mygrade9 mathstutor.com

Boost Your Skills & Grades in Grade 9 Maths

1MA1 June 2027 Paper 2H Best Guess Paper

Higher · Standard · Model Answers

Disclaimer

This independently compiled practice paper is for students preparing for Pearson Edexcel GCSE Mathematics (1MA1), Higher Tier, Paper 2H. A calculator may be used.

This is not an official Pearson Edexcel examination paper and is not endorsed by Pearson. Best Guess questions are independent practice, not a guarantee of what will appear in the exam.

Revise the full specification. Attempt the matching question paper before using the mark scheme, model answers and practice resources at www.mygrade9mathstutor.com.

If you find this paper helpful, please support me by buying me a coffee

Model Answers

Step-by-step worked answers.

Use with the matching question paper.

Calculator allowed · 21 questions · 80 marks · Suggested time: 1 hour 30 minutes.

Question 1 · Arithmetic sequences · 4 marks

Part (a)

The common difference is 4, so start with 4n.

At $n = 1$, $4n = 4$; add 3 to obtain the first term 7. The nth term is $4n + 3$.

Answer: $4n + 3$

Part (b)

Solve $4n + 3 = 87$: $4n = 84$, so $n = 21$.

Since 21 is a positive integer, 87 is a term. Check: $4 \times 21 + 3 = 87$.

Answer: 87 is the 21st term.

Question 2 · Currency exchange · 4 marks

Bureau A gives $1200 \times 0.92 = 1104$ euros.

Bureau B deducts its fee first: $1200 - 20 = 1180$ US dollars are converted.

Bureau B gives $1180 \times 0.95 = 1121$ euros.

$1121 - 1104 = 17$ euros, so Bureau B gives 17 more euros.

Answer: Bureau B; 17 more euros.

Question 3 · Modal class and estimated mean · 4 marks

Part (a)

The highest frequency is 14, so the modal class interval is $20 < h \leq 30$.

Answer: $20 < h \leq 30$

Part (b)

Use class midpoints 15, 25, 35 and 45.

Sum of midpoint $\times$ frequency $= 15 \times 8 + 25 \times 14 + 35 \times 12 + 45 \times 6 = 1160$.

Estimated mean $= 1160 \div 40 = 29$ cm.

Answer: 29 cm

Question 4 · Venn diagrams and probability · 4 marks

Part (a)

A = {2, 3, 5, 7, 11} and B = {3, 6, 9, 12}; put 3 in the intersection.

Put 2, 5, 7, 11 in A only and 6, 9, 12 in B only.

Put 1, 4, 8, 10 outside both circles, inside the universal set. All 12 numbers must appear exactly once.

Answer: A only: 2, 5, 7, 11; intersection: 3; B only: 6, 9, 12; outside: 1, 4, 8, 10.

Part (b)

$A \cup B = \{2, 3, 5, 6, 7, 9, 11, 12\}$, so $P(A \cup B) = \frac{8}{12} = \frac{2}{3}$.

Answer: $\frac{2}{3}$

Question 5 · Surface area of a cylinder · 3 marks

Total surface area includes two circular ends and the curved surface: $2\pi r^2 + 2\pi rh$.

Substitute $r = 5.4$ and $h = 12$: $2\pi(5.4)^2 + 2\pi(5.4)(12) = 187.92\pi$.

$187.92\pi = 590.36809\ldots$ cm^2, which is 590 cm^2 to 3 significant figures.

Answer: 590 cm^2 (3 significant figures)

Question 6 · Speed conversion · 2 marks

Convert 90 km to 90,000 m and one hour to 3600 seconds.

Speed = 90,000 ÷ 3600 = 25 m/s.

Answer: 25 m/s

Question 7 · Equation of a straight line · 3 marks

Gradient $m = (17 - 5) \div (6 - 2) = 12 \div 4 = 3$.

Substitute (2, 5) into $y = 3x + c$: $5 = 6 + c$, so $c = -1$.

The equation is $y = 3x - 1$; it also gives $y = 17$ when $x = 6$.

Answer: $y = 3x - 1$

Question 8 · Ratio and mass · 4 marks

There are $7 + 5 = 12$ parts, so one part represents $180 \div 12 = 15$ bags.

Small bags: $7 \times 15 = 105$. Large bags: $5 \times 15 = 75$.

Total mass $= 105 \times 65 + 75 \times 145 = 6825 + 10875 = 17700$ grams.

$17700 \div 1000 = 17.7$ kg. This is more than 17 kg, so Zoe is not correct.

Answer: No; 17.7 kg of beads are needed.

Question 9 · Reverse compound depreciation · 3 marks

The annual multiplier is $1 - 0.12 = 0.88$.

If the original value is V, then $V \times 0.88^3 = 15{,}400$, so $V = 15{,}400 \div 0.88^3$.

$V = 22{,}598.14049\ldots$; to the nearest pound the value was £22,598.

Answer: £22,598

Question 10 · Connected right-angled triangles · 4 marks

In right-angled triangle BCD, $\cos 57^\circ = \dfrac{BD}{12}$.

Therefore $BD = 12 \cos 57^\circ = 6.535668420\ldots$ cm. Keep the unrounded value.

In right-angled triangle ABD, $AB^2 = AD^2 - BD^2 = 10^2 - (12 \cos 57^\circ)^2$.

Taking the positive square root gives $AB = 7.568688017\ldots$ cm = 7.57 cm to 3 significant figures.

Answer: 7.57 cm (3 significant figures)

Question 11 · Graphical inequalities and integer points · 3 marks

Part (a) [2 marks]

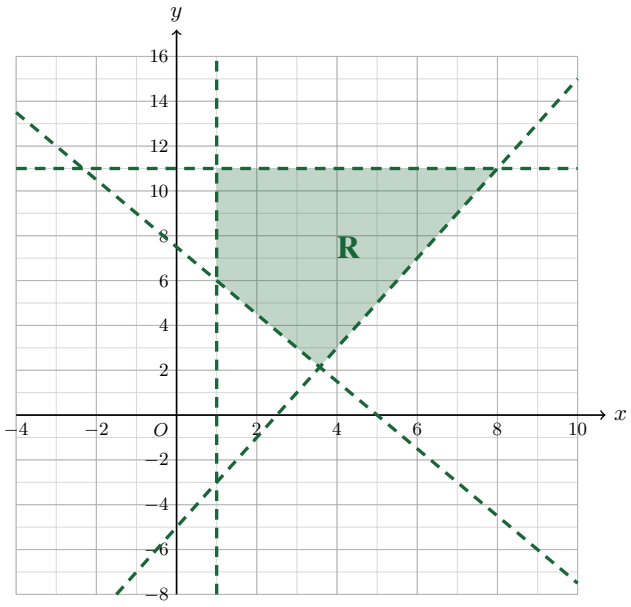
Draw dashed lines x = 1, y = 11, y = 2x − 5 and y = (15 − 3x)/2.

Shade to the right of x = 1, below y = 11 and above both sloping lines. Label this region R.

Part (b) [1 mark]

At x = 4, the bounds are y > 3, y > 1.5 and y < 11.

The integers in 3 < y < 11 are 4, 5, 6, 7, 8, 9 and 10, so n = 7.



Question 12 · Circle theorems · 4 marks

OA and OB are radii to the points of contact, so OA is perpendicular to PA and OB is perpendicular to PB.

Angles OAP and OBP are both 90°. The angles in quadrilateral OAPB sum to 360°.

Angle AOB = 360° − 90° − 90° − 56° = 124°.

The angle at the centre is twice the angle at the circumference subtended by the same arc AB, so angle ACB = 124° ÷ 2 = 62°.

Answer: 62°

Question 13 · Cumulative frequency and interquartile range · 5 marks

Part (a)

Add successive frequencies: 14; 14 + 28 = 42; 42 + 22 = 64; 64 + 12 = 76; 76 + 4 = 80.

Answer: 14, 42, 64, 76, 80

Part (b)

Plot cumulative totals against upper class boundaries: (10, 14), (20, 42), (30, 64), (40, 76), (50, 80).

Include (0, 0) and join the points with a smooth increasing curve or sensible straight segments.

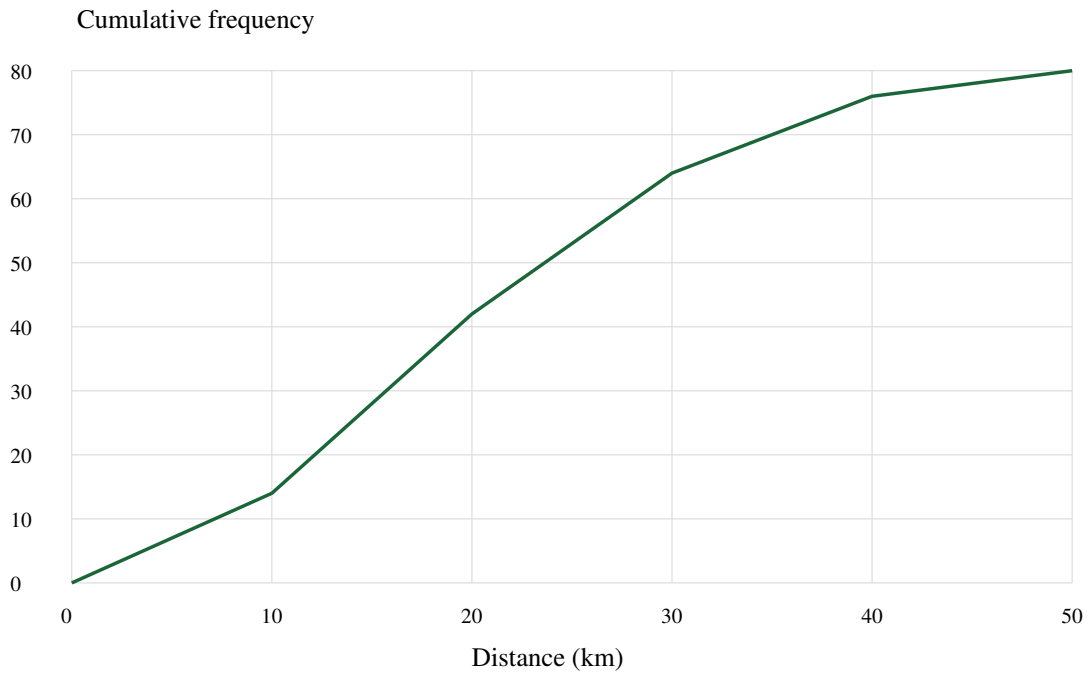
Answer: Graph through (0, 0), (10, 14), (20, 42), (30, 64), (40, 76), (50, 80).

Part (c)

For 80 workers, read Q1 at cumulative frequency 20 and Q3 at cumulative frequency 60. Straight-segment readings give Q1 ≈ 12.14 km and Q3 ≈ 28.18 km.

IQR = Q3 − Q1 ≈ 28.18 − 12.14 = 16.04 km, about 16 km.

Answer: Approximately 16 km



Question 14 · Direct proportion · 3 marks

Direct proportionality gives $y = kx^3$.

Use $x = 2$, $y = 40$: $40 = 8k$, so $k = 5$.

When $y = 1080$, $1080 = 5x^3$, giving $x^3 = 216$. Take the real cube root: $x = 6$.

Answer: $x = 6$

Question 15 · Rearranging a formula · 3 marks

Multiply by $x - 3$: $y(x - 3) = 2x + 5$, so $xy - 3y = 2x + 5$.

Collect and factor the x terms: $xy - 2x = 3y + 5$, so $x(y - 2) = 3y + 5$.

Divide by $y - 2$: $x = \frac{3y + 5}{y - 2}$. The restriction is not a separate marking point.

Answer: $x = \frac{3y + 5}{y - 2}$, $y \neq 2$.

Question 16 · Upper bound of speed · 4 marks

230 km correct to the nearest 10 km gives an upper distance bound of 235 km.

4.5 hours correct to 1 decimal place gives a lower time bound of 4.45 hours.

An upper speed bound uses the largest distance divided by the smallest time: $235 \div 4.45$.

The bound is 52.80898… km/h, or 52.8 km/h to 3 significant figures.

Answer: 52.8 km/h

Question 17 · Similar solids · 4 marks

Surface-area ratio $B : A = 90 : 40 = 9 : 4$.

The linear scale factor from A to B is $\sqrt{(9 \div 4)} = \frac{3}{2}$.

The volume scale factor is $\frac{27}{8}$.

Volume of $B = 120 \times \frac{27}{8} = 405$ cm^3.

Answer: 405 cm^3

Question 18 · Three-dimensional trigonometry · 4 marks

The projection of BH onto plane ABCD is BD. The required angle is HBD.

$BD = \sqrt{(10^2 + 6^2)} = \sqrt{136}$ cm.

In right triangle BDH, $\tan\theta = \frac{DH}{BD} = \frac{5}{\sqrt{136}}$.

$\theta = \tan^{-1}(5 \div \sqrt{136}) = 23.20706…^\circ$, which rounds to 23.2°.

Answer: 23.2°

Question 19 · Non-linear simultaneous equations · 5 marks

Substitute $y = 2x - 3$ into $2x^2 + y^2 = 30$: $2x^2 + (2x - 3)^2 = 30$.

Expand and simplify: $6x^2 - 12x - 21 = 0$, so $2x^2 - 4x - 7 = 0$.

Use the quadratic formula: $x = \frac{4 \pm \sqrt{72}}{4}$.

Simplify: $x = 1 \pm \frac{3\sqrt{2}}{2}$.

Substitute each value into $y = 2x - 3$ to obtain $y = -1 \pm 3\sqrt{2}$, with matching signs.

Answer: $x = 1 + \frac{3\sqrt{2}}{2}$, $y = -1 + 3\sqrt{2}$; or $x = 1 - \frac{3\sqrt{2}}{2}$, $y = -1 - 3\sqrt{2}$.

Question 20 · Algebraic probability · 5 marks

Let the total number of counters be N. Probability of two red counters is $\frac{5}{N} \times \frac{4}{N-1}$.

Set this equal to $\frac{5}{14} : \frac{20}{N(N-1)} = \frac{5}{14}$.

Cross-multiply and simplify: $N(N - 1) = 56$, so $N^2 - N - 56 = 0$.

Factorise: $(N - 8)(N + 7) = 0$.

Reject $N = -7$ because a number of counters must be positive. $N = 8$ gives $\frac{5}{8} \times \frac{4}{7} = \frac{5}{14}$, as required.

Answer: 8 counters

Question 21 · Algebraic cosine rule · 5 marks

Cosine rule gives $7^2 = x^2 + (x + 2)^2 - 2x(x + 2)\cos 60^\circ$.

Use $\cos 60^\circ = \frac{1}{2}$ and expand: $49 = x^2 + 2x + 4$.

Rearrange to $x^2 + 2x - 45 = 0$, or $(x + 1)^2 = 46$.

Take square roots: $x = -1 \pm \sqrt{46}$.

Reject the negative value because x is a length. The exact answer is $x = \sqrt{46} - 1$.

Answer: $x = \sqrt{46} - 1$