 \\ 24 \times \\ \hline 1500 \\ 7500 \\ \hline 9000 \end{array}$$

$= 90.00$ 3

	3	**7**	**5**	
	6	1 4	1 0	**2**
9	1 2	2 8	2 0	**4**
	0	0	0	

300	70	5	
6000	1400	100	20
1200	280	20	4

6000 + 1400 + 100 + 1200 + 280 + 20 = 9000
M1 for a complete method with relative place value correct, condone 1 multiplication error, addition not necessary
A1 for 9000
A1 (dep on M1) for correct conversion of their total into £s
or
M1 for a completed grid with not more than 1 multiplication error, addition not necessary
A1 for 9000
A1 (dep on M1) for correct conversion of their total into £s
or

M1 for sight of a complete partitioning method, condone 1 multiplication error, final addition not necessary
A1 for 9000
A1 (dep on M1) for correct conversion of their total into £s
or
M1 for repeated addition (condone 23 or 25) must be an attempt to add
A1 for 9000
A1 (dep on M1) for correct conversion of their total into £s

(b) $20\overline{)135.5^{15}0^{10}0}$ 3

$= 6.75$

M1 for 135 ÷ 20 with 6 units identified
M1 for a correct method to deal with remainder
A1 cao
or
M1 for complete method for division broken up correctly
M1 for a correct method to deal with remainders
A1 cao

[6]

19. 3kg peaches is £1.68
£2.34 – £1.68 = £0.66
£0.66 ÷ 2 = £0.33

= £0.33 or 33p 3

M1 2 × £0.84 or digits 168 seen
M1(dep) digits 234 – digits "168" or digits 66 seen
A1 £0.33 or 33p (units consistent with answer)
NB: 0.33 or 33 without units M2, £0.33p, £33p M2A1

[3]

20. (a) 450 × 28 = 12600p = £126
15 × 9.51 = £142.65
£142.65 + £126
= 268.65 3

M1 for 450 × 28 or 0.28x450 or digits 126 seen
M1 for 15 × 9.51 or 951 × 15 or digits14265 seen
A1 cao

(b) $\frac{15}{450} = \frac{1}{30}$

$\frac{1}{30}$ 2

M1 for $\frac{15}{450}$
A1 for $\frac{1}{30}$
SC B1 for 0.03(……) or 3.33(……)%

(c) 360×1.175 or

$360 \times \frac{17.5}{100} = 63$

$360 + 63$

= £423 3

M2 for 360 × 1.175 oe
A1 cao
or
M1 for 360 × $\frac{17.5}{100}$ (= 63)
or attempt at 10%, +5%, +2.5% eg digits 36 + 18 + 9
M1 (dep) 350 + "63"
A1 cao

[8]

21. (a) 4.5 + 2.7225 = 7.2225 2

M1 for 4.5 or 2.7225
A1 7.2225 cao

(b) 7 1

B1 ft to 1 sf on (a)

[3]

22. (a) 4.5 + 2.7225 = 7.2225 2

M1 for 4.5 or 2.7225
A1 7.2225 cao

(b) 7.2 1

B1 for rounding correctly their 4 or more figure answer in (a) to 1 decimal place; award if 7(a) already to 1dp

[3]

23.
$$\begin{array}{r} 540 \\ \underline{\quad 24} \\ 2160 \\ \underline{10800} \\ 12960 \end{array}$$

	5	**4**	**0**	
1	1 0	0 8	0 0	**2**
2	2 0	1 6	0 0	**4**
	9	6	0	

	500	**40**	**0**
20	10000	800	0
4	2000	160	0

10000 + 2000 + 800 + 160 = 12960

5	**0.4**	
100	8	**20**
20	1.6	**4**

100 + 20 + 8 + 1.6 = 129.6

129.6(0) 3

M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary.

OR

M1 for a complete grid. Condone 1 multiplication error, addition not necessary.

OR

M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary.

A2 for 129.6(0)(p) cao

(A1 (dep on M1) for correct placement of decimal point after final addition or for digits 1296(0) seen)

SC: B1 for addition of 24 lots of 5.4(0) or 540

[3]

24. (a) 300 ÷ 25
12 2

M1 for 25 + 25 + 25 + ... or "3" ÷ 25 or £1 = 4 oe
A1 for 12 cao

(b) $3x$ 1

B1 for 3x or 3 × x

(c) $x + 5$ 1

B1 for x + 5 cao

[4]

25. (a) $(2.40 \times 10) + (4.50 \times 5) = 24.00 + 22.50 = 46.50$
50.00-46.50
3.50 3

M1 (2.40 × 10) or (4.50 × 5) or sight of 24 or 22.5(0)
M1 (2.40 × 10) + (4.50 × 5) or sight of 24 + 22.5(0) or sight of 46.5(0)
A1 cao Accept 3.5

(b) 125×2
250 2

M1 125 × 2
A1 cao

(c) $648 \div 2$
324 2

M1 648÷2
A1 cao

[7]

26. (a) $\sqrt{\frac{21.6 \times 15.8}{3.8}} =$

9.476841579 2

M1 for 89.81052 *.... or 341.28 or 4.86151... or* $\frac{8532}{95}$ *or* $\frac{8532}{25}$
A1 for 9.47684.....
SC : B1 for 9.476841579... truncated or rounded to at least 1 decimal place

(b) $\sqrt{89.81052632}$

9.48 1

B1 ft from (a) with at least 4 significant figures

[3]

27. (a) 15.456 1

B1 cao

(b) 0.15456 1

B1 cao

(c) 3220 1

B1 cao

[3]

28. (a) 325 × 1.68
546 2

M1 for 325 × 1.68 seen or digits 546
A1 for 546, accept 546.00, 546.0

(b) 117 ÷1.5
78 2

M1 for 117 ÷1.5 seen or digits 78
A1 for 78, accept 78.00, 78.0

[4]

29. (a) 4.6 + 3.85 = 8.45
$3.2^2 - 6.51 = 3.73$
8.45 ÷ 3.73 =
2.26541555 2

M1 for $\frac{169}{20}$ *or* $\frac{256}{25}$ *or* $\frac{373}{100}$ *or 3.73 or 10.24 or 8.45 seen*

A1 for 2.265(41555); accept $\frac{845}{373}$

(b) 2 1

B1 ft for 2 or follow through their answer to part (a)
NB: 2.0 gets B0

[3]

30. (a) 8.86 1

B1

(b) 17.9867 2

"4.1"^{2} × 1.07 = 16.81 × 1.07

M1 for "4.1" followed by squaring, or sight of 16.81
A1 cao
SC: B1 for 18 or better with no working

[3]

31. 6 3

5.60 + 3(2.30) = 12.50

$\frac{7.5}{12.50}$

M1 for 5.60 + 3(2.30) oe or 12.5 seen
M1 for $\frac{75}{'12.5'}$ *oe*
A1 cao

[3]

32. (a) 17.9867 2

"4.1"^{2} × 1.07 = 16.81 × 1.07

M1 for ("4.1") followed by squaring, or sight of 16.81
A1 cao
SC: B1 for 18 or better with no working

(b) (1.6 + 3.8 × 2.4) × 4.2 1

B1 cao
Allow additional brackets if they give an expression with value 45.024

[3]

33. –114.3 2

B2 for –114.3
[B1 for –34.29 seen or –114]

[2]

34. 6.834(375) 2

B2 for 6.834375
Accept 6.834 with/without any additional digits
(B1 for 43.74 or 6.4 or 6.8 or better or digits 6834… seen)

[2]

35. £73.02 3

405 × 13.4 (= 5427)
"54.27" + 18.75

M1 for 405 × 13.4 or digits 5427 seen
M1(dep) for "54.27" + 18.75 (must be in same units)
A1 cao

[3]

36. (a) 0.278326699 2

B2 for 0.278326(699…)
(B1 for 3.5929)

(b) 0.28 or 0.278 1

B1 ft for rounds to 2dp or 3 sf or 2sf

[3]

37. $\frac{19.92}{2.5}$
7.968 2

B2 for 7.968
*(B1 for 19.92 **or** 2.5 **or** 7.97 seen)*

[2]

38. (a) 0.0082 1

B1

(b) $\frac{19.92}{2.5}$
7.968 2

B2 for 7.968
*(B1 for 19.92 **or** 2.5 in the working **or** 7.97 as an answer)*

[3]

39. 0.443450(16...) 2

B2
(B1 for 0.1966..or 0.1048... or 3.52 and 17.9 seen)

[2]

40. (a) $\frac{\sqrt{6.06}}{1.985}$ 2

1.24015

B2 for 1.24015.....
(B1 for sight of 2.46(...) or 1.985 or 1.24(...))

(b) 1.24 1

(B1 ft for any answer to (a) correctly rounded to 2, 3 or 4 significant figures)

[3]

41. 3

256

50 6

× 16

500 60

15 36

300 36

25 60

40 90

	200
10	2000
6	1200

2000, 1200, 500, 300, 60, 36 added
= 40.96

M1 for complete method for multiplying the digits 256 by 16, condone one arithmetic error
A1 for digits 4096 seen
A1 cao

[3]

42. 6549 – 5137 (= 1412) 4
"1412" × 52 (= 73424)
"73424" ÷ 100
= 734.24

M1 for 6549 – 5137 or 1412 seen
M1 (dep) for "1412" × 52 or 73424 seen
M1 for "73424" ÷ 100 (this depends upon "73424" being the result of a direct product of 52 and units given in the question)
A1 cao

Alternative

6549 × 52 (= 340548)
5137 × 52 (= 267124)
"340548" ÷ 100 – "267124" ÷ 100

Alternative

M1 for 6549 × 52 or 340548 seen or 5137 × 52 or 267124 seen
M1 for "340548" ÷ 100 or "267124" ÷ 100 (this depends upon "340548" or "267124" being the result of a direct product of 52 and units given in the question)
M1 (dep on 1st M1) for "340548" – "267124"
or "340548 ÷ 100" – "267124 ÷ 100"
A1 cao

As we have all seen, the concept of bills involving meter readings is totally foreign to many candidates. Very many are finding the sum of the units and then finding the cost of the total.
The new alternative method goes some way to address this issue.
Essentially the 3 method marks can be classified as follows:
M1 for multiplying by 52; ***either,*** *the number of either of the units given, or the* ***difference*** *of the units given or the* ***sum*** *of the units given. No other product gains this mark.*
M1 for a correct method to convert any of the answers derived from the method above into pounds. Often this is seen combined with the method above by a product including 0.52 This method mark is dependent upon the award of the previous M1.

M1 for working out the difference between the reading/cost from "new" to "old"
Candidates following the sum of the two readings/costs can only get a maximum of 2 marks (the first 2 method marks)
Sight of the digits 607672 with or without working, gets M1
Sight of 6076.72 with or without working, gets M2 (I know that these imply a multi-stage operation, but the numbers couldn't have come from anywhere else)
Similarly, sight of just 1412 or 340548 or 267124 gets 1 mark
sight of just 73424 or 3405.48 or 2671.24 gets 2 marks
(Note: sight of just 14.12 gets M1 only)
sight of 734.24 gets the full 4 marks unless contradicted by another answer on the answer line.

[4]

43. C

[1]

44. D

[1]

45. C

[1]

46. B

[1]

47. A

[1]

48. B

[1]

49. A

[1]

50. B

[1]

51. $\frac{15.6}{3.25}$

4.8 or $\frac{24}{5}$ 2

B2 for 4.8 or $\frac{24}{5}$ or $4\frac{4}{5}$ only

[B1 for 3.25 oe seen or any equivalent fraction to $\frac{24}{5}$ written as an improper or mixed fraction]

[2]

52. A

[1]

53. (a) $(3.4 + 2.1)^2 \times 5.7$
$= 5.5^2 \times 5.7$
$= 30.25 \times 5.7$
172.425 2

M1 for 5.5 or 30.25 or $\frac{121}{4}$ *or 172. (...) seen*

A1 for 172.425 or $\frac{6897}{40}$

(b) 200 1

B1 ft

[3]

54.
```
      540
       24
     2160
    10800
    12960
```
3

129.6(0)

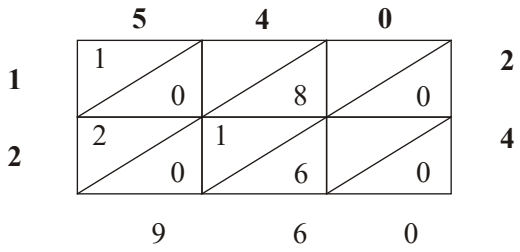
M1 for a complete method with relative place value correct. Condone 1 multiplication error, addition not necessary.

OR

M1 for a complete grid. Condone 1 multiplication error, addition not necessary.

OR

M1 for sight of a complete partitioning method, condone 1 multiplication error. Final addition not necessary.



	500	40	0
20	10000	800	0
4	2000	160	0

A1 for 129.6(0) cao
A1 (dep on M1, but not previous A1) for correct placement of decimal point.

10000 + 2000 + 800 160 = 12960

3	**0.1**	**0.05**	
60	2	1	**20**
12	0.4	0.2	**4**

100 + 20 + 8 + 1.6 = 129.6

[3]

55. (a) $2.58 \times \sqrt{2} =$
3.648670991 1
B1 for 3.648... cao

(b) 3.6 1
B1 ft for "3.6"

[2]

56. (a) 300×1.25 2
375
M1 for 300 × 1.25
A1 cao

(b) $2 \times 2.60 + 6.40 + 9.80$ (= 21.4) 4
"21.4"÷1.25
£17.12

M2 for $2 \times 2.60 + 6.40 + 9.80$ (= 21.4)
(M1 for 2.60 + 6.40 + 9.80 (= 18.8))
M1 for "total"÷1.25
A1 cao

OR

M1 for any value ÷ 1.25 (implied by at least one figure below)
M2 for "4.16" + "5.12" + "7.84"
(M1 for "2.08" + "5.12" + "7.84" (= 15.04))
A1 cao
SC: B1 for 18.8 , B2 for 15.04

[6]

57. (a) $5.000 \div 8$ 2
0.625

M1 for $5 \div 8$ or $1 \div 8 \times 5$A1 cao

(b) $\frac{14}{35} + \frac{5}{35}$ 2
$\frac{19}{35}$ 0e

M1 for correct common denominator of two fractions with at least one numerator correct
A1 for $\frac{19}{35}$ oe (for example $\frac{38}{70}$)

Alternative
0.4 + 0.143

Alternative
M1 for 0.4 and 0.14(2857…) (correct to 2dp.)
A1 for 0.54 or better

(c) $\frac{5}{2} \times \frac{8}{5} = \frac{40}{10}$ 3

4

M1 for $\frac{5}{2}$ *or* $\frac{8}{5}$ *oe M1 for* $\frac{5}{2} \times \frac{8}{5}$

A1 for 4 oe (accept 1040)

Alternative

2.5 × 1.6

Alternative
M1 For 2.5 and 1.6
M1 For 4 with any number of 0s with or without a decimal point A1 4

[7]

58. D

[1]

59. $= \sqrt{336.63}$

18.347…. 2

B2 for 18.347(47939) or $\frac{7\sqrt{687}}{10}$

(B1 for 18.3… or 336.63 seen)

[2]

60. C

[1]

61. (a) $\frac{26.4 + 8.2}{\sqrt{5.76}} = \frac{34.6}{2.4}$

14.4166(6667) 2

B2 14.4166(6667) accept $\frac{173}{12}$ *or* $14\frac{5}{12}$ *or* $14.41\dot{6}$

(B1 for 34.6 or 2.4 seen)

(b) 14.42 1

B1 ft from "14.4166…" assuming original is to 3 d.p. or more

[3]

62. A

[1]

63. $3.4^2 - 2.6^2 = 4.8$
$4.8 \div 16 = 3$ 2

M1 for 3.4 × 3.4 – 2.6 × 2.6 with evidence of multiplication or 11.56 or 6.76 or 4.8 or 289/25 or 169/25 or 24/5
A1 for 3 cao
(SC B1 for 7.335 or 1467/200)

[2]

64. $\frac{1}{8} + \frac{6}{8}$
$\frac{7}{8}$ 2

M1 for $\frac{6}{8}$ *OR correct attempt to make fractions have a common denominator with at least one fraction correct OR for 0.125 and 0.75 seen*
A1 for $\frac{7}{8}$ *oe or 0.875*

[2]

65. $\frac{3}{20}$ 2

M1 for clear attempt to multiply numerators and multiply denominators e.g $\frac{3 \times 1}{5 \times 4}$ *or* $\frac{12 \times 5}{20 \times 20}$
A1 for $\frac{3}{20}$ *oe*

[2]

66. 20 ÷ 5 (= 4)
20 – "4" (= 16)
"16" × 1.50 (= 24)
= 9 4

M1 for 20 ÷ 5
M1 for 20 – "4" where 0 < "4" < 20
M1 for "16" × 1.50 where 0 < "16" < 20
A1 cao

[4]

01. Part (a) was usually answered well. Incorrect responses often resulted from $(2.3 + 1.8)^2$ being evaluated as $2.3^2 + 1.8^2$ and some candidates tried to square by doubling. There were fewer successful attempts in part (b) with some candidates failing to put any brackets at all in the expression. Some of those giving a correct answer inserted superfluous brackets around "3.8 × 2.4".

02. Part (a) was answered very well although a surprising number of candidates could not multiply 30 by 15 correctly. Candidates were less successful in part (b) and a variety of incorrect responses involving the letters *A* and *n* were seen.

03. Most candidates were able to answer this question correctly. They could use the cube root key of their calculator with confidence and sequence the order of the calculations.
The most common incorrect answer was 3.98, obtained as a result of failing to work out the denominator first before completing the division.

04. **Mathematics A**

Paper 4

Many candidates are still attempting these questions in one stage using the calculator, and subsequently getting it wrong. Candidates who work out numerator and denominator separately, writing each down in full before carrying out the division, usually assure themselves of at least some method marks, but most go on to give the correct answer. All candidates should be advised to follow this process. The majority of candidates gained the mark in part (b) for appropriate rounding of their answer to (a).

Paper 6

This was a straightforward evaluation which most candidates could do well. Very few fell into the trap of not evaluating the denominator fully before doing the division. Answers to part (b) were good with only a few giving 1.963, or worse or at the other end, 2.

Mathematics B

Paper 17

Candidates who worked out the numerator and denominator separately usually completed the calculation accurately. An answer of 15.52197505 was a common error found by dividing by 4.81 and then adding 9.63.
Often one significant figure was chosen as an appropriate degree of accuracy in part (b); 2 being a common answer.

Paper 19

The majority of candidates were able to score full marks on this question. Of those candidates who failed to obtain the correct answer, few wrote down any working and so failed to score any marks. A common incorrect answer was 15.52… coming from the omission of brackets.

05. Many candidates realised that they needed to multiply by 365 and divide by 3500 but very few rounded the numbers to make the calculations easier. Arithmetic and place value errors were commonplace and these often led to answers of a strange magnitude. There was very little evidence to suggest that candidates had checked the reasonableness of their results by reference to the size of the numbers. The most successful candidates were those who worked out that Nick walked approximately 5 miles per day.

06. A variety of methods were used by candidates. Some drew rectangles and attempted to divide up the sides to calculate how many files are needed. Others used methods of working out areas, whilst some started by changing units. Most candidates therefore earned some credit for their working shown. Most then proceeded to multiply their answer by; £ 4.19 However, due to the number of errors accwnulated, mainly to do with units, but some with area calculations, only $^1/_5$ of the candidature gave correct final answer. It was disappointing to see some candidates performing perimeter rather than area calculations.

07. **Specification A**

Foundation Tier

Only 25% of candidates obtained the correct answer to part (a) little intermediate working was shown in answer to this part and as a result it is likely that many candidates (who did not give the correct answer) lost the partial credit they deserved for evaluating either 3.8^2 or $\sqrt{75}$ correctly. "–71.2" was a commonly seen incorrect answer. In part (b) only 15% of candidates gained the mark available for rounding their answer to (a) to 1 significant figure. Many gave answers correct to 1 or 2 decimal places.

Intermediate Tier

Part (a) was well answered. Most candidates gained at least one mark with many scoring full marks. Most often marks were lost because candidates did not write down the full calculator display but rounded or truncated the final answer. In part (b) only about 40% of candidates were able to round the answer given in part (a) correct to the required degree of accuracy. The most common error was to round it to 1 decimal place instead of to 1 significant figure.

Specification B

The evaluation of the square root and the subtraction from a square number definitely needed a calculator in order to be able to make any progress in this question. Roughly half were able to demonstrate an ability to process the numbers. The award of part marks for 14.44 or 8.66 meant that those who used a calculator could gain one mark for dealing with either the square root or the square and recording their answer. The question required the full calculator display to be recorded but some were overcome with a desire to shorten the outcome and thus lost the final mark.
Converting the result to one significant figure was not always executed correctly as this was re-written correct to one decimal place with only 14% able to correctly round their answer to part (a) to one significant figure.

08. This question proved to be a good discriminator. In part (a) those candidates who worked out that 4 CD holders cost £1 often went on to score full marks, the exception being those who lost the accuracy mark for an error in multiplying the 4 & 15. Others attempting to divide by 25 had more difficulty. In part (b) many candidates were able to find 1*0%,* 5% of £50 correctly, but many then went on to present either an incorrect or incomplete method, perhaps even just finding 1% and *Vi%,* and not the required *2Vi%,* which seems strange. Those who tried to work out 50 × 17.5 ÷ 100 often made errors in calculation. A significant number failed to attempt to add their VAT back onto the £50. The weakest candidates merely added 17.5 onto 50.

09. This was also a good discriminator. Many candidates appeared to adopt a trial and improvement approach to this question. Those who attempted it by a traditional division approach usually gained some credit. In many cases their work was disorganised, with an almost random number of attempts at multiplication problems. Some applied an incorrect partitioning method to the problem, dividing by 10, then 4. It was disappointing to find many of the better candidates giving their answer without the trailing zero, that is, using incorrect money notation.

10. **Specification A**

This proved to be a straightforward question with the majority of candidates gaining full marks. Some wrote only the answer with no evidence of any working. Many did show all their working and it was clear that some of these candidates had not used a calculator. Those candidates not giving the correct answer had usually made a basic arithmetical error in calculating 3 × £1.25 or £8.75 - £6.50. Some misread the information given in the question and worked out the cost for 3 adults and 2 children or 2 adults and 2 children.

Specification B

Most candidates scored well here, failure to gain full marks was usually a result of either misreading the question (2 children instead of 3) or poor arithmetic. Candidates who chose to work in pence had to clearly show their units to gain full marks.

11. Part (a) was answered well with many candidates using the traditional method for long multiplication. The Napier's Bones method was also used to good effect. The main errors in both methods were either in the poor recall of basic multiplication facts or, more often, in the mishandling of carry digits between columns or diagonal rows. A grid method was also commonly used. Again there were inaccuracies in the recall of multiplication facts but mistakes were also made in the multiplication of one multiple of ten by another. Candidates using partitioning methods often made mistakes with place value or forgot to deal with part of the calculation. The working of these candidates was sometimes difficult to follow. In part (b), not all candidates appreciated the need to divide and some chose to multiply. Many did not know which way round to write the division and a common error was for candidates to attempt to divide 500 by 2.5. Conversion to grams was frequently not carried out and, even when it was, some candidates multiplied by 100 rather than by 1000.

12. **Paper 5524**

A significant number merely keyed in the numbers into the calculator and inevitably got the wrong answer. Only those who undertook separate calculations for numerator and denominator arrived at the correct answer. Many candidates were unable to round the answer in (a) correctly to 3 significant figures, with many choosing to round to decimal places by mistake, or truncating. Rounding is clearly a general weakness.

Paper 5526

Part (a) required the correct use of a calculator. The vast majority of candidates could sequence the calculations and achieve the correct answer. There was a worrying minority of students who did not appreciate the need to apply Bidmas (Or Bodmas) especially when it came to the evaluation of the denominator of the expression, thus the most common errors were to square root only the 19.2 and not the result of $19.2 + 2.6^2$ and to evaluate the numerator and denominator separately and thus divide by 2.7 and multiply by 1.5. Most candidates could round off correct to 3 significant figures.

13. This question was very poorly answered by the majority of candidates. It was only the better candidates who achieved any marks and this was usually by splitting a whole bottle into sixths thus achieving 6 + 6 + 3 = 15 glasses.

14. **Foundation Tier**

For the better candidate parts (a) and (b) were well answered. It was very rare to get success with this question for candidates who were aiming for Grade F and E. Part (c) was hardly ever correct on this foundation paper.

Intermediate Tier

The majority of candidates were successful in part (a). Slightly fewer gave the correct answer in part (b) and a common error was for 4.56, instead of 45.6, to be given. Part (c) was answered least well. Here, a common incorrect answer was 24. Some candidates did not use the information given at the start of the question and attempted to work out each calculation from scratch. These attempts almost invariably failed.

15. This question tested the use of a calculator to work out a relatively simple numerical expression. It is disappointing to report that a large proportion of candidates did not appreciate the need to work out the value of the denominator first and / or use brackets appropriately when evaluating the fraction using their calculator. This resulted in the very common incorrect response of "-3". Other common incorrect answers were 10.6 (4.7 + 9.4 – 3.5), 8.2 (4.7 – 9.4 – 3.5) and 1.2… ((9.4 – 3.5) ÷ 4.7). Despite the question requesting candidates to "write down all the figures on your calculator display", a significant number of candidates rounded or truncated their answer which sometimes resulted in a loss of marks.

16. The majority of candidates were able to calculate the long multiplication correctly, and most placed the decimal point in the correct position. A variety of methods were seen. Those who used the standard algorithm were often successful although sometimes the relative place value was incorrect. The Napier's Bones method still seems to be as successful as in the past. Here the errors tended to occur in the addition stage of the process due to the figures not being lined up correctly. Candidates using a grid method often succeeded. Again, errors were made at the addition stage but many could not deal with the decimal part of 3.15. Some used 10 and 5 in the multiplication by 20 and 4 but used 3 instead of 300. Others tried to multiply 20 and 4 by 0.15. This often led to a wrong answer. There were still many candidates who used variations of repeated addition to find the answer. These attempts were less successful as they provided numerous opportunities for errors in addition to take place.

17. Most candidates appeared to possess a calculator, and where able to perform the correct operations. In part (a) most success was demonstrated when candidates wrote down the denominator and numerator as a single number, and then performed the division. Many arrived at the final answer. Predictably the most common incorrect answer was -3, from those candidates who just entered the numbers in their calculator as given, without thinking about the order of operations: 4.7 ÷ 9.4 – 3.5. In part (b) it was encouraging to see so many candidates achieving success. Most gained some credit for their efforts; many knew how to convert between fractions and decimals. Where errors were made, it was most frequently the fractions 2/3 and 7/8 that were most frequently in the wrong position.

18. Foundation Tier

It was very rare to see fully correct answers to this question as candidates do struggle with long multiplication and long division. They achieved more success in the multiplying rather than the dividing with counting on methods gaining some success in part (a) and dividing by 10 then 2 gaining success in (b).

Intermediate Tier

More than half of the candidates were able to work out the long multiplication correctly in part (a), often by using a grid or the Gelosia method. Many also used the standard algorithm accurately, although some made a mistake with the relative place value and wrote 750 instead of 7500. Candidates who attempted a partitioning method frequently made errors in positioning the decimal point in one or more of their parts or did not include all the necessary multiplications. Candidates were less successful in part (b). Many started the division correctly and calculated the initial value of 6 but then did not know how to deal with the remainder of 15. Very often the answer was given as 6.15. A common method to obtain the 6 was to build up to 135 in multiples of 20. Some candidates divided by 10 and then by 2 but common errors were to divide by 10 and then by 10 again or to divide by 10 and then double the result. A lot of answers in the 60s were seen, some of which resulted from candidates simply dividing by 2.

19. Foundation Tier

Correct answers were given by a good proportion of candidates, many of whom had struggled with earlier questions in the paper. However, many candidates failed to score full marks only because they did not make clear the units used in their answers. A sizeable minority of candidates simply halved £2.34 and gave £1.17 as their final answer.

Intermediate Tier

Most candidates got as far as the digits 33,but were then either unsure of their units or ignorant of the need to include them in an answer.

20. Foundation Tier

Answers seen to part (a) of this question showed that candidates usually identified the correct method but that many were thwarted by their inability to deal correctly with place value when dealing with money. As they had shown their intention to multiply the correct quantities, examiners were often able to award candidates at least two of the marks available. Significantly fewer candidates were able to answer part (b) correctly, particularly the simplification of the fraction. There were very few correct answers to part (c). Many candidates who attempted this part just added £17.50 to £360 and gave an answer of £377.50.

Intermediate Tier

The majority of candidates showed intent to multiply the correct amounts in part (a), but were not always able to convert one or the other or both to £, so losing the accuracy mark. Many candidates used long multiplication methods rather than using their calculators. In part (b) 15/450 was seen in most cases, but a significant number could not then simplify this fraction. In part (c) those candidates who relied on non-calculator methods rarely accessed any marks. A significant number either added or divided the 17.5.

21. Few candidates wrote down any intermediate steps in this "use of calculator" question and so no marks could be awarded in part (a) if the answer was incorrect. Candidates correctly writing down the square root of 20.25 (4.5) or the square of 1.65 (2.7225) were rewarded with a mark.In part (b) it was rare to see a correct rounding of their answer to part (a) of this question. Some candidates rounded to one decimal place rather than the one significant figure required.

22. Many scored full marks, and then went on o round their answers correctly in part (b). Errors were made in part (a) by those who attempted the calculation in one stage on their calculators. This often resulted in $20.25 + 1.65^2 = 22.9725$ and then 4.792…

There was a problem with decimal points. Either the candidate failed to show them in their answer, or merely moved them in part (b) instead of rounding.

23. **Foundation**

This multiplication was attempted by a wide variety of methods with just under half of the candidates gaining full marks. Those who broke the calculation up into $10 \times 5.40 + 10 \times 5.40 + 45.40$ were often successful. For those using the traditional long multiplication method the most common mistake was in place value (omission of the 0). Partitioning methods were very popular but many candidates were confused by the £ and p. Often they worked with 5 and 40 and tried to incorporate place value at the end. A common wrong answer was £216, from working out 5×24 (= 120) and 4×24 (= 96) and then adding. Incorrect multiplication by zero ($2 \times 0 = 2$ and $4 \times 0 = 4$) was a mistake common to several methods. Some weaker candidates listed £5.40 24 times and attempted to add, usually unsuccessfully. A significant number of candidates seemed not to have considered the reasonableness of their answer and it was a shame that many candidates produced working that was very difficult for examiners to follow.

Higher

This question was done well by most candidates. Partitioning and grid methods were as popular as the traditional approach to multiplying numbers. If a candidate lost a mark on this question it was more likely to be as a result of arithmetic error than an incorrect placement of the decimal point. A small number of candidates treated a multiplication by 0 as a multiplication by 1.

24. Part (a) was answered very well. Many candidates worked out that 4 stamps could be bought for £1 so therefore 12 could be bought for £3 and some showed division of 300 by 25. Some made simple mistakes such as 5 stamps for £1, leading to an answer of 15, or 4 for £1, 8 for £2 so 16 for £3. Common incorrect methods were $25 \div 3$ and 25×3. Part (b) was answered less well but nevertheless more than half of the candidates were able to give the correct expression. A common incorrect answer was x^3. Some candidates, not appreciating that an expression was required, wrote $x = 3x$ which gained no credit. In part (c) the correct answer was seen less often. Many incorrect expressions had 5 being multiplied by x rather than added to it and some candidates added 5 to Barry's amount rather than to Adam's amount.

25. Most candidates gained full marks in part (a), though those attempting the question by non-calculator methods rarely gained the full marks due to numerical errors in their calculations. Of those using calculators a common error was to write down and use £22.05 instead of £22.50. A significant number stopped after having found the total cost and failed to find the change.

In parts (b) and (c) about half the candidates gained the marks. It was usually a choice between dividing and multiplying, with many accepting answers which were numerical incorrect given the context. Some candidates lost marks due to their confusion over the units being used.

26. Only just under 40% of candidates were able to attain full marks for this very early question. Marks were generally lost due to an inability to use a calculator correctly. Taking the square root of just the numerator rather than the whole fraction was the most common error.

27. Foundation

In part (a), 57% gave the correct answer. Parts (b) and (c) were less well done, with incorrect positioning of the decimal point accounting for the majority of the errors made.

Higher

Part (a) was answered correctly by about 90% of the candidates and almost 70% were successful in part (b). Many of those who answered (b) incorrectly did not appreciate that the answer had to be less than 1. Part (c) proved to be the most difficult with about half of the candidates giving the correct answer. The most common incorrect answer in this part was 32.20.

28. Specification A

Foundation

The majority of candidates gained full marks for this question. The main misconception was in the operations required, and it was not uncommon to find candidates applying the operations the wrong way around in (a) and (b). Again the absence of a calculator was an inhibitor, leading to complex multiple addition and subtraction methods which rarely gained any marks.

Higher

The majority of students gained full marks on this question. Many however multiplied when they should have divided and vice versa.

Candidates need to be encouraged to write out their working as too many merely gave answer only solutions, some of which you suspect, but without any evidence, were copying errors e.g. £564 in(a) or £87 in (b). Some candidates used repeated addition in (a) rather than multiplication.

Specification B

Foundation

Converting from pounds sterling to euros and the reverse seemed to be well within the experience of the students with nearly half the candidates changing both values correctly. It appeared to come down to knowing whether to multiply or divide. In part (a) writing down 325 × 1.68 helped to reinforce the fact they would be getting numerically more euros than the pounds they were exchanging.

Similar thinking applied in part (b) gave rise to a division. However, there did appear to be more correct answers to part (b) than part (a).

Higher

This was a standard currency exchange question and it was pleasing to see so many candidates carry put the correct operation s and get the correct answer. There were a few candidates who did the operations the wrong way round for the two parts but they were in a small minority. A few candidates did not read the second part carefully enough and divided by the currency rate from the first part.

29. The advice given to many candidates is to calculate the numerator and denominator separately before dividing to get the final answer.

This advice was ignored by many candidate who just put the numbers into their calculator in the order given in the question and hoped for the best, which was usually no marks as a result. A significant number doubled 3.2 rather than squaring. In part (b) most students did not understand what 1 significant figure meant, and gave their answer to 1dp instead. Many who gave a negative answer in (a) rounded their answer to a positive answer in (b).

30. There were many variations in the answers to this question with little indication as to what they might be attempting to do. Of the two parts, most success was noted in the first. In the second many seemed unable to cope with the idea of squaring the result of the addition. Writing down all the numbers on the calculator display was often ignored.

31. The number ‘6’ was shown on the answer line without any working in many cases. Many ignored the children altogether obtaining an answer of 12 from dividing £75 by 5.60. Others multiplied the £2.30 by 3 children but then omitted to add in the cost of the adult. Repeated subtraction from £75 was much in evidence perhaps indicating that candidates did not have access to (or use) a calculator.

32. This was a good opening question, which was generally well done. Errors were usually related to the order of operation working out $2.3 + 1.8^2 \times 1.07$ to give 5.7668 instead of that required. A significant number of candidates found the sum of the squares of 2.3 and 1.8, and then multiplied their answer by 1.07. Many candidates showed no working and therefore any errors were more difficult to detect.
Part (b) was done less well, $(1.6 + 3.8) \times (2.4 \times 4.2)$ being the common mistake. Many candidates justified their incorrect answers by again showing a lack of understanding of the order of operations.

33. Many candidates gained full marks. Those who worked out the numerator and denominator separately usually gained 1 if not both marks. Sadly many candidates omitted the negative sign giving an answer of 114.3 and often showing 34.29 in their working. A common wrong answer was –126.9 found by dividing only the 6.3^2 by 0.3

34. Use of a calculator was good with 60% of candidates gaining full marks. Of those failing to score full marks, one mark was often gained for correctly working out either the numerator or the denominator. Centres have clearly taken previous advice on board encouraging candidates to show all steps in their working. Many candidates failed to correctly order their operations and an answer of – 2.3439…… was common.

35. The great majority of candidates realised that they had to multiply 13.4 by 405 and so were awarded at least the first method mark. Confusion with monetary units often lead to no further marks being gained. £5445.75 (£5427 + £18.75) was the most common error. Such candidates obviously not appreciating that £5445.75 is a little excessive for a mobile phone bill. To be awarded the second method mark, candidates were required to show, clearly, the units in which they were working.

36. This question was answered correctly by the vast majority of candidates. A minority of candidates failed to use their calculator correctly. The common incorrect answer arising from this error was –3.725824042.

37. Only one-fifth were able to use the calculator to arrive at the final correct answer although they had managed to evaluate the numerator as '19.92' and the denominator as '2.5' for which a method mark was awarded. The question then arose as to what to do with one number divided by another. Addition and subtraction of 19.92 and 2.5 regularly featured in the working but only a minority realised that having one number over another actually represented a division sum. Many left their answer as 19.92 over 2.5 Others did not first evaluate the numerator or denominator or use brackets. As a result 12.177419 and –0.487096774 regularly featured in the answer space. Candidates are to be encouraged to show their evaluation of each of the numerator and denominator in order to access a method mark.

38. The correct answer of 0.0082 was often seen in part (a) but 0.0, 0.00 and 82 were the usual incorrect responses made. 0.00820 was also not uncommon; it should be noted that the final zero is significant. In part (b) candidates who wrote down the intermediate values for the numerator and the denominator usually went on to score full marks. Those who didn't often gave 12.17…… having confused the order of operations.

39. Many candidates were unable to use their calculator correctly. The correct answer was given by only approximately 55% of candidates. Those candidates who showed evidence of first evaluating the numerator and the denominator gained a method mark. Having done this correctly, many candidates were then unable to cope with the division and the square root. The incorrect answer of 0.1048… was frequently seen from candidates who omitted to use brackets after pressing the square root key.

40. Many candidates scored at least one mark in this question, often giving their answer to part (a) to an acceptable degree of accuracy. 2, 3 or 4 significant figures was required. Failure to compute the correct answer to part (a) was usually attributed to either incorrect use of the order of operations or failing to find the square root of (2.56 + 3.50).

41. Candidates used a variety of methods to work out 25.6 × 1.6 with the mean mark for this 3 mark question being only 0.4 The most common error using a traditional long multiplication approach was to add 1536 to 256. As this was a conceptual error, this scored no marks. Many used grid methods but then failed to deal with the decimal points correctly. Candidates would be better off ignoring the decimals when using this method, and use 200, 50 and 6 for 25.6 as well as using 10 and 6 for 1.6 and then deal with the decimals in the answer only. The method of using Napier's Bones was also popular. Here candidates tended to score at least one mark, often making an error by not carrying the 1 in the addition of the diagonals.

42. Many candidates clearly did not understand the concept of meter readings and utility bill calculations. Multiplying the sum of the two meter readings by 52 was a common error. This was often left as an answer of £607672 and sometimes £6076.72, gaining one and two marks respectively. Candidates readily accepting a gas bill of such magnitude.

Weaker candidates chose to divide the sum, or sometimes the difference, of the readings by 52 Even when the difference (1412) was multiplied by 52 an answer of £73424 often seen.

43. No Report available for this question.

44. No Report available for this question.

45. No Report available for this question.

46. No Report available for this question.

47. No Report available for this question.

48. No Report available for this question.

49. No Report available for this question.

50. No Report available for this question.

51. At this level the use of a calculator was usually good. Candidates failing to calculate the denominator (3.25) often used incorrect order of operations and this usually lead to an answer of 15.2….

An answer of 0.2083 recurring was common, given by those giving the reciprocal.

52. No Report available for this question.

53. Many seemed to have access to a calculator to deal with this question as there were very few attempts at a long multiplication method.

Adding the two numbers together, arriving at 5.5 scored a method mark (the 5.5 had to be seen somewhere in the working), but squaring the outcome was not always understood. Evidence of squaring the numbers individually and then performing the addition was the most prolific error along with interpreting the '2' as meaning 'multiply by 2'. There is a need to read and understand the instructions given in the question especially with regard to 'writing down all the figures on your calculator display'. Around a third of the candidates answered part (a) correctly with about 12% scoring 1 mark, generally for 5.5 seen.

Candidates struggled to write their answer to part (a) correct to 1 significant figure with only around 4% rounding their answer correctly.

Where candidates had their calculators set in fraction mode, they were awarded both marks in (a) for $\frac{6897}{40}$. However, they then had no idea how to round this answer in part (b) with the majority just attempting to round the numerator of their fraction.

54. Many candidates still find difficulty when finding the product of two numbers using long multiplication methods, particularly when multiplying decimal numbers. Many candidates found success in using 'traditional' methods of long multiplication although, in many cases, an answer of 1296 (or 129.6) was given as a result of ignoring or misplacing the decimal point. Matrix and multiplication table methods were also popular approaches, however many failed to demonstrate a complete method in their inability to correctly work out 0.4×0.2 and 0.4×0.04, incorrect answers of 0.8 and 0.16 were commonplace, showing a lack in the understanding of place value.

An incorrect answer of 1016 was common from weaker candidates who simply calculated $50 \times 20 = 1000$ and $4 \times 4 = 16$.

Napier's bones method is still popular, however this often leads to candidates making errors with the digits in the diagonals or getting the diagonals to face the wrong way.

55. A poorly answered question with many candidates not gaining the mark for (a) but picking up the mark in (b) for writing their answer to (a) correct to one decimal place. A frequent response to (a) was to write the square root of 2 as the answer.

56. There were many correct answers in part (a), the only common error to divide rather than multiply. The greatest error in part (b) was in not reading the question. There were far too many candidates who neglected to include **two** necklaces in their calculations. Those who chose to work out the total, or do the conversion first were equally split, with similar problems of operator as indicated for part (a).

57. (a) The many students who got this wrong fell mainly into 3 camps.. Those who did not know that to convert 85to a decimal requires the division of 5 by 8 or its equivalent, those that could not carry out the division and those who tried to work out 58÷. A small number of candidates tried to do a chunking method along the lines of 0.5 + 0.5 ÷ 4 with the second part being worked out by repeated halving.

(b) Responses to this straightforward question were often disappointing, with the usual errors of $\frac{2}{5}+\frac{1}{7}=\frac{3}{12}$ or $\frac{3}{35}+\frac{1}{35}=\frac{4}{35}$ appearing.

(c) Many candidates were unaware of the standard method of multiplying mixed numbers by changing them to improper fractions. Of those that did write 5825× a surprising number went on to find either $\frac{5}{2}\times\frac{8}{5}$ (a confusion with division) or $\frac{25}{10}\times\frac{16}{10}=\frac{400}{10}$ (a confusion with addition)

58. No Report available for this question.

59. **Foundation**

This question was very poorly answered even though it was testing the use of a calculator on a calculator paper. The modal answer was for finding the square root of 12.63 and then adding the square of 18. Another group of candidates calculated 12.63 + 18^2 but then did not square root their answer. Unfortunately these answers were incorrect. Only 18% of candidates gave the fully correct answer whilst a further 11% gained 1 mark usually for calculating 336.63 or writing the answer as 18.3 rather than giving all the figures on their calculator display as required.

Higher

The great majority of candidates either scored full marks for a correct answer or no marks for evaluating $\sqrt{2.63}$ + 18^2 rather than the expression given. Most of the candidates who failed to gain any marks wrote an answer down without any intermediate working. If they had written down some working they may have given thought to the order of operations required. Despite the instruction to write down all the figures from the calculator display, a significant proportion of candidates went on to round their answer. Further rounding was ignored if candidates had written the full version in the working space. Some calculators give the answer in the form $\frac{7\sqrt{687}}{10}$. This was accepted. In this question, the first on the paper, 59% of candidates were awarded 2 marks, but 33% of candidates could not be awarded any marks.

60. No Report available for this question.

61. **Foundation**

This question was poorly attempted by all candidates with only 18% of candidates able to give the correct answer in (a). Many answers seen here, the most common being 29.8166666... or 6.00694… which were incorrect. A method mark for 34.6 and/or 2.4 was often gained in part (a) but working was frequently not shown. In part (b) the understanding of writing to 2 decimal places was poorly attempted.

Many candidates truncated their answer some gave their answer to 2 significant figures and a large number moved the decimal point 2 places (left or right). Only 8% of candidates were able to gain full marks on the whole question the style of which is quite common.

Higher

This question was not that well attempted on this higher paper with only 49% of candidates able to give the correct answer in (a). Many answers were seen here, the most common being 29.8166666… or 6.00694… which were incorrect. A method mark for 34.6 and/or 2.4 was often gained in part (a) but working was frequently not shown.

In part (b) the understanding of writing to 2 decimal places too was poorly attempted. Many candidates truncated their answer some gave their answer to 2 significant figures and a large number moved the decimal point 2 places (left or right). It was interesting to note that 29% of candidates scored only 1 mark or no marks on this question which appears regularly on this paper.

62. No Report available for this question.

63. Foundation

Almost one third of candidates answered this question successfully, many of whom did not show any working. The question was a good discriminator and many candidates who did not give the correct answer were awarded 1 mark for demonstrating that they could correctly evaluate at least one of "3·4²" or "2·6²". Perhaps, not surprisingly, many candidates failed to ensure that the numerator was fully evaluated, either by using the brackets function on their calculator or by writing down intermediate working, before dividing by 1·6. Of the 48% of candidates who could not be awarded any marks, most multiplied by 2 rather than squaring or worked out "3·4 – 2·6" rather then "3·4² – "2·6²". These errors usually lead to the incorrect answers "1" and "0·5".

Higher

This question was answered well with 72% of the candidates being awarded full marks. Some candidates did not evaluate the numerator before performing division by 1·6. The evidence suggests that these candidates had not realised the need to use the brackets keys on their calculator or to record intermediate working. A generous mark scheme enabled the candidates to gain one mark for correctly evaluating at least one of $3 \cdot 4^2$ and $2 \cdot 6^2$.

64. This question was not done well. More than two thirds of the candidates scored 0 marks in this question. By far the most common incorrect approach was to simply add the numerators and add the denominators to get $\frac{4}{12}$. A significant number of those candidates using the tabular approach got confused somewhere in their method.

65. A standard, context free fraction multiplication with no cancelling required. As with question 1 there was a great deal of evidence pointing to poor arithmetical as well as conceptual/ process skills. The major error was where the multiplication process is confused with addition, so the candidates write $\frac{12}{20} \times \frac{5}{20}$,making the denominators the same and then go on to work this out as $\frac{60}{20}$ or 3. (Of course, $\frac{60}{400}$ was an acceptable answer). Further common wrong answers were $\frac{17}{20}$ from adding the numerators of the equivalent fractions and $\frac{4}{20}$ from possibly $3 \times 1 = 4$, or from simply multiplying the denominators of the original fractions and adding the numerators. Some clearly confused the methods required for multiplication and division and turned the second fraction upside down before multiplying to reach $\frac{12}{5}$ A few candidates replaced the fractions by decimals. They were allowed full marks on a correct decimal answer.

66. Once again a surprising number of candidates could not apply the appropriate arithmetical skills correctly. The major problem came with 16 × £1.50 with many candidates failing to see that the most direct way of working this out was to do 16 + half of 16. Some candidates were confused by the context and worked out one fifth of 15 and then used that answer in various inventive ways. Others found one fifth of 20 as 4 and then used that to get £6 as the profit, in this case ignoring most of the information given in the question. Many failed to complete the final step of the question which was performing a subtraction to calculate the profit.