AQA Style Pre Paper 3F Practice Paper June 2018 Answers

This set of answers is not a conventional marking scheme; while it gives a basic allocation of marks, its main purpose it to help students understand how to do each question and how they can avoid making mistakes. As such, its format is rather different from that of a normal mark scheme. Included with each answer is the statement from the specification to which it applies (where “basic foundation content” is in normal type, and “additional foundation content” is in <u>underlined type</u>); content in *italics* is taken from the ‘notes’ sections of the specification. The "basic foundation content" and "additional foundation content" can be assessed on Foundation tier question papers.

The following guidance is adapted from that issued by AQA

Types of mark

M Method marks are awarded for a correct method which could lead to a correct answer.

A Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.

B Marks awarded independent of method.

Working out

Usually, if the question asks students to show working, marks are not awarded to students who show no working. As a general principle, where the questions does not ask students to show working, a correct answer is awarded full marks. However, if the answer is incorrect, students can still obtain method marks, assuming that they show some valid working out. **An incorrect answer with no working out is always awarded zero.**

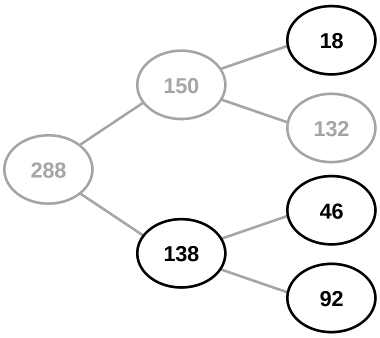
Premature approximation

Rounding off too early can lead to inaccuracy in the final answer. This is normally penalised by 1 mark.

Q	Answer	Mark	Comments
1	**N15** round numbers and measures to an appropriate degree of accuracy (eg to a specified number of decimal places or significant figures)		
	4.90	B1	
2	**R9** interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively		
	48 × 1.08	B1	
3	**S4** *students should know and understand the terms: primary data, secondary data, discrete data and continuous data*		
	primary	B1	
4	**G12** identify properties of the faces, surfaces, edges and vertices of: cubes, cuboids, prisms, cylinders, pyramids, cones and spheres		
	6	B1	
5 (a)	**A14** plot and interpret graphs, and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance, speed and acceleration		
	1.2 km	B1	
5 (b)	**R14** interpret the gradient of a straight-line graph as a rate of change		
	Identifies *BC*.	B1	May be implied
	0.7 km travelled in 30 sec	B1	
	$\frac{0.7}{30}$ km per second **or** 0.7 km × 120	M1	
	84 kph	A1	
6 (a)	**N2** understand and use place value (eg when working with very large or very small numbers, and when calculating with decimals) *including questions set in context. Knowledge and understanding of terms used in household finance, for example profit, loss, cost price, selling price, debit, credit, balance, income tax, VAT and interest rate*		
	14.63	A1	
	71.50	A1	Be careful with the minus sign, and (for money questions) remember to use two decimal places, so 71.50 here, not 71.5.
	863.13	A1	
6 (b)	**R9** solve problems involving percentage change, including percentage increase/decrease and original value problems, and simple interest including in financial mathematics		
	Any method	M1	Remember that you have a calculator, so use it; don't spend your time doing 10%, 1%, 0.1%, etc. Methods include $\frac{3.2}{100}$ × 920, or 1.032 × 920.
	949.44	A1	

Q	Answer	Mark	Comments
7 (a)	**A8** work with coordinates in all four quadrants		
	(−4 , 1)	B1	
7 (b)	**A8** work with coordinates in all four quadrants		
	G4 derive and apply the properties and definitions of: special types of quadrilaterals, including square, rectangle, parallelogram, trapezium, kite and rhombus		
	(4 , −1)	B1	
	(0 , 5)	B1	
8 (a)	**A17** solve linear equations in one unknown algebraically		
	Multiplies by 4	M1	Must see $3x - 1 = 44$ or better ($3x - 1 = 11 \times 4$ is not enough)
	15	A1	
8 (b)	**A17** solve linear equations in one unknown algebraically <u>including those with the unknown on both sides of the equation</u>		
	Attempts to put terms in p together	M1	$2p + p = 25 + 7$. Allow one error (for example $25 - 7$)
	Reaches $3p = 18$	M1	Care with minus signs; this should follow completely correct working and award of first **M1**.
	6	A1	Do not award if this is "fluked" from incorrect working.
9	**S4** interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers)		
	Correct method attempted	M1	$0 \times 28 + 1 \times 19 + 2 \times 8 + 3 \times 5 = 50$. One error allowed for **M1** if method used is correct.
	Divides answer by 60	M1	Allow follow through from incorrect value for 50.
	0.8333… or $\frac{50}{60}$, or $\frac{5}{6}$	A1	

Q	Answer	Mark	Comments

10 (a)	**P1** record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency trees		
		B1	18 and 138 seen
		M1	Attempts to divide 288 in ratio 2 : 7
		A1	64 students wear glasses 224 students don't wear glasses (may be implied)
		B1	46 and 92 seen

10 (b)	**R4** use ratio notation, including reduction to simplest form		
	46 : 92	B1	
	1 : 2	A1	

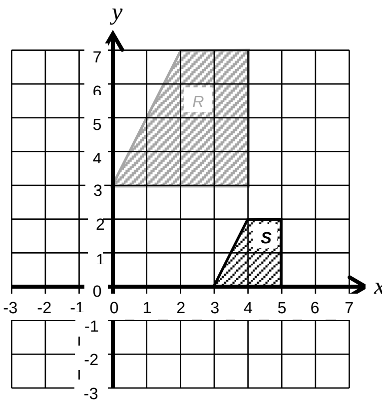
11	**G24** describe translations as 2D vectors		
	$\begin{pmatrix} -4 \\ 3 \end{pmatrix}$	B1	

12	**G3** understand and use alternate and corresponding angles on parallel lines; *colloquial terms such as Z angles are not acceptable and should not be used*		
	corresponding	B1	

13	**R6** apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) *including better value or best-buy problems*		
	R11 use compound units such as speed, rates of pay, unit pricing *including making comparisons*		
	Multibuy is £7.98 for 1500g	M1	May be implied. May state that multibuy is better value than the single standard box without further working.
	Either 4.49 ÷ 0.85 = 5.28… and 7.98 ÷ 1.5 = 5.32… **or** 850 ÷ 4.49 = 189.30… 1500 ÷ 7.98 = 187.97… **(other variants possible)**	M1	**Either** divide the price by the quantity (to find the cost of 1 kg or 1 g) **or** divide the quantity by the price (to find the quantity per £1 or 1p). There are several alternatives (g or kg, £1 or 1p); two are given here.
		A1	Both divisions must be correct for the second mark.
	Economy	B1	As well as ticking the box, write down your conclusion from the calculations. Of course, ticking a box (even the correct one) with no working out will get you no marks.

Q	Answer	Mark	Comments
14	**G16** know and apply formulae to calculate: area of triangles, parallelograms, trapezia		
	$\frac{1}{2} \times (7 + 4.5) \times 6$	M1	You could, alternatively, split the shape into a rectangle and a triangle, or even two triangles; if you do so, and combine the results correctly, you will still get full marks. **Do not** use the 6.5 cm; always use the perpendicular distance between the two parallel sides to find the area.
	34.5 cm^2	A1	
15	**A19** solve two simultaneous equations in two variables (linear/linear) algebraically		
	Correct method to obtain x or y	M1	Could use elimination or substitution. A likely first step is to double the second equation (to match terms in y), then find x from $10x - 3x = 24 - 3$
	$x = 3$	A1	
	$y = -1\frac{1}{2}$ or $y = -1.5$	A1	
16 (a)	**A22** solve linear inequalities in one variable; *students should know the conventions of an open circle on a number line for a strict inequality and a closed circle for an included boundary.*		
	$-2 < x \leq 3$	M1	Note the link between the different circles and the symbols < and ≤.
16 (b)	**A22** solve linear inequalities in one variable		
	3, 4, 5, 6, 7	M1	Either 3, … at start or …, 7 at end.
		A1	Must be fully correct.
17 (a)	**P3** relate relative expected frequencies to theoretical probability, using appropriate language and the 0 to 1 probability scale		
	$40 \div 0.2$ or 40×5	M1	
	200	A1	
17 (b)	**P4** apply the property that the probabilities of an exhaustive set of outcomes sum to 1; apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to 1		
	$1 - (0.2 + 0.44)$	M1	
	Divides 0.36 so that one number is 3 times the other.	M1	0.27 and 0.09. Could use a ratio of 3 : 1
	0.27 **or** $\frac{27}{100}$ **or** 27%	A1	…but not “27 out of 100”, or any kind of ratio.

Q	Answer	Mark	Comments
18 (a)	**S2** interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use		
	Finds angle for one student or number of students for one degree	M1	360° ÷ 240 = $1\frac{1}{2}$ ° **or** 240 ÷ 360° = $\frac{2}{3}$ students.
	58	A1	From 87 ÷ 1.5 **or** 87 × $\frac{2}{3}$ **or** 87 × 2 ÷ 3, etc.
18 (b)	**S2** interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, and know their appropriate use		
	Either finds total of angles for Italian and Spanish **or** finds total of students for Italian and Spanish	M1	150° **or** 100 students.
	Correct method to divide 150° **or** 100 students using ratio 3 : 2.	M1	Must see at least 150° ÷ 5 or 100 ÷ 5 (may be implied)
	40	A1	20 × 2
19	**R5** divide a given quantity into two parts in a given part : part or part : whole ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations)		
	Either 3 tonnes = 3000 kg **or** 800 kg = 0.8 tonnes and 2100 kg = 2.1 tonnes	M1	
	Either 3000 ÷ 4 = 750 and 2100 ÷ 3 = 700 **or** 3 ÷ 4 = 0.75 and 2.1 ÷ 3 = 0.7	M1	This identifies the quantity of sand as the "limiting" ingredient; there will be some cement and some gravel left over when the cement has been made.
	Either (1 + 4 + 3) × 700 kg **or** (1 + 4 + 3) × 0.7 tonnes	M1	Units not essential here
	5600 kg **or** 5.6 tonnes	A1	Units must now be correct
20 (a)	**A11** identify and interpret roots, intercepts and turning points of quadratic functions graphically *including the symmetrical property of a quadratic*		
	(2 , −4)	B1	
20 (b)	**A11** identify and interpret roots, intercepts and turning points of quadratic functions graphically		
	$x = 0$	B1	These are the x co-ordinates of the two points at which the curve crosses the x axis.
	$x = 4$	B1	

Q	Answer	Mark	Comments
21	**G7** identify, describe and construct congruent and similar shapes, including on coordinate axes, by considering rotation, reflection, translation and enlargement <u>including fractional scale factors</u>		
		B1	**Either** any enlargement scale factor $\frac{1}{2}$ **or** any enlargement centre (6 , −3).
		B1	Shape *S*; check all vertices correct.

Q	Answer	Mark	Comments
22 (a)	**A4** <u>factorising quadratic expressions of the form $x^2 + bx + c$, including the difference of two squares</u>		
	$(x + 7)(x - 4)$	B1	

Q	Answer	Mark	Comments
22 (b)	**A18** <u>solve quadratic equations algebraically by factorising</u>		
	−7	A1	Award **A1 A0** for two correct solutions obtained from incorrect factorisation in part **(a)**.
	4	A1	

Q	Answer	Mark	Comments
23	**G17** know the formulae: circumference of a circle = $2\pi r = \pi d$; area of a circle = πr^2; calculate perimeters of 2D shapes, including circles, areas of circles and composite shapes		
	Finds area of circle using $\pi \times \text{radius}^2$	M1	$\pi \times 1.5^2 = 7.06858\ldots$ Must see radius = 1.5 m used.
	Correct method to find area of grass	M1	8 × 11 − 2 × "your 7.06858…" = 73.862… Allow some mistakes (for example only taking away the area of one pond) if method/intention is clear.
	73.862… m^2	A1	
	£55.92	A1	Eight bags needed (although 73.862… rounds to 70, buying only seven bags would not be enough). No follow through here from incorrect area of grass.

Q	Answer	Mark	Comments
24 (a)	**G20** know the formula for Pythagoras' theorem, $a^2 + b^2 = c^2$ and apply to find angles and lengths in right-angled triangles in two dimensional figures		
	Uses Pythagoras for XZ	M1	Must see $XZ^2 = 20^2 - 9.5^2$, or at least $20^2 = XZ^2 + 9.5^2$, with numbers substituted into the formula; just writing $a^2 + b^2 = c^2$ or similar isn't enough for a mark. You can use a symbol like x for XZ if you prefer.
	XZ = 17.5997…	M1	Uses square root to get DE; must see $\sqrt{309.75}$.
	XZ = 17.60	M1	Final 0 must be present for 2 decimal places
24 (b)	**G20** know the trigonometric ratios $\sin x = \frac{\text{opposite}}{\text{hypotenuse}}$, $\cos x = \frac{\text{adjacent}}{\text{hypotenuse}}$ and $\tan x = \frac{\text{opposite}}{\text{adjacent}}$ and apply them to find angles and lengths in right-angled triangles in two dimensional figures		
	$\cos x = \frac{4.2}{5.1}$	M1	Not enough just to identify "trigonometry" here; you must use the correct trigonometric ratio (sin, cos or tan) and make a fraction with the numbers.
	$x = 34.6°$	A1	
25	**A5** rearrange formulae to change the subject		
	Moves 5 to right hand side	M1	Must see $\frac{a}{3} = b - 5$
	$a = 3(b - 5)$ **or** $a = 3b - 15$	A1	Must have "a ="
26	**A6** know the difference between an equation and an identity		
	Either $a - 1 = 3$ (using x) **or** $2a = 8$ (using constant)	M1	
	4	A1	