Unit 1 Revision Sheet A Fractions Decimal Percentages Foundation & Higher

Questions

Q1.

(a) Write down the value of the 3 in the number 7.432

.....

(1)

(b) Round 7.432 to the nearest whole number.

.....

(1)

(c) Write down the number which is exactly halfway between 0.7 and 0.8

.....

(1)

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

0.14 0.35 0.4 0.07 0.306

..... **(1)**

(e) Write 0.31 as a fraction.

.....

(1)

(Total for question = 5 marks)

Q2.

(a) Write these numbers in order of size.

Start with the smallest number.

2.08 2.13 2.7 2.0034 2.111

.....

(1)

(b) Write 5.8394 correct to 2 decimal places.

.....

(1)

(c) Write 0.73 as a fraction.

.....

(1)

(d) Write down the value of the 6 in the number 0.067

.....

(1)

(e) Write 17% as a decimal.

.....

(1)

(Total for question = 5 marks)

Q3.
Here are four discs.
Each disc has a number on it.

These four discs are arranged to make the number 7235

(a) Arrange the four discs to make an even number.

(1)

(b) Arrange the four discs to make the smallest possible number.

(1)

(c) Arrange two of the discs to make a square number.

(1)

(d) Arrange two of the discs to make a cube number.

(1)

(e) Arrange two of the discs to make a prime number.

(1)

(Total for question = 5 marks)

Q4.

Write your answers in the spaces provided.

You must write down all the stages in your working.

(a) Write these numbers in order of size.

Start with the smallest number.

73 138 36 219 89

(1)

(b) Write in figures the number two thousand and eighteen.

(1)

(c) Write in words the number 4309

(1)

(d) Write down the value of the 7 in 9715

(1)

(e) Write the number 286 correct to the nearest 10

(1)

(f) Work out $\frac{4}{5}$ of 185

(2)

(Total for question = 7 marks)

Q5.

(a) Write these numbers in order of size.

Start with the smallest number.

−4 7 −1 3 −8

.....

(1)

(b) Write these numbers in order of size.

Start with the smallest number.

0.078 0.4 0.407 0.8 0.007

.....

(1)

(c) Write $\frac{3}{5}$ as a decimal.

.....

(1)

(d) Write 0.9 as a percentage.

..... %

(1)

(e) Find the number that is exactly halfway between 0.3 and 0.4

.....

(1)

(Total for question = 5 marks)

Q6.

Nav makes bracelets using cord.

Nav has a 6 metre length of cord.
Each bracelet needs 17.5 cm of cord.

Work out the greatest number of bracelets that Nav can make.

.....

(Total for question = 3 marks)

Q7.

The table shows the temperatures recorded at midnight and at midday for each of five North American cities on a Monday one week.

City	Midnight temperature (°C)	Midday temperature (°C)
Boston	– 2	14
Houston	11	20
Chicago	– 8	7
Detroit	– 7	– 1
New York	0	12

(a) Which city had the lowest midnight temperature?

.....

(1)

(b) Find the difference between the midnight temperature and midday temperature for Boston.

..... °C

(1)

From Monday to Thursday, the midday temperature in Detroit increased by 2°C each day.

(c) Work out the midday temperature in Detroit on Thursday.

..... °C

(2)

(Total for question = 4 marks)

Q8.

Janine has 2 litres of orange squash.

She also has some empty cups.
When full, each cup holds 300 millilitres of orange squash.

Janine fills as many cups as possible.

How much orange squash does Janine have left after filling as many cups as possible?
State the units of your answer.

....

(Total for question = 3 marks)

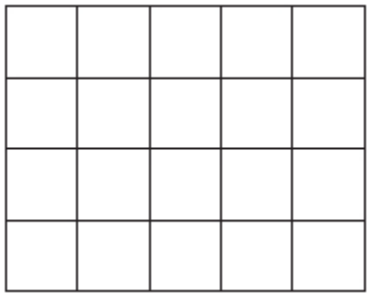
Q9.

Show that $2\frac{4}{7} \div 1\frac{1}{8} = 2\frac{2}{7}$

(Total for question = 3 marks)

Q10.

Here is a shape made of squares.



(a) Shade $\frac{3}{5}$ of the shape.

(1)

(b) Which one of these fractions is **not** equivalent to $\frac{4}{7}$?

$\frac{40}{70}$ $\frac{8}{14}$ $\frac{400}{700}$ $\frac{14}{17}$ $\frac{20}{35}$

.....

(1)

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

..... %

(1)

(d) Write $\frac{77}{9}$ as a mixed number.

.....

(1)

$\frac{5}{6}$ of a number is 40

(e) What is the number?

.....

(2)

(Total for question = 6 marks)

Q11.

(a) Show that $\frac{3}{10} \div \frac{1}{4} = \frac{6}{5}$

(2)

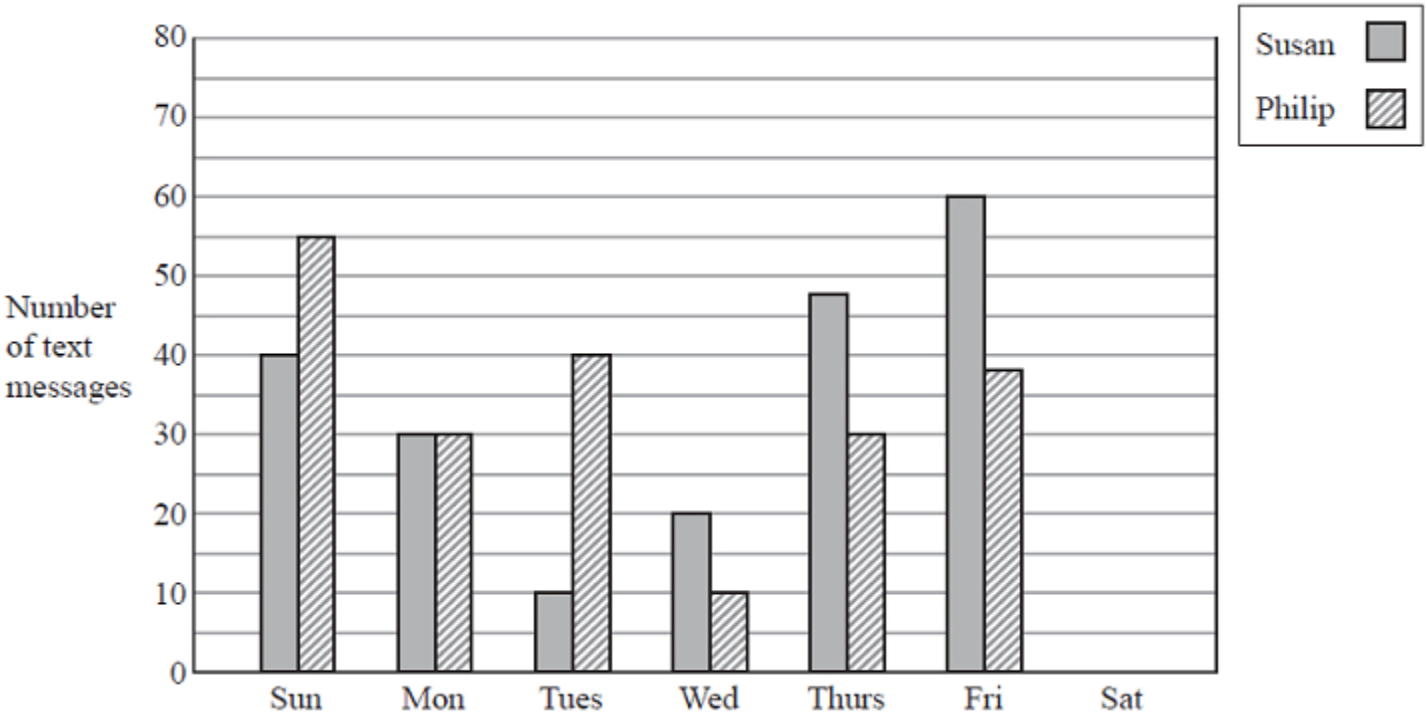
(b) Show that $\frac{5}{6} - \frac{3}{4} = \frac{1}{12}$

(2)

(Total for question = 4 marks)

Q12.

The bar chart shows information about the numbers of text messages that Susan and Philip sent from their mobile phones on each of six days one week.



(a) On which day did Susan send twice as many text messages as Philip?

.....

(1)

(b) How many text messages did Philip send on Sunday?

.....

(1)

On Saturday, Susan sent 15 text messages and Philip sent 40 text messages.

(c) Show this information on the bar chart.

(1)

In the following week, Philip sent a total of 180 text messages.
Of these text messages, 25% were sent to Susan.

(d) Work out 25% of 180

.....

(2)

(Total for question = 5 marks)

Q13.

Victor buys 12 bottles of apple juice for a total cost of $21
Victor sells all 12 bottles at $2.45 each bottle.

Work out Victor's percentage profit.

..... %

(Total for question = 3 marks)

Q14.

(a) Express 180 as a percentage of 750

..... %

(2)

Zaina has booked a singer for a show.
The singer will get 94% of the total money from the ticket sales.

The cost of each ticket for the show is 32.50 dirhams.
Zaina sells 180 tickets.

(b) Work out the amount of money the singer will get.

..... dirhams

(3)

(Total for question = 5 marks)

Q15.

Show that $4\frac{2}{3} + 3\frac{4}{5} = 8\frac{7}{15}$

(Total for question = 3 marks)

Q16.

Mike buys 150 burger buns.

He buys the burger buns in packs of 6 burger buns.
Each pack of 6 burger buns costs £1.03

Work out how much Mike pays for the 150 burger buns.

£

(Total for question = 3 marks)

Q17.

Here is a number machine.

(a) Work out the output when the input is –2

.....

(1)

(b) Work out the input when the output is 24

.....

(2)

(Total for question = 3 marks)

Q18.

Nina buys 8 pencils and 13 identical rulers.
Each pencil costs $0.58
The total cost is $23.62

(a) Work out the cost of each ruler.

$ .....

(3)

Bjorn has $15 to spend on pens.
Each pen costs $0.62
He buys as many pens as he can.

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

$ .....

(3)

(Total for question = 6 marks)

Q19.

(a) Write down all the factors of 20

.....

(2)

(b)

3 −6 7 −10 −4

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

.....

(1)

(c) Work out

(i) − 4 ÷ − 2

.....

(ii) 2 − (−3)

.....

(2)

(d) Work out 15% of 80

.....

(2)

(Total for question = 7 marks)

Q20.

Paolo has a bag of flour.
The flour in the bag has a weight of 3 kilograms.

Paolo makes 8 pies using the flour in the bag.

3 of the pies each need 150 grams of the flour.
5 of the pies each need 180 grams of the flour.

Work out the weight of flour that remains in the bag when Paolo has made these pies.
Give your answer in grams.

..... grams

(Total for question = 3 marks)

Q21.

The cost of a mobile phone in the UK is £350
The cost of an identical mobile phone in India is 28 938 rupees.

The exchange rate is £1 = 91 rupees.

The cost of the mobile phone in the UK is more than the cost of the mobile phone in India.

Work out how much more.

.....

(Total for question = 3 marks)

Q22.

(a) Work out 39% of 450

.....

(2)

(b) Write one pair of brackets in this calculation so that the answer is correct.

$$9 \times 8 - 5 - 2 = 25$$

(1)

(c) Work out the value of $\dfrac{\sqrt{8.9}}{6.2 - 3.5}$

Give your answer as a decimal.
Write down all the figures on your calculator display.

.....

(2)

(Total for question = 5 marks)

Q23.

Write 3.6×10^3 as a product of powers of its prime factors.
Show your working clearly.

.....

(Total for question = 3 marks)

Q24.

Write 600 as a product of powers of its prime factors.
Show your working clearly.

.....

(Total for question = 3 marks)

Q25.

(a) Use your calculator to work out the value of $\frac{2.14^3 - 3.76}{\sqrt{1.24}}$

Write down all the figures on your calculator display.

.....

(2)

(b) Write your answer to part(a) correct to 2 significant figures.

.....

(1)

(Total for question = 3 marks)

Q26.

The length of a fence is 137 metres, correct to the nearest metre.
Write down
(i) the lower bound for the length of the fence,

..... metres

(ii) the upper bound for the length of the fence.

..... metres

(Total for question = 2 marks)

Q27.

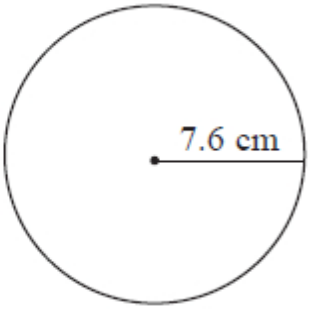


Diagram **NOT** accurately drawn

(a) A circle has a radius of 7.6 cm.
Work out the area of the circle.
Give your answer correct to 3 significant figures.

..... cm^2

(2)

The radius, 7.6 cm, is correct to 1 decimal place.

(b) (i) Write down the upper bound of the radius.

..... cm

(ii) Write down the lower bound of the radius.

..... cm

(2)

(Total for Question is 4 marks)

Q28.

Each side of a regular octagon has a length of 18 mm, correct to the nearest 0.5 mm

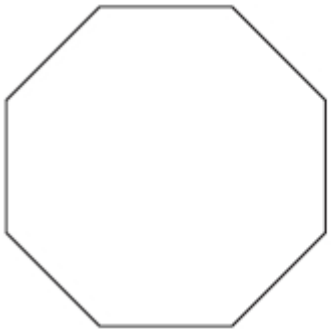


Diagram **NOT** accurately drawn

(a) Write down the lower bound of the length of each side of the octagon.

..... mm

(1)

(b) Write down the upper bound of the length of each side of the octagon.

..... mm

(1)

(Total for question = 2 marks)

Q29.

(a) Find the value of the cube of 4

.....

(1)

(b) Write 3 × 3 × 3 × 3 × 3 as a single power of 3

.....

(1)

(c) Write $\frac{7^5 \times 7^9}{7^6}$ as a single power of 7

.....

(2)

(Total for Question is 4 marks)

Q30.

(a) Express 600 as a product of powers of its prime factors.
Show your working clearly.

.....

(3)

(b) Simplify $\dfrac{5^{12}}{5^2 \times 5}$

Give your answer as a power of 5

.....

(2)

(Total for question = 5 marks)

Q31.

(a) Simplify $(4^{-2})^0$

.....

(1)

$3^{-14} \times 3^8 = 3^m$

(b) Find the value of m

m = ...

(1)

(Total for question = 2 marks)

Q32.

$$\frac{8}{2^7} = 2^n$$

(a) Find the value of n.

n = ...

(2)

$(13^{-6})^4 \times 13^5 = 13k$

(b) Find the value of k.

k = ...

(2)

(Total for question = 4 marks)

Q33.

$$\frac{2^k}{4^n} = 2^x$$

Find an expression for x in terms of k and n

x = ...

(Total for question = 2 marks)

Mark Scheme

Q1.

Question	Working	Answer	Mark	Notes
(a)		3/100	1	B1 accept 100^{ths}, hundredths, 1/100 (0).03, (0).01, {leading zeros not necessary}
(b)		7	1	B1 accept 7.0, 7.00, 7.000 etc
(c)		(0).75	1	B1 leading zero not necessary
(d)		0.07, 0.14, 0.306, 0.35, 0.4	1	B1 leading zeros not necessary
(e)		31/100	1	B1
				Total 5marks

Q2.

Q	Working	Answer	Mark	Notes
(a)		2.0034, 2.08, 2.111, 2.13, 2.7	1	B1 All five numbers must be present may include extra zero's eg 2.7000
(b)		5.84	1	B1 cao
(c)		$\frac{73}{100}$	1	B1 oe eg $\frac{730}{1000}$ Do not allow $\frac{7.3}{10}$
(d)		(6) hundredths	1	B1 $\frac{6}{100}$ (not 0.06) Accept incorrect spelling if meaning is clear NB not hundreds
(e)		0.17	1	B1 Accept (….000000).17 Allow comma for decimal point

Q3.

Question	Working	Answer	Mark	Notes
(a)	3572 or 3752 or 5372 or 5732 or 7352 or 7532		1	B1
(b)		2357	1	B1
(c)		25	1	B1
(d)		27	1	B1
(e)	23 or 37 or 53 or 73		1	B1
				Total 5 Marks

Q4.

Question	Working	Answer	Mark	Notes
(a)		36, 73, 89, 138, 219	1	B1
(b)		2018	1	B1
(c)		Four thousand three hundred and nine	1	B1
(d)		700	1	B1 oe eg 100
(e)		290	1	B1
(f)	$\frac{4}{5} \times 185$ or 0.8×185 oe	148	2	M1 For a complete method A1

Q5.

Q	Working	Answer	Mark	Notes
(a)		−8, −4, −1, 3, 7	1	B1 cao
(b)		0.007, 0.078, 0.4, 0.407, 0.8	1	B1 cao
(c)		0.6	1	B1 cao
(d)		90	1	B1 cao
(e)		0.35	1	B1 cao
				Total 5 marks

Q6.

Q	Working	Answer	Mark	Notes
	6 × 100 (= 600) **or** 17.5 ÷ 100 (= 0.175)		3	B1
	"600" ÷ 17.5 (= 34.28…) **or** 6 ÷ "0.175" (= 34.28…)			M1 ft incorrect conversion
		34		A1 cao
				Total 3 marks

Q7.

Question	Working	Answer	Mark	Notes	
(a)		Chicago	1	B1	Accept misspellings
(b)		16	1	B1	accept –16
(c)	$-1+2\times3$		2	M1	for clearly adding 3 lots of 2 or the sequence – 1, 1, 3, 5
		5		A1	
					Total 4 marks

Q8.

Q	Working	Answer	Mark	Notes
	2 [litres] = 2000 [millilitres] or 300 [millilitres] = 0.3 [litres]		3	B1 oe for a correct conversion within working
	"2000" ÷ 300 (= 6.66...) oe **or** 2 ÷ "0.3" (= 6.66...) oe **or** 300 + 300 + 300 + 300 + 300 + 300 (= 1800) oe **or** 0.3 + 0.3 + 0.3 + 0.3 + 0.3 + 0.3 (= 1.8) oe **or** 300 + 300 + 300 + 300 + 300 + 300 + 300 (= 2100) oe **or** 0.3 + 0.3 + 0.3 + 0.3 + 0.3 + 0.3 + 0.3 (= 2.1) oe			M1 Allow use of their converted values Allow 300 + …. + 300 = 1800 or 0.3 + …. + 0.3 = 1.8 If adding 300 or 0.3 they must have sufficient values just below or just above their amount of squash
	Working not required, so correct answer scores full marks (unless from obvious incorrect working eg a wrong conversion)	200 millilitres or 0.2 litres		A1 Must have correct units (m*l* or *l* can be used) Must come from correct working
				Total 3 marks

Q9.

Q	Working	Answer	Mark	Notes
	eg $\frac{18}{7}$ **and** $\frac{9}{8}$ oe		3	M1 both fractions expressed as improper fractions, no need for ÷ or × may be equivalent to those given eg $\frac{36}{14}$ or $\frac{27}{24}$ etc. A student could invert $\frac{9}{8}$ and go straight to the 2nd M1, this mark is then implied.
	eg $\frac{18}{7}\times\frac{8}{9}$ oe **or** $\frac{144}{56}\div\frac{63}{56}$ oe			M1 **or** for both fractions expressed as equivalent fractions with denominators that are a common multiple of 7 and 8 eg $\frac{144}{56}\div\frac{63}{56}$
	eg $\frac{18}{7}\times\frac{8}{9}=\frac{144}{63}=\frac{16}{7}=2\frac{2}{7}$ **or** $\frac{18}{7}\times\frac{8}{9}=\frac{144}{63}=2\frac{18}{63}=2\frac{2}{7}$ **or** $\frac{\cancel{18}^{2}}{7}\times\frac{8}{\cancel{9}^{1}}=\frac{16}{7}=2\frac{2}{7}$ **or** $\frac{18}{7}\div\frac{9}{8}=\frac{144}{56}\div\frac{63}{56}=\frac{144}{63}=\frac{16}{7}=2\frac{2}{7}$ **or** correct working to $\frac{16}{7}$ **and** writing $2\frac{2}{7}=\frac{16}{7}$	shown		A1 Dep on M2 for conclusion to $2\frac{2}{7}$ from correct working – either sight of the result of the multiplication or division e.g. $\frac{144}{63}$ must be seen or correct cancelling prior to the multiplication to $\frac{16}{7}$ **or** writing $2\frac{2}{7}=\frac{16}{7}$ (maybe on first line of working) and correct working as far as LHS $=\frac{16}{7}$ **NB: use of decimals scores no marks**
				Total 3 marks

Q10.

Q	Working	Answer	Mark	Notes
(a)		12 squares shaded	1	B1 can be any 12 squares shaded – use professional judgement as to whether a square is shaded or not
(b)		$\frac{14}{17}$	1	B1 with no others may be indicated in list
(c)		30	1	B1
(d)		$8\frac{5}{9}$	1	B1
(e)	$40 \div 5 \times 6$ oe eg $\frac{6}{5} \times 40$ oe		2	M1 A fully correct method
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	48		A1 trial and improvement scores no marks unless fully correct
				Total 6 marks

Q11.

Question	Working	Answer	Mark	Notes
(a)	eg $\frac{3}{10}\times\frac{4}{1}(=\frac{12}{10})$ or $\frac{6}{20}\div\frac{5}{20}$ or $\frac{12}{40}\div\frac{10}{40}$		2	M1 Inverting $\frac{1}{4}$ and changing to multiply or writing both fractions with the same denominator.
	eg $\frac{3}{10}\times\frac{4}{1}=\frac{12}{10}=\frac{6}{5}$ or $\frac{6}{20}\div\frac{5}{20}=\frac{6}{5}$ or eg $\frac{3}{\cancel{10}^{5}}\times\frac{\cancel{4}^{2}}{1}=\frac{6}{5}$	shown		A1 Conclusion to $\frac{6}{5}$ from correct working – either sight of the result of the multiplication eg $\frac{12}{10}$ must be seen or correct cancelling prior to multiplication. NB use of decimals scores no marks.
(b)	eg $\frac{10}{12}-\frac{9}{12}$ or $\frac{20}{24}-\frac{18}{24}$ oe or eg $\frac{10-9}{12}$		2	M1 for correct fractions with a common denominator of 12 or a multiple of 12.
	eg $\frac{10}{12}-\frac{9}{12}=\frac{1}{12}$ or $\frac{20}{24}-\frac{18}{24}=\frac{2}{24}=\frac{1}{12}$ oe	clearly shown		A1 dep on M1 for a correct answer from fully correct working.
				Total 4 marks

Q12.

Question	Working	Answer	Mark	Notes	
(a)		Wednesday	1	B1	Accept Wed
(b)		55	1	B1	
(c)		Correct Bars	1	B1	Susan 1.5 cm, Philip 4 cm (and having the correct key)
(d)	$\frac{25}{100}\times180$ or 0.25×180 or $180\div4$ oe		2	M1	
		45		A1	
					Total 5 marks

Q13.

Q	Working	Answer	Mark	Notes
	12×2.45 (= 29.4) **or** $21 \div 12$ (= 1.75)		3	M1
	$\frac{'29.4'-21}{21}\times100$ oe **or** $\frac{2.45-'1.75'}{'1.75'}\times100$ oe **or** $(\frac{'29.4'-21}{12}) \div '1.75' \times 100$ oe **or** $(\frac{2.45}{'1.75'}\times100)-100$ oe			M1 or an answer of 140(%)
	Correct answer scores full marks (unless from obvious incorrect working)	40		A1
				Total 3 marks

Q14.

Q	Working	Answer	Mark	Notes
(a)	e.g. $\frac{180}{750}\times 100$ oe **or** 0.24×100		2	M1 for a complete method
		24		A1
(b)	e.g. 32.50×180 (= 5850) **or** e.g. 0.94×32.50 oe (= 30.55)		3	M1 for finding the total income **or** 94% of the cost of one ticket
	e.g. $0.94 \times$ "5850" oe **or** "5850" $- 0.06 \times$ "5850" oe **or** $180 \times$ "30.55"			M1 for a complete method
		5499		A1
				Total 5 marks

Q15.

Question	Working	Answer	Mark	Notes
	$\frac{14}{3}(+)\frac{19}{5}$ or $(4)\frac{10}{15}(+)(3)\frac{12}{15}$ or $(4)\frac{10a}{15a}(+)(3)\frac{12a}{15a}$		3	M1 for correct improper fractions or fractional part of numbers written correctly over a common denominator
	eg $\frac{14\times 5+19\times 3}{3\times 5}$ or $\frac{70}{15}+\frac{57}{15}$ or $\frac{70a}{15a}+\frac{57a}{15a}$ or $4\frac{10}{15}+3\frac{12}{15}=7\frac{22}{15}$ oe			M1 for correct fractions with a common denominator of 15 or a multiple of 15
	$\frac{70}{15}+\frac{57}{15}=\frac{127}{15}=8\frac{7}{15}$ or $7\frac{22}{15}=8\frac{7}{15}$ or if shows $8\frac{7}{15}=\frac{127}{15}$ at the beginning then show that the addition comes to $\frac{127}{15}$	Shown		A1 dep on M2 for a correct answer from fully correct working **or** shows that RHS = $\frac{127}{15}$ **and** fully correct working shows LHS = $\frac{127}{15}$
				Total 3 marks

Q16.

Question	Working	Answer	Mark	Notes
	150 ÷ 6 (=25) or 6 × 25 = 150 or 1.03 ÷ 6 (=0.17…) "25" × 1.03 or "0.17…" × 150	 25.75	 3	M1 M1 dep A1

Q17.

Question	Working	Answer	Mark	Notes
(a)		−30	1	B1
(b)	24 ÷ 3 + 8		2	M1 for an inverse operation (+8 or ÷3)
		16		A1 16
				Total 3 marks

Q18.

Question		Working	Answer	Mark	Notes
	(a)	(8 × 0.58) (= 4.64)			M1 for a method to work out the cost of 8 pencils
		23.62 – (8 × 0.58) (= 18.98) **or** 23.62 – ('4.64') (= 18.98)			M1 for a method to work out the cost of 13 rulers
			$1.46	3	A1
	(b)	15 ÷ 0.62 (= 24.193....) **or** 24 **or** 14.88			M1
		15 – '24' × 0.62 **or** 15 – '14.88' **or** (24.1(935.....) – 24) × 0.62 **or** 0.193(548...) × 0.62			M1 for a complete method
			$0.12	3	A1
					Total 6 marks

Q19.

Question	Working	Answer	Mark	Notes
(a)		1, 2, 4, 5, 10, 20	2	B2 B1 for 3 or more correct factors, with at most one error **or** 2 correct factors with no errors. Ignore repeats, may be given as products. If no answer on answer line, award B1 for a completely correct factor tree
(b)		– 10, – 6, – 4, 3, 7	1	B1
(c)(i)		2	1	B1
(c)(ii)		5	1	B1
(d)	$\frac{15}{100} \times 80$	12	2	M1 $\frac{15}{100} \times 80$ oe or completely correct method. A1 80 ±12 gets M1 only
				Total 7 marks

Q20.

Q	Working	Answer	Mark	Notes
	3 kg = 3000 g or 150 g = 0.15 kg or 180 g = 0.18 kg or 1350 g = 1.35(0) kg		3	B1 may be seen used as part of a calculation
	3 × 150 + 5 × 180 (= 1350) 3 × 0.15 + 5 × 0.18 (=1.35(0))			M1 Could use their converted values
		1650		A1
				Total 3 marks

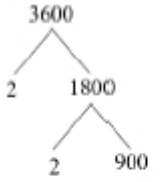
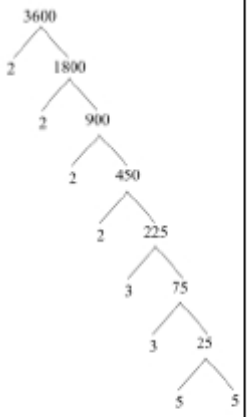
Q21.

Q	Working	Answer	Mark	Notes
	350 × 91 (= 31 850) **or** 28 938 ÷ 91 (= 318)		3	M1 for converting one cost to the other currency
	"31 850" – 28 938 (= 2912) **or** 350 – "318" (= 32)			M1 for finding difference, accept 28 938 – "31 850" (= –2912) **or** "318" – 350 (= –32)
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	2912 rupees **or** £32		A1 must include units
				Total 3 marks

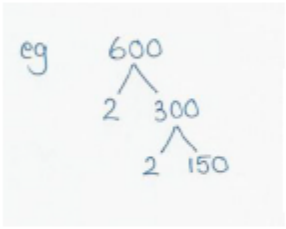
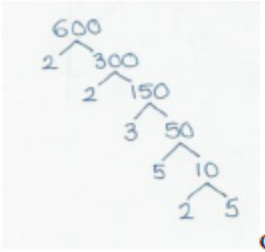
Q22.

Q	Working	Answer	Mark	Notes
(a)	0.39×450 **or** $\frac{39}{100} \times 450$ **or** $\frac{450}{100} \times 39$ oe eg $3 \times 45 + 9 \times 4.5$ oe		2	M1
	Working not required, so correct answer scores full marks (unless from obvious incorrect working)	175.5		A1
(b)		Brackets around (8 – 5)	1	B1 $9 \times (8 - 5) - 2 = 25$ with no incorrect brackets, condone eg $(9 \times (8 - 5)) - 2 = 25$ which has extra brackets that are not incorrect
(c)		1.1049(21029)	2	B2 for 1.1049(21029) ie 5 sf or better truncated or rounded (B1 for 2.98... **or** 2.7)
				Total 5 marks

Q23.

<table>
<tr><th>Q</th><th>Working</th><th>Answer</th><th>Mark</th><th>Notes</th></tr>
<tr><td></td><td>E.g.
$2 \times 2 \times 900$ or $2^2 \times 900$ or $2 \times 3 \times 600$ or
$2 \times 5 \times 360$ or $3 \times 3 \times 400$ or $3^2 \times 400$ or
$3 \times 5 \times 240$ or $5 \times 5 \times 144$ or $5^2 \times 144$
E.g.
<table><tr><td>2</td><td>3600</td></tr><tr><td>2</td><td>1800</td></tr><tr><td></td><td>900</td></tr></table>
E.g.
  </td><td></td><td>3</td><td>M1 for at least 2 correct stages in prime factorisation which give 2 prime factors – may be in a factor tree or a table or listed eg 2, 2, 900
(see LHS for examples of the amount of work needed for the award of this mark, allow no more than one mistake ft in factor tree or table
(eg one mistake with 2 prime factors ft: $3600 = 1800 \times 20 = 2 \times 900 \times 4 \times 5$ or $360 = 2 \times 2 \times 90$)</td></tr>
<tr><td></td><td>E.g. $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$
E.g.
<table><tr><td>2</td><td>3600</td></tr><tr><td>2</td><td>1800</td></tr><tr><td>2</td><td>900</td></tr><tr><td>2</td><td>450</td></tr><tr><td>3</td><td>225</td></tr><tr><td>3</td><td>75</td></tr><tr><td>5</td><td>25</td></tr><tr><td>5</td><td>5</td></tr><tr><td></td><td>(1)</td></tr></table>
E.g.
  </td><td></td><td></td><td>M1 for 2, 2, 2, 2, 3, 3, 5, 5 or 2^4 , 3^2 , 5^2 or $2^4 + 3^2 + 5^2$ (ignore 1s) (may be a fully correct factor tree or ladder)</td></tr>
<tr><td></td><td>Working required</td><td>$2^4 \times 3^2 \times 5^2$</td><td></td><td>A1 dep on M2
can be any order (allow $2^4 \, . \, 3^2 \, . \, 5^2$)
(SCB1 for $3.6 \times 2^3 \times 5^3$)</td></tr>
<tr><td></td><td></td><td></td><td></td><td>Total 3 marks</td></tr>
</table>

Q24.

Q	Working	Answer	Mark	Notes
	eg $2 \times 2 \times 150$ **or** $3 \times 5 \times 40$ **or** $2 \times 3 \times 100$ **or** $5^2 \times 24$ **or**  **or** eg 2 | 600 2 | 300 | 150		3	M1 for at least 2 correct stages in prime factorisation which give 2 prime factors – may be in a factor tree or a table or listed eg 2, 2, 150 (see LHS for examples of the amount of work needed for the award of this mark, allow no more than one mistake ft (eg one mistake with 2 prime factors ft: $600 = 200 \times 30 = 2 \times 100 \times 5 \times 6$)
	eg $2 \times 2 \times 2 \times 3 \times 5 \times 5$  oe 2 | 600 2 | 300 2 | 150 3 | 75 5 | 25 5 | 5 | [1] oe			M1 for 2, 2, 2, 3, 5, 5 (ignore 1s) (may be a fully correct factor tree or ladder)
	Working required. *NB: answer must be given as a product of powers of prime factors*	$2^3 \times 3 \times 5$		A1 dep on M2 can be any order (allow $2^3 \cdot 3 \cdot 5^2$)
				Total 3 marks

Q25.

Question	Working	Answer	Mark	Notes
(a)	$\frac{6.04(0344...)}{1.11(3552873...)}$		2	M1 Either numerator or denominator correct (at least 3 digits needed) or for an answer of 5.42 to 5.4243 rounded or truncated.
		5.4243(89042…)		A1 accept 5.4243 or 5.4244 or better.
(b)		5.4	1	B1ft ft their answer to (a), must have at least 3 sig figs in part (a)
				Total 3 marks

Q26.

Q	Working	Answer	Mark	Notes
(i)		136.5	1	B1
(ii)		137.5 or 137.499..	1	B1 At least 137.499 or better
				Total 2 marks

Q27.

Question	Working	Answer	Mark	Notes
(a)	$\pi \times 7.6^2$			M1
		181	2	A1 181(.4583...) accept answers 181 – 182 inclusive
(b) (i)		7.65	1	B1 accept $7.64\dot{9}$
(ii)		7.55	1	B1
				Total 4 marks

Q28.

Q	Working	Answer	Mark	Notes
(a)		17.75	1	B1 oe
(b)		18.25	1	B1 oe $18.24\dot{9}$ (allow 18.2499…)
				SC B1 for 17.5 in (a) **and** 18.5 (or $18.4\dot{9}$)in (b)
				Total 2 marks

Q29.

Question	Working	Answer	Mark	Notes
(a)		64	1	B1 cao
(b)		3^5	1	B1 cao
(c)	$\frac{7^{14}}{7^6}$ or $\frac{7^9}{7^{(1)}}$ or $7^5 \times 7^3$	7^8	2	M1 A1
				Total 4 marks

Q30.

Question	Working	Answer	Mark	Notes
(a)	Correct factor tree or repeated division to find factors 2, 2, 2, 3, 5, 5 (condone inclusion of 1's)		3	M2 for finding correct factors (condone the inclusion of 1) M1 for finding a set of factors (with a product of 600) which includes at least 3 of the six prime factors. This may be a factor tree that is incomplete or only correct to this stage, for instance.
		$2^3 \times 3 \times 5^2$		A1 dep on M2
(b)	$\frac{5^{12}}{5^3}$ or $\frac{5^{10}}{5}$ or $\frac{5^{11}}{5^2}$		2	M1 For a correct application of an index law.
		5^9		A1
				Total 5 marks

Q31.

(a)		1	1	B1 cao
(b)		−6	1	B1 Allow 3^{-6}
				Total 2 marks

Q32.

Question	Working	Answer	Mark	Notes
(a)	$\frac{2^3}{2^7}$ **or** $2^3\times2^{-7}$ **or** $\frac{1}{2^4}$ **or** $(\frac{1}{16}$ **and** $16=2^4)$	-4	2	M1 A1 Accept 2^{-4}
(b)	$13^{-24}\times13^5$	-19	2	M1 for 13^{-24} or for $k = -6 \times 4 + 5$ A1 Accept 13^{-19} **Total 4 marks**

Q33.

Q	Working	Answer	Mark	Notes
	$(4^n=)(2^2)^n$ **or** $(4^n=)2^{2n}$ oe eg $2^k\div2^{2n}=2^x$ **or** $2^k=4^{\frac{1}{2}k}$ **and** $2^x=4^{\frac{1}{2}x}$ oe eg $\frac{4^{\frac{1}{2}k}}{4^n}=4^{\frac{1}{2}x}$		2	M1 for writing 4^n as $\left(2^2\right)^n$ or 2^{2n} or for writing each term in terms of 4 ie $2^k=4^{\frac{1}{2}k}$ **and** $2^x=4^{\frac{1}{2}x}$ If these things are seen in working, award this mark even if followed by incorrect working – if not a choice of methods
		$k-2n$		A1 allow 2^{k-2n}
				Total 2 marks