Pearson Edexcel

International GCSE Mathematics A

Exemplar Material for Paper 2 Foundation produced from the 2018 May/June Series

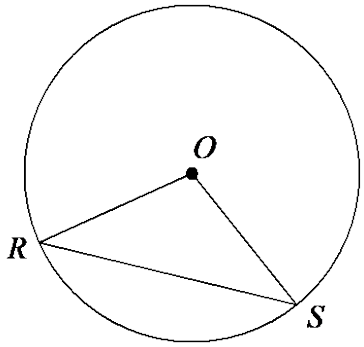
4MA1/02

Paper 2F (Calculator)

Exemplar Question 1

Foundation tier Paper 2 Question 9abc

9 *R* and *S* are points on a circle with centre *O*.



(*a*) On the diagram above, shade a segment of the circle.

(1)

(*b*) Write down the mathematical name of the straight line *RS*.

.....

(1)

In the diagram below, *P* and *Q* are points on a circle with centre *O*.

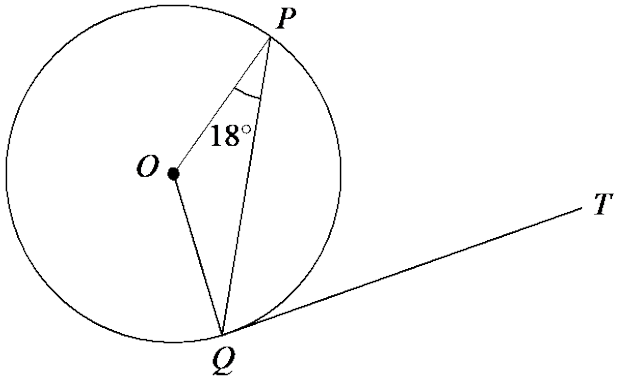


Diagram NOT accurately drawn

QT is a tangent to the circle.
Angle *OPQ* = 18°

(*c*) Work out the size of angle *PQT*.
Give a reason for each stage of your working.

..... °

(3)

Mean score: (a) 0.7/1 (b) 0.32/1 (c) 0.48/3

Examiner Comments:

Mark Scheme

Question		Working	Answer	Mark	Notes	
9	(a)		Segment shaded	1	B1	Accept minor segment or major segment.
	(b)		Chord	1	B1	
	(c)	$\angle OQT = 90°$ **and** $\angle OQT = 18°$ **or** 90 – 18		3	M1	For 90° **and** 18° correctly identified in the working or on the diagram or for 90 – 18 or for other fully correct method
			72		A1	
		Angle between tangent and radius is 90 degrees			B1	Correct reason for 90° angle [If used alternate segment theorem]
						Total 5 marks

Examiner Comments

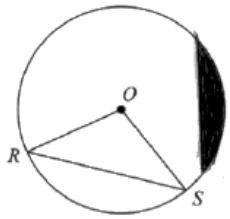
(a) Most students were able to correctly shade a segment, some shading the given area bounded by the line *RS* and the circumference but a few drew their own. Shading all areas apart from the triangle was seen and also the shading of the major sector *ROS*.

(b) We saw several correct answers but many incorrect, giving answers such as radius, tangent, sector and in some cases a blank response.

(c) Students found this question which used the 'angle between the tangent and radius' circle theorem quite challenging. We saw a number of correct answers, but many spurious attempts that used the values such as 180° and 360° incorrectly. The answers that were correct, rarely had a correct reason and so generally 2 marks was the maximum out of 3 that was awarded.

Student Response A

9 *R* and *S* are points on a circle with centre *O*.



(a) On the diagram above, shade a segment of the circle.

(1) 1 Q09a

(b) Write down the mathematical name of the straight line *RS*.

Sector

(1) 0 Q09b

In the diagram below, *P* and *Q* are points on a circle with centre *O*.

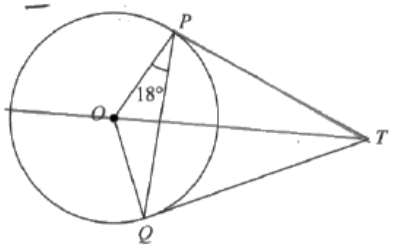


Diagram **NOT** accurately drawn

QT is a tangent to the circle.
Angle *OPQ* = 18°

(c) Work out the size of angle *PQT*.
Give a reason for each stage of your working.

tangent QT = 90° → where tangent meets a circle is 90°

QT = PT → QT and PT are both equal because they both have tangents to the circle so QT is equal to PT
90° = 90°

not 90°

(3) 0 Q09c

Examiner Comments:

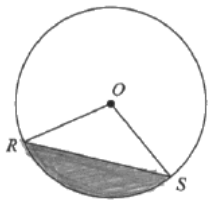
(a) B1 for a segment shaded – we did expect students to shade the segment enclosed by the line RS and the arc RS, but some chose to draw their own and of course were awarded the mark.

(b) Many incorrect answers were seen here – sector was one of these. B0

(c) This student seems to know a little about a tangent and 90° but has not got it quite right. No marks are awarded M0A0B0

Student Response B

9 R and S are points on a circle with centre O.



(a) On the diagram above, shade a segment of the circle.

(1) 1 Q09a

(b) Write down the mathematical name of the straight line RS.

chord

(1) 1 Q09b

In the diagram below, P and Q are points on a circle with centre O.

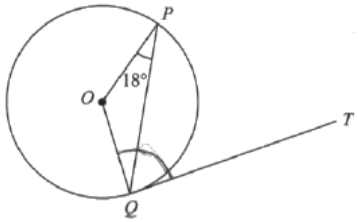


Diagram **NOT** accurately drawn

QT is a tangent to the circle.
Angle $OPQ = 18°$

(c) Work out the size of angle PQT.
Give a reason for each stage of your working.

Angle OQT = ~~180~~ 90° ~~180 - 18 = 162°~~
OQP = 18°
90 - 18 = 72°

72 °

(3) 2 Q09c

(Total for Question 9 is 5 marks) 4

Examiner Comments

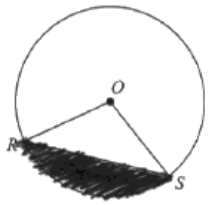
(a) Correct B1

(b) Correct B1

(c) A correct answer but with no reason – students often miss this out – either they do not know or choose to ignore the request for a reason for each stage of working.
B1B1M1A1B0

Student Response C

9 R and S are points on a circle with centre O.



(a) On the diagram above, shade a segment of the circle.

(1) 1 Q09a

(b) Write down the mathematical name of the straight line RS.

tangent

(1) 0 Q09b

In the diagram below, P and Q are points on a circle with centre O.

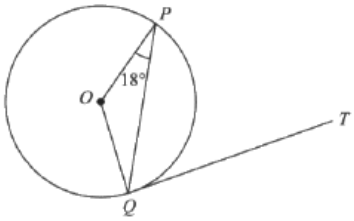


Diagram **NOT** accurately drawn

QT is a tangent to the circle.
Angle $OPQ = 18°$

(c) Work out the size of angle PQT.
Give a reason for each stage of your working.

61 °

(3) 0 Q09c

(Total for Question 9 is 5 marks) 1

Examiner Comments

(a) Correct B1

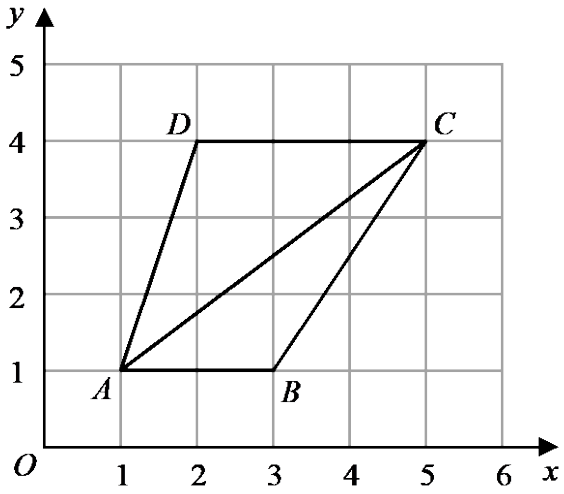
(b) Another frequently occurring incorrect answer. B0

(c) An incorrect answer – it appears to just be a randomly chosen number. M0A0B0

Exemplar Question 2

Foundation tier Paper 2 Question 12abc

The diagram shows a quadrilateral *ABCD* on a centimetre grid.



(*a*) Work out the area of triangle *ABC*.
You must include the units with your answer.

....

(3)

(*b*) Give a reason why angle *ACD* is equal to angle *CAB*.

.....

(1)

(*c*) Write down an equation for the straight line that passes through *D* and *C*.

.....

(1)

(Total for Question 12 is 5 marks)

Mean score: (a) 1.02/3 (b) 0.09/1 (c) 0.20/1

Examiner Comments

This question is within the context of AO2, Shape, Space and Measure.

In part (a) students were being tested on finding the area of a triangle and the units of the answer. Part (b) was a reasoning question and was looking for knowledge of alternate angles. Part (c) was looking for the equation of a horizontal line.

Mark Scheme

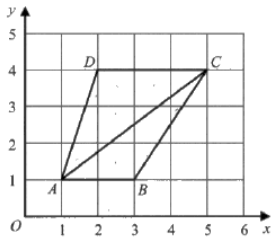
12 (a)	0.5 x 2 x 3		3	M1	Accept even if added to another area
		3 cm^2		A1 B1	for 3 for units
(b)		alternate angles	1	B1	'alternate' or 'alternating' or equivalent statement
(c)		$y=4$	1	B1	
					Total 5 marks

Examiner Comments

(a) We saw a few fully correct answers, but many incorrect with all sorts of wrong working such as multiplying the lengths of all the sides, adding the sides, multiplying the lengths of all sides of the quadrilateral *ABCD* and so on. We awarded a method mark if a student also added on the area of triangle *ADC* to find the area of quadrilateral *ABCD* – they were clearly asked to find the area of a triangle. The mark for units was an independent mark and was frequently awarded, although some students did not appear to read the sentence regarding units and gave none. A number of students had cm or cm3 as the units for area.
(b) Few students gave the correct reason of 'alternate angles' with many saying things such as 'they are the same' and 'they are reflections of each other'. A few got mixed up with angle types and gave 'corresponding angle' and a few gave 'Z' angles which unfortunately was not enough.
(c) It was pleasing to see such a lot of students knowing that the line through *D* and *C* was $y = 4$. Of the incorrect answers, $x = 4$ was common but some students also gave responses such as $y = x + 4$ and just sets of coordinates were seen a number of times.

Student Response A

12 The diagram shows a quadrilateral *ABCD* on a centimetre grid.



(a) Work out the area of triangle *ABC*.
You must include the units with your answer.

7 cm²

(3) 1 Q12a

(b) Give a reason why angle *ACD* is equal to angle *CAB*.

ACD and CAB are parallel to eachother

(1) 0 Q12b

(c) Write down an equation for the straight line that passes through *D* and *C*.

y = 4

(1) 1 Q12c

(Total for Question 12 is 5 marks) 2

Examiner Comments

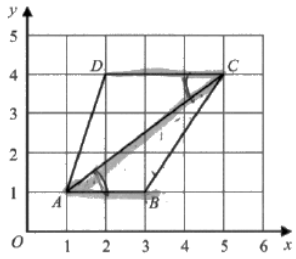
(a) The value of 7 with no working gains zero marks, but the correct units gain B1.

(b) We needed 'alternate angles'; the reason given is incorrect. B0

(c) A correct answer B1

Student Response B

12 The diagram shows a quadrilateral *ABCD* on a centimetre grid.



(a) Work out the area of triangle *ABC*.
You must include the units with your answer.

$\frac{2 \times 2}{2} = 2$

2 cm²

(3) 1 Q12a

(b) Give a reason why angle *ACD* is equal to angle *CAB*.

~~opposite~~ alternate angles are equal

(1) 1 Q12b

(c) Write down an equation for the straight line that passes through *D* and *C*.

y = 4

(1) 1 Q12c

(Total for Question 12 is 5 marks) 3

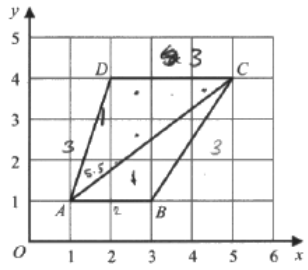
Examiner Comments

(a) B1 for correct units but the answer is incorrect and follows wrong working.

(b) B1 for the correct reason.

(c) B1 for the correct equation of the line.

12 The diagram shows a quadrilateral $ABCD$ on a centimetre grid.



(a) Work out the area of triangle ABC.
You must include the units with your answer.

54 cm^2

(3) 1 Q12

(b) Give a reason why angle ACD is equal to angle CAB.

equalatral

(1) 0 Q12

(c) Write down an equation for the straight line that passes through D and C.

$y = 4$

(1) 0 Q12

(Total for Question 12 is 5 marks) 1

Examiner Comments

(a) B1 for the correct units. The student seems to have multiplied together the lengths they have written on the sides of the shape.
(b) B0 incorrect.
(c) B0 incorrect.

Exemplar Question 3

Foundation tier Paper 2 Question 18abc

18 (*a*) Make *a* the subject of the formula $M = ac - bd$

.....

(2)

(*b*) Solve the inequality $5x - 4 < 39$

.....

(2)

(*c*) Factorise fully $18e^2f^3 - 12e^3f$

.....

(2)

(Total for Question 18 is 6 marks)

Mean score: (a) 0.23/2, (b) 0.59/2, (c) 0.30/2

Examiner Comments

This question is testing 3 areas of AO1, Algebra.

Mark Scheme

Question	Working	Answer	Mark	Notes
18 (a)	$ac=M+bd$ **or** $-ac = -M - bd$ **or** $\frac{M}{c}=a-\frac{bd}{c}$		2	M1 For a correct first stage
		$a=\frac{M+bd}{c}$		A1 oe, eg $a=\frac{M}{c}+\frac{bd}{c}$, $a=\frac{-M-bd}{-c}$ [must have been seen with a = to award accuracy mark]
(b)	$5x<39+4$ oe		2	M1 Accept as equation or with the wrong inequality sign. Also award M1 for an answer of 8.6 or 8.6 with an = sign or the incorrect inequality sign.
		$x<8\frac{3}{5}$		A1 Accept $x<\frac{43}{5}$ **or** $x<8.6$ **or** $[-\infty, 8.6)$
(c)	eg $6e^2(3f^3-2ef)$, eg $2f(9e^2f^2-6e^3)$ eg $ef(18ef^2-12e^2)$		2	M1 Any correct partially factorised expression with at least 2 terms in the common factor **or** for the correct common factor and a 2 term expression inside the brackets with just one error
		$6e^2f(3f^2-2e)$		A1
				Total 6 marks

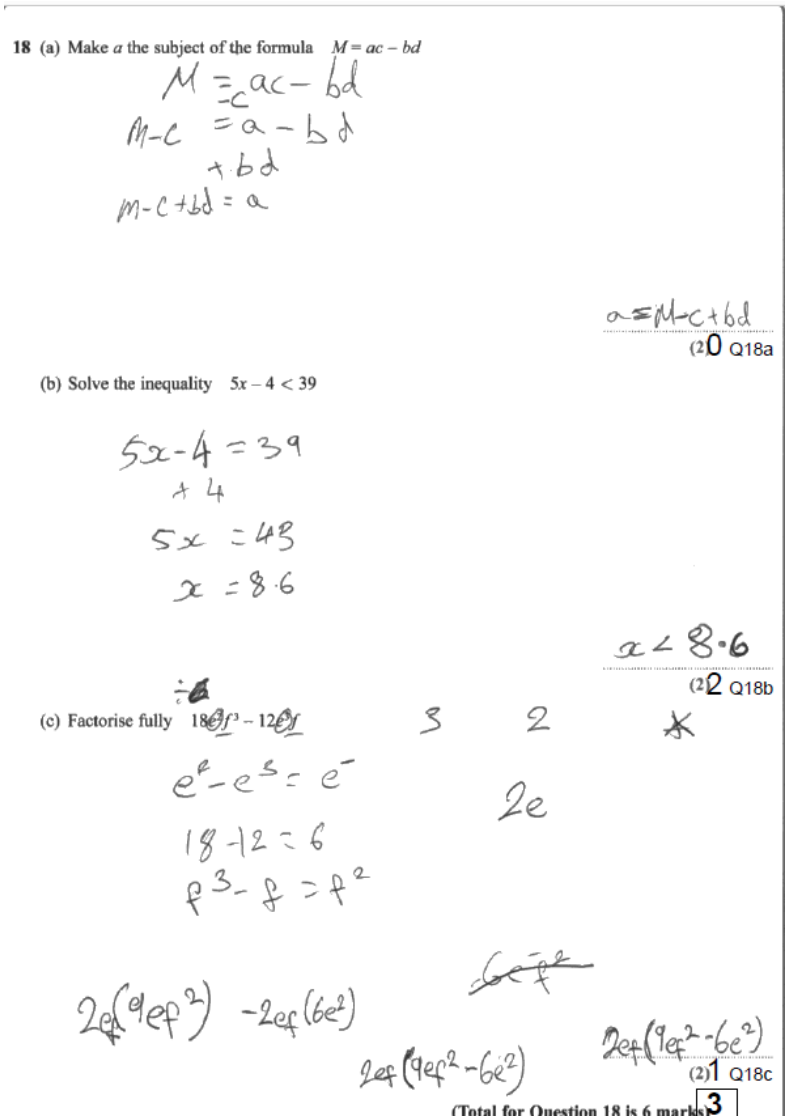
Examiner Comments

(a) This question was poorly done on the foundation paper, with few understanding what was needed. Some merely swapped the *M* and the *a* around in an attempt to make a the subject.

(b) Having an inequality sign rather than an equals sign seemed to 'throw' students entirely and they struggled with this question, often not showing any correct method. There were students that were able to correctly solve the inequality but far too many thought the answer was $x = 8.6$ or just 8.6. These students were unable to gain the final method mark even if we saw the correct solution in the working. It is essential that students realise that for inequalities there is not a single value solution.

(c) We saw very few correct answers for this question on factorising fully. Many did not even show any type of factorisation, but instead, tried to simplify the terms.

Student Response A



18 (a) Make a the subject of the formula $M = ac - bd$

$M = ac - bd$

$M - c = a - bd$

$+ bd$

$M - c + bd = a$

$a = M - c + bd$

(2) 0 Q18a

(b) Solve the inequality $5x - 4 < 39$

$5x - 4 = 39$

$+ 4$

$5x = 43$

$x = 8.6$

$x < 8.6$

(2) 2 Q18b

(c) Factorise fully $18ef^3 - 12ef$

$e^2 - e^5 = e^{-}$

$18 - 12 = 6$

$f^3 - f = f^2$

$2ef(9ef^2) - 2ef(6e^2)$

$2ef(9ef^2 - 6e^2)$

$2ef(9ef^2 - 6e^2)$

(2) 1 Q18c

(Total for Question 18 is 6 marks) 3

Examiner Comments

(a) The response incorrectly thinks you can remove c but subtracting it from both sides. No correct first stage is shown. M0A0

(b) The correct answer is given following correct working. M1A1

(c) M1A0 is awarded for a correct incomplete factorisation with at least 2 terms in the common factor.

Student Response B

18 (a) Make a the subject of the formula $M = ac - bd$

$\frac{M}{a} = \frac{ac - bd}{a}$

$\frac{m}{a} \times m = c - bd \times m$

$a = c - bd \times m$

$a = c - bd \times m$

(2) 0 Q18a

(b) Solve the inequality $5x - 4 < 39$

$\frac{5x}{5} < \frac{43}{5}$

$x < 8.6$

$x > 8.6$

$x > 8.6$

(2) 1 Q18b

(c) Factorise fully $18e^2f^3 - 12e^3f$

$6ef^3$

$6ef(3ef^2 - 6e^2)$

$18e^2f^3 - 12e^3f$

$6ef(3ef^2 - 6e^2)$

$6ef$

(2) 0 Q18c

Examiner Comments

(a) The response incorrectly divides each term by a as a first step to make a the subject. M0A0

(b) The student shows a correct first stage, and even a correct answer, but then chooses to swap the direction of the inequality sign and loses the accuracy mark. M1A0

(c) No marks are awarded as the incomplete factorisation is incorrect with 6 as the second term in the bracket rather than 2 M0A0

Exemplar Question 4

Foundation tier Paper 2 Question 20

20 Show that $3\frac{4}{7} - 1\frac{5}{8} = 1\frac{53}{56}$

(Total for Question 20 is 3 marks)

Mean score: 0.93/3

Examiner Comments

This question is AO1, Number. It is 'show that' question so all steps in a students working must be shown for marks to be awarded.

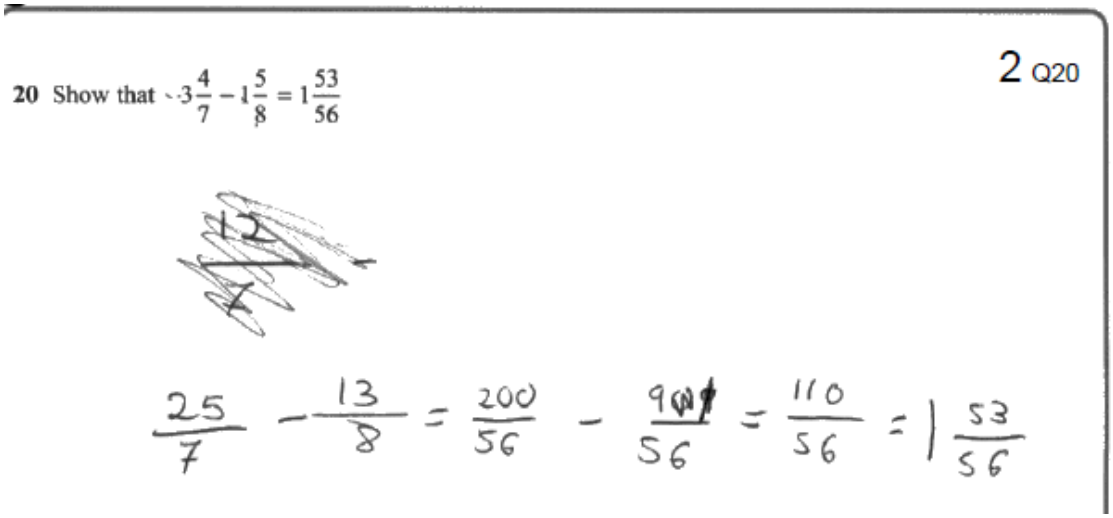
Mark Scheme

Question	Working	Answer	Mark	Notes
20	$\frac{25}{7}$ and $\frac{13}{8}$		3	M1 correct improper fractions **or** two improper fractions with a common denominator, at least one correct
	eg $\frac{200}{56} - \frac{91}{56}$ *or* $\frac{8\times25}{56} - \frac{7\times13}{56}$			M1 two correct fractions with a common denominator
	$\frac{109}{56} = 1\frac{53}{56}$ Or $\frac{109}{56}$ with RHS shown as $\frac{109}{56}$	correctly shown		A1 dep on M2 with sight of the result of the subtraction eg $\frac{109}{56}$ and $1\frac{53}{56}$ but allow showing that $1\frac{53}{56} = \frac{109}{56}$ on RHS in working
	Alternative method			
	eg $(3)\frac{32}{56} - (1)\frac{35}{56}$		3	M1 two improper fractions with a common denominator, at least one correct
	$-\frac{3}{56}$			M1 correct subtraction of fractional parts
		correctly shown		A1 dep on M2 with sight of the result of the subtraction eg $\frac{109}{56}$ or $2-\frac{3}{56}$
	Alternative method			
	eg $3\frac{32}{56} - 1\frac{35}{56}$		3	M1 two correct fractions with a common denominator, at least one correct
	eg $2\frac{88}{56} - 1\frac{35}{56}$			M1 complete correct method
		correctly shown		A1 dep on M2
				Total 3 marks

Examiner Comments

Students are getting used to the 'show that' fraction question and on the whole if they understood subtraction of fractions were very good at showing us how to arrive at the given answer. Those who did not often gained M1 for correct improper fractions to start with. Many 'fudged' stages to try and show us they could gain the correct result but had nothing correct prior to the result. It is essential that students show us every stage in their working so that can benefit from full marks. The few decimal solutions gained no marks at all.

Student Response A



20 Show that $3\frac{4}{7} - 1\frac{5}{8} = 1\frac{53}{56}$

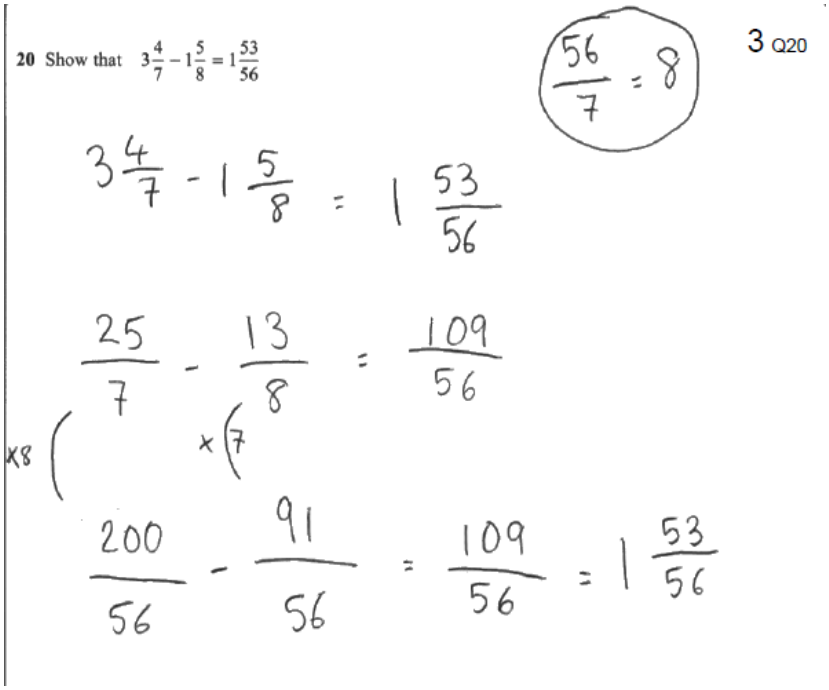
2 Q20

$\frac{25}{7} - \frac{13}{8} = \frac{200}{56} - \frac{91}{56} = \frac{110}{56} = 1\frac{53}{56}$

Examiner Comments

The student shows a good start to the method gaining M1 for correct improper fractions and then M1 for correct fractions over a common denominator. The mistake they make is getting 110/56 rather than 109/56 so they lose the final mark.

Student Response B



20 Show that $3\frac{4}{7} - 1\frac{5}{8} = 1\frac{53}{56}$

$\frac{56}{7} = 8$

3 Q20

$3\frac{4}{7} - 1\frac{5}{8} = 1\frac{53}{56}$

$\frac{25}{7} - \frac{13}{8} = \frac{109}{56}$

$\times 8 \quad \times 7$

$\frac{200}{56} - \frac{91}{56} = \frac{109}{56} = 1\frac{53}{56}$

Examiner Comments

This response is fully correct and one that very clearly shows how the answer is obtained. Students should be shown to give a response with this detail to ensure they gain full marks.

Exemplar Question 5

Foundation tier Paper 2 Question 21

21

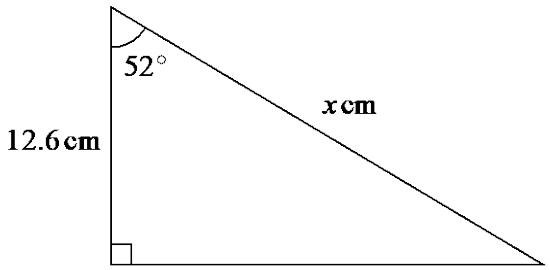


Diagram NOT accurately drawn

Work out the value of x.
Give your answer correct to 3 significant figures.

x =.....

(Total for Question 21 is 3 marks)

Mean score: 0.58/3

Examiner Comments

This question is AO2,Shape, Space and Measure. The trigonometry question is quite hard for Foundation level students particularly because they are being asked to find the hypotenuse.

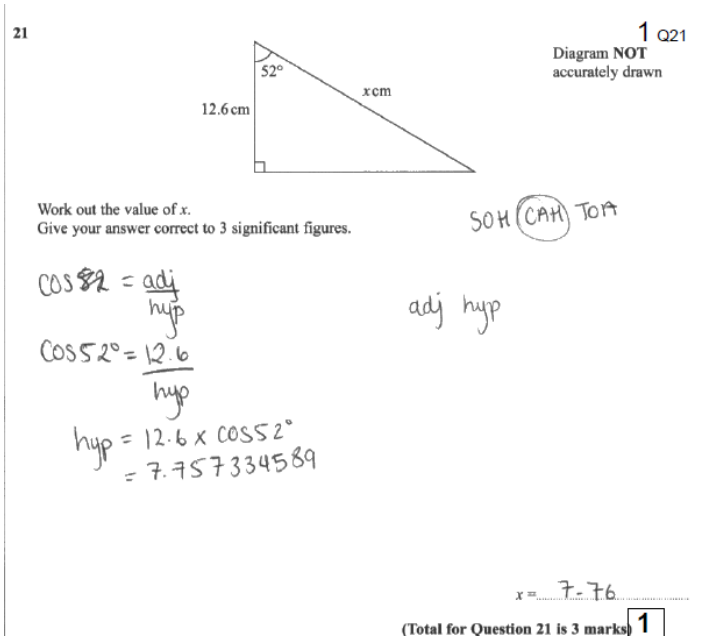
Mark Scheme

Question	Working	Answer	Mark	Notes
21	$\cos 52 = \frac{12.6}{x}$ **or** sin 38 = $\frac{12.6}{x}$		3	M1 Or use of tan to find horizontal side 12.6 × tan 52 or $\frac{12.6}{\tan 38}$ (=16.12...) **and** a correct first stage to find x eg $x^2 = 12.6^2 + "16.12..."^2$ or $\sin 52 = \frac{"16.12..."}{x}$ oe Allow correct first stage of sine rule
	$(x =)\frac{12.6}{\cos 52}$ **or** $\frac{12.6}{\sin 38}$ $(=\frac{12.6}{0.61566...})$ **or**			M1 Accept decimal correct to at least 3SF Or $(x =)\sqrt{12.6^2 + "16.12..."^2}$ **or** $(x =)\frac{"16.12..."}{\sin 52}$ Allow rearranged (x =) sine rule
		20.5		A1 20.4 – 20.5
				Total 3 marks

Examiner Comments

We saw few responses that merited any marks at all for this trigonometry question. Some started correctly with a statement such as cos 52 = 12.6/x and gained M1 but they were unable to make correct progress because they were unused to having x as the denominator in their equation.

Student Response A



21

1 Q21

Diagram **NOT** accurately drawn

52°

x cm

12.6 cm

Work out the value of x.
Give your answer correct to 3 significant figures.

SOH CAH TOA

$\cos 52 = \frac{adj}{hyp}$

adj hyp

$\cos 52° = \frac{12.6}{hyp}$

$hyp = 12.6 \times \cos 52°$

$= 7.757334589$

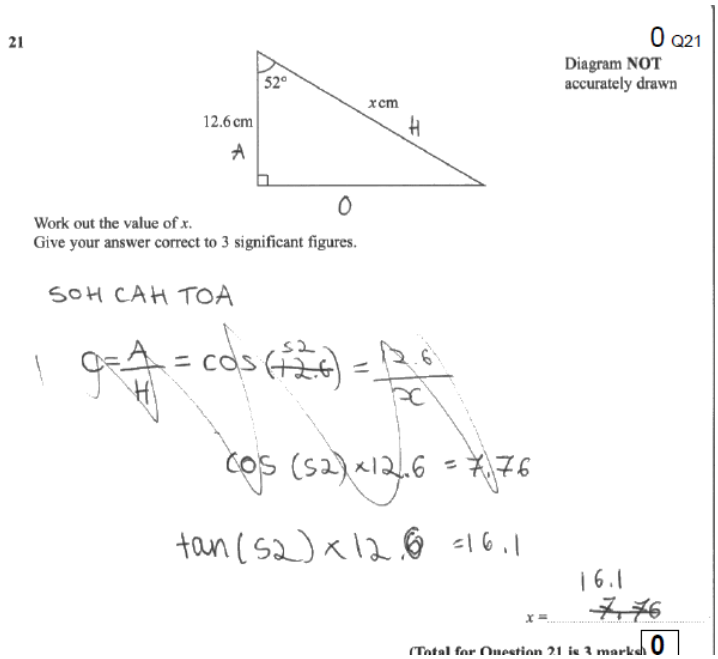
$x =$ 7.76

(Total for Question 21 is 3 marks) 1

Examiner Comments

A very common incorrect solution is found here. A mark is awarded for a correct first statement, but then the student rearranges incorrectly and gives the wrong answer. M1M0A0

Student Response B



21

0 Q21

Diagram **NOT** accurately drawn

52°

x cm

12.6 cm

A

H

O

Work out the value of x.
Give your answer correct to 3 significant figures.

SOH CAH TOA

$\cos = \frac{A}{H} = \cos(52) = \frac{12.6}{x}$

$\cos(52) \times 12.6 = 7.76$

$\tan(52) \times 12.6 = 16.1$

16.1

$x =$ ~~7.76~~

(Total for Question 21 is 3 marks) 0

Examiner Comments

No marks are awarded for an incorrect trig ratio and no correct method seen. M0M0A0

Exemplar Question 6

Foundation tier Paper 2F Question 22ab

22 The students in Class A and in Class B take the same examination.

There are 28 students in Class A and 32 students in Class B.
The mean score for all the students in both classes is 72.6.
The mean score for the students in Class A is 75.

(*a*) Work out the mean score for the students in Class B.

.....

(4)

The lowest score in Class A is 39.
The range of scores for Class A is 57.
The lowest score in Class B is 33.
The range of scores for Class B is 60.

(*b*) Find the range of scores for all the students in both classes.

.....

(3)

(Total for Question 22 is 7 marks)

Mean score: (a) 0.34/4 (b) 0.70/3

Examiner Comments:

This question is in a problem solving situation and examines AO3, Handling Data.

Students at this level find calculations such as these very difficult and often do not realise the correct method to find the total of a group of results.

Mark Scheme

Question		Working	Answer	Mark	Notes
22	(a)	$(28+32)\times72.6$ (= 4356) **or** 28×75 (= 2100)		4	M1 Expression for total of both classes together **or** total of class A
		$(28+32)\times72.6-28\times75$ (= 2256)			M1 Expression for total of class B.
		$\frac{(28+32)\times72.6-28\times75}{32}$ (="2256" ÷ 32)			M1 Correct calculation for mean of class B
			70.5		A1
	(b)	Highest in A = 39 + 57 (= 96) Highest in B = 33 + 60 (= 93)		3	M1 for 39 + 57 (=96) **or** 33 + 60(=93)
		(39 + 57) − 33			M1 or for 33 − "96" or 33 to "96" oe
			63		A1
					Total 7 marks

Examiner Comments:

(a) This question caused a lot of student's problems and we saw many attempts with spurious working. Some who knew something about the mean gave the answer 70.2 as they thought the mean for both classes would be the mean of the 2 values for the mean of class A + class B, ie $(75 + x) \div 2 = 72.6$. It was rare to see a correct response.

(b) While some students did not make progress on this question, there were a lot who gained M1 for giving us a correct highest value. Not that many were able to give the range of both classes together with other calculations such as the mean of the two top values.

Student Response A

22 The students in Class A and in Class B take the same examination.

There are 28 students in Class A and 32 students in Class B.
The mean score for all the students in both classes is 72.6
The mean score for the students in Class A is 75

(a) Work out the mean score for the students in Class B.

$\frac{A+B}{2} = 72.6$

$\frac{A}{28} = 75$ $\quad \frac{75+x}{2} = 72.6$

$75+x = 145.2$

$x = 70.2$

$\frac{B}{32} = 70.2$

$\frac{75+70.2}{2} = 72.6$ $\quad 70.2$

(4) 0 Q22a

The lowest score in Class A is 39
The range of scores for Class A is 57
The lowest score in Class B is 33
The range of scores for Class B is 60

(b) Find the range of scores for all the students in both classes.

A

39 +57 96

B

33 +60 93

$96-33=63$

63

(3) 3 Q22b

Examiner Comments:

(a) No marks as there is no correct method at all. The answer of 70.2 was a popular incorrect one where the student thinks the mean for both classes is the mean of the 2 means. M0M0M0A0

(b) A fully correct method is seen here. M1M1A1

Student Response B

22 The students in Class A and in Class B take the same examination.

There are 28 students in Class A and 32 students in Class B.
The mean score for all the students in both classes is 72.6
The mean score for the students in Class A is 75

(a) Work out the mean score for the students in Class B.

60 = 72.6

30 = 36 -3

15 = 18 - 15

class A = 75 x 28 = 2100

7.5 =

72.6 - 2.4 = 70.2

class B???

75 - 72.6 = 2.4

70.2

(4) 1 Q22

The lowest score in Class A is 39
The range of scores for Class A is 57
The lowest score in Class B is 33
The range of scores for Class B is 60

(b) Find the range of scores for all the students in both classes.

A = 57 + 39 = 96

B = 60 + 33 = 93

72
189

117

(3) 1 Q22

(Total for Question 22 is 7 marks) 2

Examiner Comments

(a) An incorrect answer and nothing worthy of a method mark. M0M0M0A0

(b) A method mark is awarded for finding a highest value (both are given although only 1 was needed for the award of this mark). The student has not found the range of scores for both classes. M1M0A0

Exemplar Question 7

Foundation tier Paper 2F Question 23

Solve the simultaneous equations

$$x + y = 15$$
$$7x - 5y = 3$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 23 is 3 marks)

Mean Score: 0.54/3

Examiner Comments: A question from AO1, Algebra where clear algebraic working is needed. We find that students at Foundation level generally find these confusing and hard to work though accurately in examinations.

Mark Scheme

23	eg $7x + 7y = 105$ – $5x + 5y = 75$ + $7x - 5y = 3$ $7x - 5y = 3$ $7(15 - y) - 5y = 3$ **or** $7x - 5(15 - x) = 3$ oe		3	M1	Correct method to eliminate x or y: coefficients of x or y the same **and** correct operation to eliminate selected variable (condone any one arithmetic error in multiplication) **or** writing x or y in terms of the other variable and correctly substituting
	$6.5 + y = 15$ **or** $x + 8.5 = 15$ **or** $7 \times 6.5 - 5y = 3$ **or** $7x - 5 \times 8.5 = 3$			M1	dep Correct method to find second variable using their value from a correct method to find first variable or for repeating above method to find second variable
		$x = 6.5$, $y = 8.5$		A1oe	dep on first M1
					Total 3 marks

Examiner Comments:

We saw only a small minority of correct responses for this simultaneous equation question. In fact, many were blank and it seemed some were using a trial and improvement method to find x and y which even if correct would have gained no marks as no algebraic working was seen.

Student Response A

23 Solve the simultaneous equations

$x + y = 15$
$7x - 5y = 3$

0 Q23

Show clear algebraic working.

(7x4) -(5x5)-3

4+5=9 15-9=6

4+3=7 (7x7)-(5x8)=9

5+3=8

$x = 6.5$

$y = 8.5$

(Total for Question 23 is 3 marks) 0

Examiner Comments:

Correct answers for x and y are given. However, the student is awarded no marks as no algebraic working is shown. M0M0A0

Student Response B

23 Solve the simultaneous equations

$x + y = 15$
$7x - 5y = 3$

3 Q23

Show clear algebraic working.

75

5x + 5y = 45 x 5

7x + 5y = 3

+ 12x = 78

÷12 ÷12

78 ÷12

6.5 + y = 15

15-6.5 = 8.5

$x = 6.5$

$y = 8.5$

(Total for Question 23 is 3 marks) 3

Examiner Comments:

Correct answers for x and y are given and full marks are awarded as a fully correct method is shown. M1M1A1

Exemplar Question 8

Foundation tier Paper 2F Question 24ab

24

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

(*a*) Find the value of *n*.

n = ...

(2)

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

(*b*) Find the value of *k*.

k = ...

(2)

(Total for Question 24 is 4 marks)

Mean Score: (a) 0.15/2 (b) 0.28/2

Examiner Comments: This question is examining AO1, Number. The question is set at the top grade for the paper, so it was expected that students would find this very difficult.

Mark Scheme

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

Examiner Comments:

(a) Very few students knew what the approach for this question was and just calculated the value on their calculators. Clearly we were targeting work on indices and powers, so this gained no marks. Knowing $8 = 2^3$ and showing this in the quotient would have been awarded M1, so students need to be reminded if they see numbers such as 8 appearing with powers of 2 this is a likely starting point.
(b) This part was done better than part (a) and it seemed the lack of a quotient helped them. Many benefitted from a method mark for seeing 13^{-24} although many put the whole calculation in their calculator, giving a commonly occurring wrong answer which gained zero.

Student Response A

24 $\frac{8}{2^7} = 2^n$

(a) Find the value of n.

$\frac{8}{2^7} = 0.0625$

$n = 0.03125$

(2) 0 Q24a

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

(b) Find the value of k.

$(13^{-6})^4 \times 13^5 = \frac{6.846318221 \times 10^{-22}}{13}$

$= 5.261783247 \times 10^{-23}$

$k = 5.261783247 \times 10^{-23}$

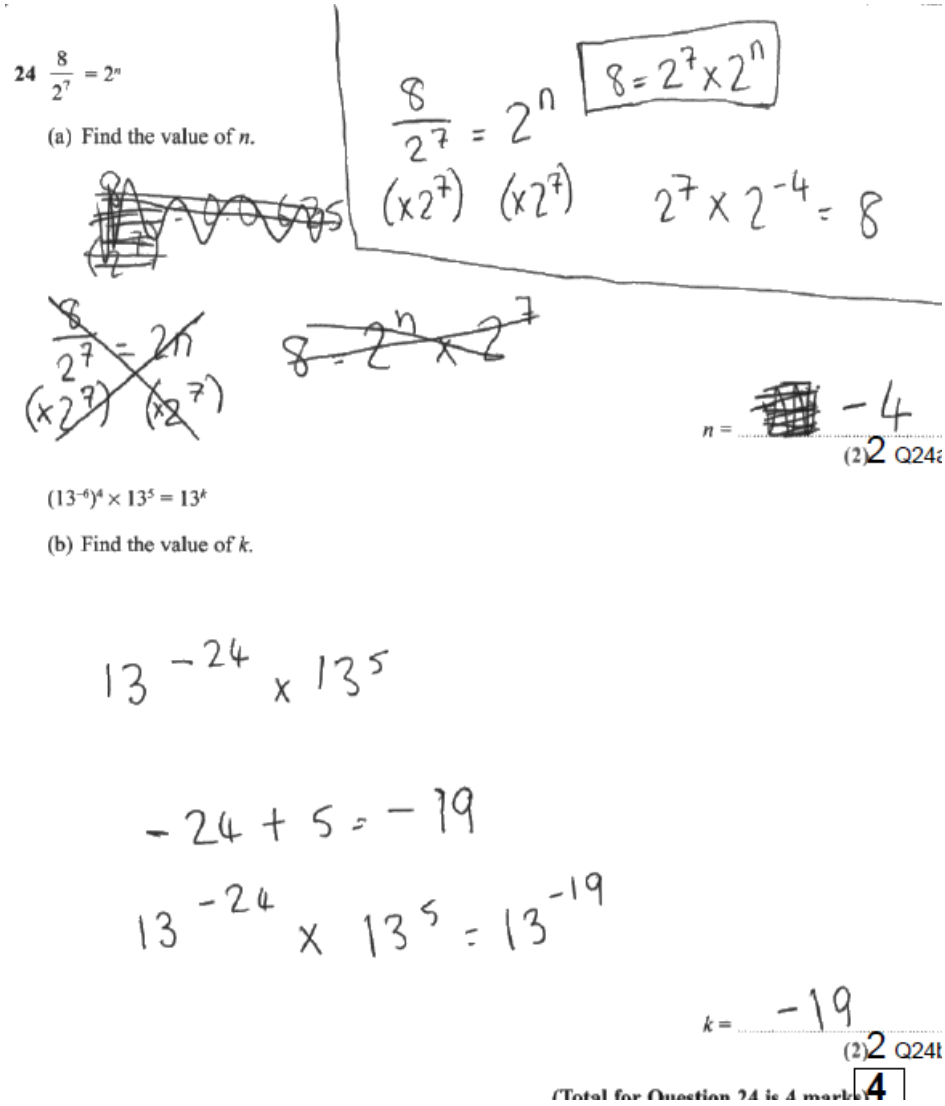
(2) 0 Q24b

(Total for Question 24 is 4 marks) 0

Examiner Comments:

(a) This shows a frequently seen response where students use their calculator to do the calculation and gain a value and it does not give the value of n. No marks are awarded as the question was targeting work on indices. M0A0

(b) This answer was also commonly seen and shows the student who can only work with the calculator and does not understand the indices. M0A0



Examiner Comments:

(a) This shows a fully correct answer and gains M1A1

(b) Another correct response which gains full marks M1A1