Q1. A box contains only red pencils and blue pencils.
The ratio of the number of red pencils to the number of blue pencils is 2 : 3.

What fraction of the pencils are red?

.....

(Total 2 marks)

Q2. (a) Change $\frac{1}{4}$ to a decimal.

.....

(1)

(b) Find 10% of £50.

£ .....

(1)
(Total 2 marks)

Q3. (a) Write $\frac{9}{10}$ as a decimal.

.....

(1)

(b) Write $\frac{3}{4}$ as a percentage.

..... %

(1)

(c) Write 23% as a fraction.

.....

(1)

(d) Work out $\frac{1}{5}$ of 50

.....

(1)

(Total 4 marks)

Q4. (a) Write 25.2 to the nearest whole number.

.....

(1)

(b) Write $\frac{1}{5}$ as a decimal.

.....

(1)

(c) Write 27% as a fraction.

.....

(1)
(Total 3 marks)

Q5. (a) Write $\frac{1}{4}$ as a decimal.

.....

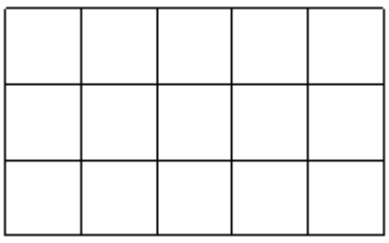
(1)

(b) Write the fraction $\frac{18}{24}$ in its simplest form.

.....

(1)

(c) Shade $\frac{3}{5}$ of this shape.



(1)
(Total 3 marks)

Q6. (a) Work out $\frac{1}{2} \times \frac{1}{5}$

.....

(1)

(b) Work out $\frac{1}{2} + \frac{3}{8}$

Give your answer in its simplest form.

.....

(2)
(Total 3 marks)

Q7. (a) Work out 90 ÷ 10

.....

(1)

(b) Write these numbers in order of size.

Start with the smallest number.

2.8 4.71 0.6 13.4

.....

(1)

(c) Write $\frac{7}{10}$ as a decimal.

.....

(1)
(Total 3 marks)

Q8. There are 200 people in a cinema.

25% of the people are men.

$\frac{1}{5}$ of the people are women.

The rest of the people are children.

Work out how many children are in the cinema.

.....

(Total 3 marks)

Q9. In a school there are 220 pupils in Year 9.
120 of these pupils are girls.

What fraction of the 220 pupils are boys?

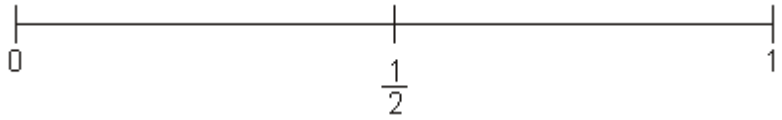
Give your fraction in its simplest form.

.....

(Total 2 marks)

Q10. Liam rolls an ordinary dice.

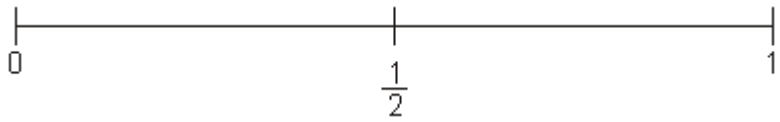
(a) On the probability scale below, mark with a cross ( ) the probability that he gets a number less than 7.



(1)

A bag contains 3 blue counters and 1 red counter.
Kenneth takes at random one counter from the bag.

(b) On the probability scale below, mark with a cross (✕) the probability that he takes a red counter.



(1)

Terry spins a coloured spinner.
The probability that the spinner will land on green is 0.25

The probability that the spinner will land on yellow is 0.35

(c) (i) Write 0.25 as a fraction.

.....

(1)

(ii) Write 0.35 as a percentage.

.....

(1)

A weather forecaster says that the probability it will rain tomorrow is *s*.

(d) Write down, in terms of *s*, the probability that it will **not** rain tomorrow.

.....

(1)
(Total 5 marks)

Q11. (a) Work out the square of 3

.....

(1)

(b) Work out the value of 2^6

.....

(1)

(c) Write 80% as a fraction.
Give your answer in its simplest form.

.....

(2)

(d) Work out 10% of £320

£ .....

(2)

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

$\frac{2}{5}$ 45% 0.35 $\frac{3}{8}$

.....

(2)
(Total 8 marks)

Q12. (a) Write 92% as a decimal.

.....

(1)

(b) Write 3% as a fraction.

.....

(1)

(c) Work out 5% of 400 grams.

..... grams

(2)
(Total 4 marks)

Q13. (a) Here are some fractions.

$\frac{2}{4}$ $\frac{4}{8}$ $\frac{2}{5}$ $\frac{7}{14}$

Which one of these fractions is **not** equal to $\frac{1}{2}$?

.....

Give a reason for your answer.

.....

.....

(2)

(b) Work out $\frac{3}{4}$ of 20

.....

(2)
(Total 4 marks)

Q14. The table shows some information about the medals won by each of 6 countries at the 2004 Olympic Games.

	Medals			
Country	**Gold**	**Silver**	**Bronze**	**Total**

United States	35	39	29	103
Russia	27	27	38	.....
Australia	17	16	.....	49
Germany	14	16	18	48
Italy	10	11	11	32
Great Britain	9	9	12	30

(a) Complete the table for Russia and Australia.

(2)

(b) How many bronze medals did Russia win?

.....

(1)

(c) Which country won 10 gold medals?

.....

(1)

Great Britain won a total of 30 medals.

(d) Work out the fraction of these medals which were silver.
Give your fraction in its simplest form.

.....

(2)

(e) Find the ratio of the total number of medals won by Germany to the total number of medals won by Italy.
Give your ratio in its simplest form.

.....

(2)
(Total 8 marks)

Q15.

Keith buys 3 pens.

(a) Work out the total cost.

£ .....

(2)

Simon buys a pencil case, a ruler and a pen.
He pays with a £5 note.

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

£ .....

(3)

The gift shop also sells pencils.

The price of a pencil is $\frac{2}{3}$ of the price of a pen.

(c) Work out the price of a pencil.

..... p

(2)
(Total 7 marks)

Q16. 36 students each went to one revision class.

$\frac{1}{6}$ of the students went to the physics revision class.

$\frac{2}{9}$ of the students went to the biology revision class.

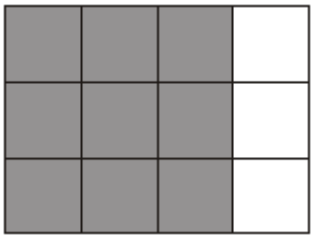
All of the other students went to the chemistry revision class.

How many students went to the chemistry revision class?

.....

(Total 3 marks)

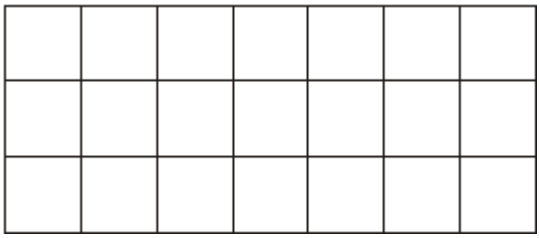
Q17. (a) Write down the fraction of this shape that is shaded.
Give your fraction in its simplest form.



.....

(2)

(b) Shade $\frac{2}{7}$ of this shape.



(1)

(c) Write $\frac{3}{10}$ as a decimal.

.....

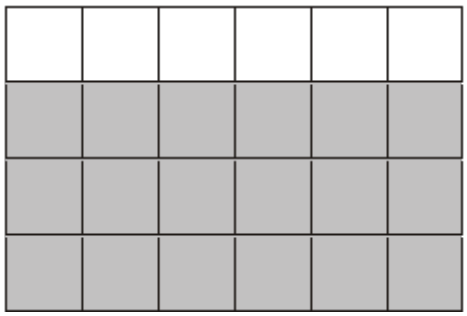
(1)

(d) Write 0.39 as a fraction.

.....

(1)
(Total 5 marks)

Q18.

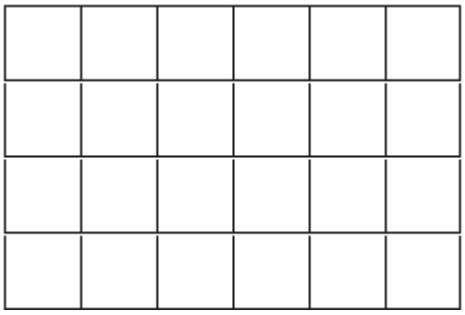


(a) Write down the fraction of this shape that is shaded.
Write your fraction in its simplest form.

.....

(2)

(b) Shade $\frac{2}{3}$ of this shape.



(1)
(Total 3 marks)

Q19. Emma says

"Since 3 is half way between 2 and 4 then $\frac{1}{3}$ will be half way between $\frac{1}{2}$ and $\frac{1}{4}$"

Emma is wrong.

Show that $\frac{1}{3}$ is not half way between $\frac{1}{2}$ and $\frac{1}{4}$

Show your working here.

(Total 3 marks)

M1.

Answer	Mark	Additional Guidance
$\frac{2}{5}$	2	**B2** for $\frac{2}{5}$ (**B1** for $\frac{a}{5}$ or $\frac{2}{b}$)
		Total for Question: 2 marks

M2.

	Answer	Mark	Additional Guidance
(a)	0.25	1	**B1** cao
(b)	5	1	**B1** cao
			Total for Question: 2 marks

M3.

	Answer	Mark	Additional Guidance
(a)	0.9	1	**B1** for 0.9
(b)	75	1	**B1** for 75 cao
(c)		1	**B1** for $\frac{23}{100}$ o.e.
(d)	10	1	**B1** for 10 cao
			Total for Question: 4 marks

M4.

	Answer	Mark	Additional Guidance
(a)	25	1	**B1** for 25 cao
(b)	0.2	1	**B1** for 0.2 cao
(c)	$\frac{27}{100}$	1	**B1** for $\frac{27}{100}$ cao
			Total for Question: 3 marks

M5.

	Answer	Mark	Additional Guidance

(a)	0.25	1	**B1** cao
(b)	$\frac{3}{4}$	1	**B1** cao
(c)	9 squares shaded	1	**B1** for any 9 squares shaded
			Total for Question: 3 marks

M6.

	Working	Answer	Mark	Additional Guidance
(a)	$\frac{1}{2} \times \frac{1}{5}$	$\frac{1}{10}$	1	**B1** oe
(b)	$\frac{1}{2} + \frac{3}{8} = \frac{4}{8} + \frac{3}{8} =$	$\frac{7}{8}$	2	**M1** common denominators with at least one numerator correct or an unsimplified answer, or a fraction that is not completely

	Total for Question: 3 marks

M7.

	Answer	Mark	Additional Guidance
(a)	9	1	**B1** cao
(b)	0.6, 2.8, 4.71, 13.4	1	**B1** cao
(c)	0.7	1	**B1** cao
			Total for Question: 3 marks

M8.

Working	Answer	Mark	Additional Guidance
$\frac{25}{100}$ × 200 = 50 $\frac{1}{5}$ × 200 = 40 200 – 50 – 40 OR 25 + 20 = 45 100 – 45 = 55 $\frac{55}{100}$ × 200 OR	110	3	**M1** for $\frac{25}{100}$ × 200 or 200 ÷ 4 (= 50) or $\frac{1}{5}$ × 200 or 200 ÷ 5 (= 40) **M1** (dep) for 200 – '50' – '40' OR **M1** for 25 + "20" (= 45) or 100 – "45" or $\frac{"45"}{100}$ × 200 (= 90) **M1** (dep) for $\frac{"55"}{100}$ × 200 or 200 – $\frac{"45"}{100}$ × 200

$\frac{1}{4}+\frac{1}{5}=\frac{5}{20}+\frac{4}{20}=\frac{9}{20}$ $\frac{11}{20}$ × 200			OR **M1** for $\frac{1}{4}+\frac{1}{5}$ or $\frac{"9"}{20}$ or $\frac{"9"}{20}$ × 200 (= 90) **M1** (dep) for $\frac{"11"}{20}$ × 200 or 200 – $\frac{"9"}{20}$ × 200 **A1** cao
			Total for Question: 3 marks

M9.

Working	Answer	Mark	Additional Guidance

220 – 120 $\frac{100}{220}$	$\frac{5}{11}$	2	

Total for Question: 2 marks

M10.

	Working	Answer	Mark	Additional Guidance
(a)		Cross at 1	1	**B1** for cross at 1 (allow ±2 mm tolerance)

(b)			1	

(c)(i)		$\frac{1}{4}$	2	
(ii)		35		

(d)		$1 - s$	1	**B1** cao
				Total for Question: 5 marks

M11.

	Answer	Mark	Additional Guidance
(a)	9	1	**B1** cao
(b)	64	1	**B1** cao
(c)	$\frac{4}{5}$	2	**B2** for 4/5 (**B1** for 80/100 oe or 0.8)
(d)	£32	2	**M1** for 10/100 × 320, or 320 ÷ 10 **A1** cao NB: £320-£32=£288 or £320+£32=£352 can be awarded **M1** **A1**, but £288 or £352 without working award **B1**
(e)	0.35, 3/8 2/5, 45%	2	**B2** all correct, or for equivalents in order: 0.35, 0.375, 0.4, 0.45, or for a mixture of equivalents as long as the order is correct. (**B1** one error of misplacing numbers, or correct conversion to decimals or %, or correct order but reversed). NB: accept 0.38 or 0.37 instead of 0.375 for **B1**, but not **B2**
			Total for Question: 8 marks

M12.

	Working	Answer	Mark	Additional Guidance
(a)		0.92	1	**B1** for 0.92 cao
(b)		$\frac{3}{100}$	1	**B1** for $\frac{3}{100}$ cao 100
(c)	$\frac{5}{100} \times 400$	20	2	**M1** for $\frac{5}{100} \times 400$ oe **A1** for 20 cao
				Total for Question: 4 marks

M13.

	Working	Answer	Mark	Additional Guidance
(a)	3 × (20 ÷ 4)	$\frac{2}{5}$ Reason	2	**B1** for $\frac{2}{5}$ **B1** for correct reason. E.g. "$\frac{2}{5}$ does not cancel to $\frac{1}{2}$" or "2 is not half of 5" or "$\frac{2}{5}$ is 0.4" or "$\frac{2}{5}$ is less than $\frac{1}{2}$" or "(the top is even and) the bottom is odd" oe
(b)		15	2	**M1** for 3 × (20 ÷ 4) oe or $\frac{60}{4}$ or 5 seen **A1** for 15 cao
				Total for Question: 4 marks

M14.

	Working	Answer	Mark	Additional Guidance
(a)		92 and 16	2	**B1** for 92 **B1** for 16
(b)		38	1	**B1** cao
(c)		Italy	1	**B1** cao
(d)	$\frac{9}{30}$	$\frac{3}{10}$	2	**B2** cao (**B1** for $\frac{9}{30}$)
(e)	48:32	3:2	2	**B2** cao (**B1** for sight of 48, 32 or two numbers in correct proportion) SC **B1** for 2:3
				Total for Question: 8 marks

M15.

	Working	Answer	Mark	Additional Guidance
(a)	3 × 60	1.80	2	**M1** for 3 × 60 or 60 + 60 + 60 or 3 × 45 or 180 seen **A1** (accept 1.8) SC **B1** for £1.35
(b)	2.70 + 0.45 + 0.60 = 3.75 5 – 3.75 = 1.25	1.25	3	**M1** for 2.70 + 0.45 + 0.60 or 3.75 seen (note: working could be in pence) **M1**(dep) for 5 – "3.75" **A1** cao SC **B2** for 125

(c)	60 ÷ 3 = 20 20 × 2 = 40	40	2	**M1** for 60 ÷ 3 or 60 × 2 or sight of 20 or 120 **A1** cao
				Total for Question: 7 marks

M16.

Working	Answer	Mark	Additional Guidance
$\frac{1}{6}$ × 36 = 6 $\frac{2}{9}$ × 36 = 8 36 – (8 + 6)	22	3	**M1** for $\frac{1}{6}$ × 36 or 36 ÷ 6; $\frac{2}{9}$ × 36 or 36 ÷ 9 × 2 or 8 seen or 14 seen or $\frac{1}{6}+\frac{2}{9}$ or $\frac{7}{18}$ oe or 6 seen as long as not with incorrect working. **M1** (dep) for 36 – '(8+ 6)' or 36 – "$\left(\frac{2}{9}+\frac{1}{6}\right)$" × 36 or $\left(1-\frac{'1}{6}+\frac{2'}{9}\right)$ × 36 **A1** for 22 cao SC **B2** for $\frac{22}{36}$ oe fraction
			Total for Question: 3 marks

M17.

	Working	Answer	Mark	Additional Guidance

(a)	$\frac{9}{12}$	$\frac{3}{4}$	2	**B2** for $\frac{3}{4}$ cao (**B1** for $\frac{9}{12}$ seen)
(b)		shading	1	**B1** for 6 squares (only) shaded
(c)		0.3	1	**B1** for 0.3 oe
(d)		$\frac{39}{100}$	1	**B1** for $\frac{39}{100}$ oe as a fraction
				Total for Question: 5 marks

M18.

	Working	Answer	Mark	Additional Guidance

(a)		$\frac{3}{4}$	2		

(b)		Any 16 squares shaded	1	**B1** Any 16 squares shaded
				Total for Question: 3 marks

M19.

	Working	Answer	Mark	Additional Guidance
QWC **ii, iii**	$\frac{1}{2}=\frac{4}{8}, \frac{1}{4}=\frac{2}{8}$	Coherent and well structured argument with appropriate reason	3	**M1** to change both fractions to equivalent fractions **M1** (dep on at least one correct equivalent fraction) to find midpoint **C1** conclusion following correct work by stating that

Total for Question: 3 marks

E1. For many candidates it was too easy to write the answer as 2/3. Only a minority gave the correct answer of 2/5.

E2. Fractions often cause a lot of problems on a foundation paper but 50% of candidates were able to write ¼ as 0.25 and there was even more success with percentages where 71% of candidates were able to write 10% of £50 as £5.

E3. Conversions involving fractions, decimals and percentages were not as well handled as would be expected for the opening question with around two-thirds of the candidates having success on each part except for part (c) which only had a 57% success rate.

Practice might have eliminated some misunderstandings of the type '$\frac{9}{10}$ = 9.10', '$\frac{3}{4}$ = 34%' and '23% = $\frac{2}{3}$'.

E4. The first part of the first question on the paper was answered well with a success rate of over 80%. "26" was the most frequently seen incorrect response. Parts (b) and (c) provided more of a challenge. In part (b) only about one quarter of candidates could give a correct answer. The incorrect answer "0·15" was more commonly seen. In part (c) the fraction "$\frac{2}{7}$" was seen almost as often as the correct answer "$\frac{27}{100}$". Here, just over a half of candidates were awarded the mark available.

##

Part (a) was well answered, but in part (b) the common error was to partially cancel perhaps leaving the answer as 9/12. In part (c) too many answers consisted of a random number of squares shaded, not always totalling 9. Shading 3 then 5 was common, or just 3, indicating little understanding of the fraction.

##

Many gained the correct answer in part (a), but it was disappointing to see many stating “1 × 1 = 2”. In part (b) few gained the correct answer, with many showing a poor level of understanding. 4/10 or an equivalent was the most common response seen. A few used 16 as common denominator but got both numerators wrong.

##

Although most gave the correct answer, many were confused with the ten and multiplication was not uncommon. In part (b) most gave the correct answer, with the most common error being the 4.71 and 13.4 reversed. In part (c) both 0.7 and 0.70 were acceptable as answers. When 7.1, 7, 10 or other fractions were given as answers it was clear the candidate did not understand place value.

##

Most candidates were able to gain some credit in this question, usually for correctly calculating 25% of 200 Having established an answer of 50 men, many candidates then went on to work out one fifth of 150 (200 – 50), giving an answer of 30 women. If a final answer of 120 (200 – 50 – 30) followed, 2 out of the 3 marks were awarded.

A few candidates worked in percentages giving a final answer of 55%. This gained one mark only; they were required to find 55% of 200 to gain further credit. An even smaller number of candidates worked in decimals, usually unsuccessfully.

E11. The success rate in parts (a) & (b) in this question was related to that of question 2(ii), about half the candidates gaining the mark, with many lacking an understanding of square numbers or indices. In part (c) most were able to express the fraction as 80/100, but of these half were then unable to cancel the fraction into its simplest form.

Candidates used a variety of methods in part (d), with many realising that a division by 10, or "10p in the £" would lead to the correct answer.

Candidates found part (e) far more challenging. The most successful method appeared to be conversion to decimals.

E12. Part (a) was answered with the most success with two thirds of candidates able to write 92% as 0.92. The most common incorrect answer was 9.2. It was disappointing that in part (b) fewer than half of the candidates could write 3% as 3/100. The most common incorrect answers were 1/3 and 3/10. Part (c) was answered quite well and successful candidates often used the standard non-calculator method of finding 10% first. Some worked out 50% = 200 and 25% = 100 but then got stuck. Where the traditional method of 5/100 × 400 was seen candidates usually struggled to proceed any further with the calculation. A common incorrect method was for 400 to be divided by 5. Unfortunately many candidates showed no method at all.

E13. In part (a) most candidates identified 2/5 as the fraction not equal to 1/2 but giving a reason for their choice proved more difficult with some candidates having difficulty putting their thoughts into words. The most successful were those who used reasoning such as "the top number is not half of the bottom number" or "2 does not go into 5". It was pleasing that the terms 'numerator' and 'denominator' were frequently used. Some candidates did choose an incorrect fraction, most notably 7/14. Part (b) was answered well. Most attempted it and about two thirds of candidates got the correct answer, often with no working shown. The most common error was for candidates to work out 1/4 of 20 as 5 and then give this as the final answer.

E14. The first three parts of this question were answered very well with nearly all candidates gaining at least 3 of the first four marks available. Working out the simplified fraction in part (d) proved more of a challenge. However, about 60% of candidates were awarded at least one mark for giving the fraction in an unsimplified form even if they could not give its simplest form. Responses to part (e) were also good with nearly all candidates using acceptable notation. Where candidates did not give the answer 3:2 it was often through incorrect or incomplete simplification or because they gave 2:3 as their answer.

E15. The first part of the question was successfully answered by almost 90% of candidates. Common errors seen included candidates working out the total cost of 3 rulers rather than 3 pens. These candidates could be given partial credit as they had misread the price list. Some candidates wrote the answer £180 and had clearly not considered the answer in the context of the question or surely they would have realised that this answer was unreasonable. Other candidates worked out the total cost of buying one of each item. In the second part of the question most candidates found the cost of the articles bought (£3.75) and usually realised the need to subtract this from £5. A significant proportion of candidates were unable to carry out this subtraction accurately. £2.25 and £1.35 were common incorrect answers. In part (c) there was again some evidence of candidates using the price of a ruler rather than a pen. A number of candidates found 1/3 of the price of a pen then went no further. This part of the question was completely correct in just over half of the responses seen.

E16. **Specification A**

Candidates were generally successful in calculating the unit fraction of the amount, but there were many errors in calculating 2/9 of 36. Those candidates who attempted to add the two fractions usually made errors, with many giving the sum incorrectly as $\frac{3}{15}$ after adding both numerators and denominators. Once fractions had been added candidates became unstuck as to where to go next with the solution, generally giving the complimentary fraction as the final answer, thus failing to interpret the context of the answer.

Specification B

Calculating how many students went to the chemistry revision class involved being able to handle the $\frac{1}{6}$ × 36 and $\frac{2}{9}$ × 36 confidently. The first stages in the working might have been to work out $\frac{1}{6}$ × 36 = 6 but this result become less convincing when the second fraction was used as $\frac{2}{9}$ × 36 = 18 (2 × 9 = 18). Another approach was to add together the two fractions first and then to multiply by 36 but once more it was not unusual to see this evaluated incorrectly as $\frac{1}{6}+\frac{2}{9}=\frac{3}{15}$. Manipulation of fractions does seem to be an area of arithmetic which causes considerable difficulties for the students with nearly half the candidates failing to score any marks at all. Around a third of the candidates scored 2 or 3 marks.

E17. Most candidates gave $\frac{9}{12}$ as their initial response, but not all cancelled their fractions correctly. Part (b) was also well answered. Only 50% of candidates were able to give this common fraction as a decimal, with many giving incorrect answers such as 3.0, 0.03, or failing to attempt the question. Part (d) was answered far better.