mygrade9
mathstutor.com
Boost Your Skills & Grades in Grade 9 Maths

1MA1 November 2026 · Paper 3H · Worked Solutions

———————————- Disclaimer ———————————-

This paper has been created based on topics from previous years and careful analysis of what topics are highly likely to appear in paper 3H. The paper should be excellent at helping students revise for exams. This paper is specifically targeted at students aiming for a Grade 5, so it intentionally avoids some of the grade 7 to 9 real exam paper. The topics from this paper may well appear in the real exams, however there is absolutely no guarantee of this. There are deliberately more questions at a higher grade than you would expect.
Despite what you might see on social media it is not possible to "predict" the paper perfectly. This is usually what people say when they are selling you something...

The best way to prepare for the exams is to revise all topics
You can find a link to this paper and more completely free resources at www.mygrade9mathstutor.com

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

The Playlist for Solutions can be found

The best way to work with this paper is work though it all, watch the Clip. If you get the question incorrect watch the clip again and then try the similar questions from the worksheets

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 1 · Scale Models

Convert the actual length to centimetres: 78 × 100 = 7800 cm.

A scale of 1:200 means the model is 200 times smaller: 7800 ÷ 200 = 39 cm.

Answer: 39 cm

Q1 clip

Practice worksheet

Question 2 · Averages Problem Solving

Step 1: The median is the middle value, which falls halfway between 10 and q.
(10 + q)/2 = 11 ⇒ 10 + q = 22 ⇒ q = 12.

Step 2: The mode is the most frequent number (19). Because r appears twice, both r values must be 19.

Step 3: The range is 16. The range is the largest value (19) minus the smallest value (p).
19 – p = 16 ⇒ p = 3.

Answer: p = 3, q = 12, r = 19

Q2 clip

Practice worksheet

Question 3 · Upper and Lower Bounds

Step 1: Degree of accuracy is 0.1 m. Half of this is 0.05 m.

Step 2: Upper bound = 1.6 + 0.05 = 1.65 m.

Step 3: Lower bound = 1.6 - 0.05 = 1.55 m.

Answer: Upper = 1.65 m, Lower = 1.55 m

Q3 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 4 · Exchange Rates and Ratios

Step 1: Convert £600 to Euros: 600 × 1.15 = €690.

Step 2: Find savings portion (2 parts out of 5): €690 × (2/5) = €276.

Step 3: Convert savings back to Pounds at new rate: €276 ÷ 1.18 = £233.898...

Step 4: Round to nearest penny.

Answer: £233.90

Q4 clip

Practice worksheet

Question 5 · Expanding Double Brackets

(a) Expand: $x^2 + 7x - 4x - 28 = x^2 + 3x - 28$.

(b) Factorise: Highest common factor is $6cw^2$. Expression becomes $6cw^2(3c^4 + 5w)$.

(c) Solve: Multiply both sides by 4: $7x - 2 = 4(3x + 1) \Rightarrow 7x - 2 = 12x + 4$. Rearrange: $-5x = 6 \Rightarrow x = -1.2$.

Answer: (a) $x^2 + 3x - 28$, (b) $6cw^2(3c^4 + 5w)$, (c) $x = -1.2$

Q5(a) clip

Practice worksheet

Q5(b) clip

Practice worksheet

Q5(c) clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 6 · Reverse Bearings

Step 1: Since the bearing is less than 180°, add 180°.

Step 2: 75° + 180° = 255°.

Answer: 255°

Q6 clip

Practice worksheet

Question 7 · Volume of a Cylinder

Step 1: Use formula $V = \pi r^2 h$.

Step 2: $V = \pi \times 4.5^2 \times 10 = 202.5\pi = 636.172...$ cm³.

Step 3: Round to 3 significant figures.

Answer: 636 cm³

Q7 clip

Practice worksheet

Question 8 · Speed, Distance and Time

Step 1: Convert distance to metres: 135 km = 135,000 m.

Step 2: Convert time to seconds: 1.5 hours × 3600 = 5400 seconds.

Step 3: Speed = Distance / Time = 135,000 / 5400 = 25 m/s.

Answer: 25 m/s

Q8 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 9 · Probability and Ratio

54 orange counters represent probability 0.45, so there are 54 ÷ 0.45 = 120 counters.

Blue and yellow together have probability 1 – 0.15 – 0.45 = 0.4, so there are 120 × 0.4 = 48.

Blue:yellow = 3:5. Blue counters are 3/8 of the 48, giving 48 × 3/8 = 18.

Answer: 18 blue counters

Q9 clip

Practice worksheet

Question 10 · Graphical Inequalities

(a) Substitute x = –2, 0, 2 and 3 to get the points (–2,8), (0,4), (2,0) and (3,–2). Join them with a straight line across the specified range.

(b) x ≥ 0 means right of the y-axis; y ≥ –1 means above the horizontal line y = –1; y ≤ –2x + 4 means below the sloping line.

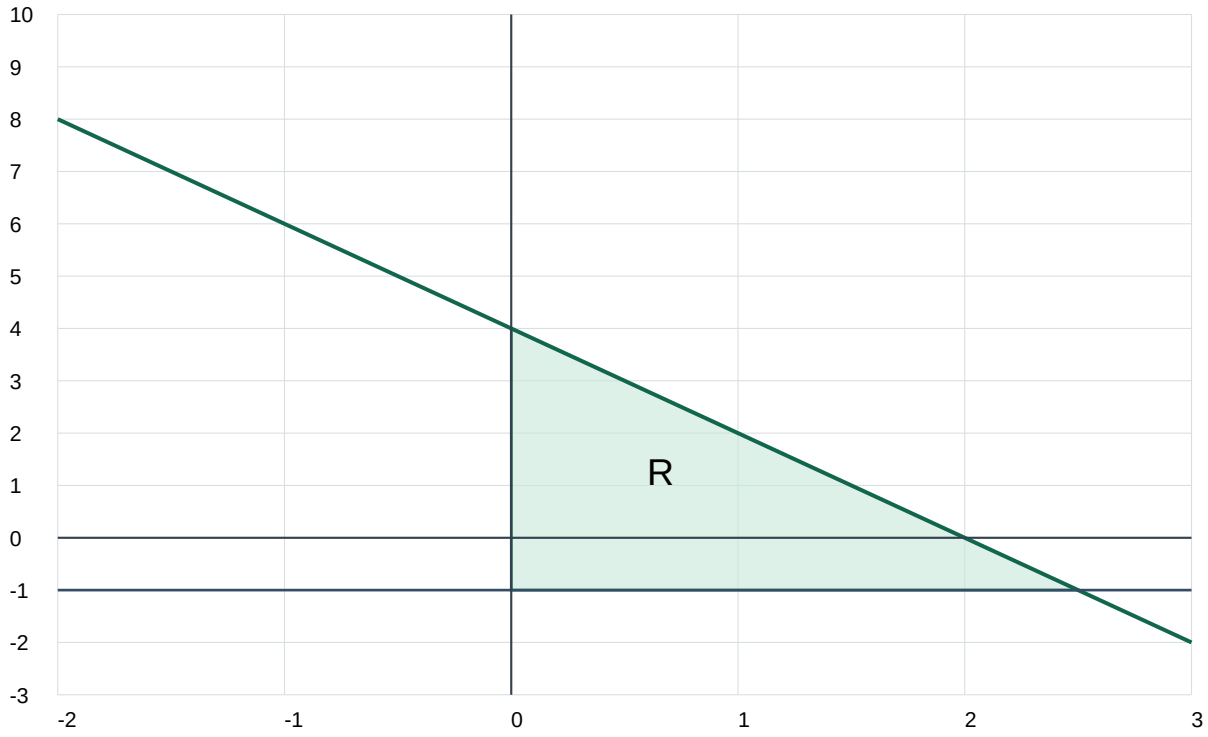
The common region is the triangle bounded by (0,–1), (0,4) and (2.5,–1). Include the boundaries because all inequalities allow equality. Shade it and label it R.

Answer: See the annotated graph

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 10 · annotated graph



Solid boundaries included; shaded triangle is R.

Q10 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 11 · Zero, Negative and Combined Indices

(a) Any non-zero number raised to the power 0 equals 1. Since $5^k = 1$, k = 0.

(b) Write 27 as a power of 3, then subtract indices when dividing:
$27/3^8 = 3^3/3^8 = 3^{3-8} = 3^{-5}$.
Therefore m = –5.

(c) Multiply indices for a power of a power, then add indices when multiplying:
$(7^{-4})^3 \times 7^5 = 7^{-12} \times 7^5 = 7^{-7}$.
Therefore p = –7.

Answer: (a) k = 0 (b) m = –5 (c) p = –7

Q11 clip

Practice worksheet

Question 12 · Compound Percentage Change

Step 1: Apply depreciation multipliers: 85,000 × 0.88 × 0.85 = 63,580.

Step 2: Set up year 3 multiplier: 63,580 × (1 + x/100) = 66,759.

Step 3: 1 + x/100 = 66,759 / 63,580 = 1.05 ⇒ x = 5.

Answer: x = 5

Q12 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 13 · Angles in a Regular Polygon

Interior angle = 180° – 360°/11 = 147.2727…°.

BCDE is an isosceles trapezium. Its angles at C and D are both 147.2727…°, so its two equal base angles total 360° – 2 × 147.2727…° = 65.4545…°.

∠DEB = 65.4545…° ÷ 2 = 32.7272…°.

∠BEF = 147.2727…° – 32.7272…° = 114.5454…°. Round only the final answer.

Answer: 114.5°

Q13 clip

Practice worksheet

Question 14 · Cubic Graph

(a) At x = –2: y = –8 + 6 + 1 = –1. At x = 0: y = 1. At x = 2: y = 8 – 6 + 1 = 3.

(b) Plot the table points and draw a smooth cubic. The exact values at x = –0.5 and 1.5 are 2.375 and –0.125; the table rounds them to 2.4 and –0.1.

(c) The equation $x^3 – 3x – 1 = 0$ is equivalent to $x^3 – 3x + 1 = 2$, so draw the horizontal line y = 2.

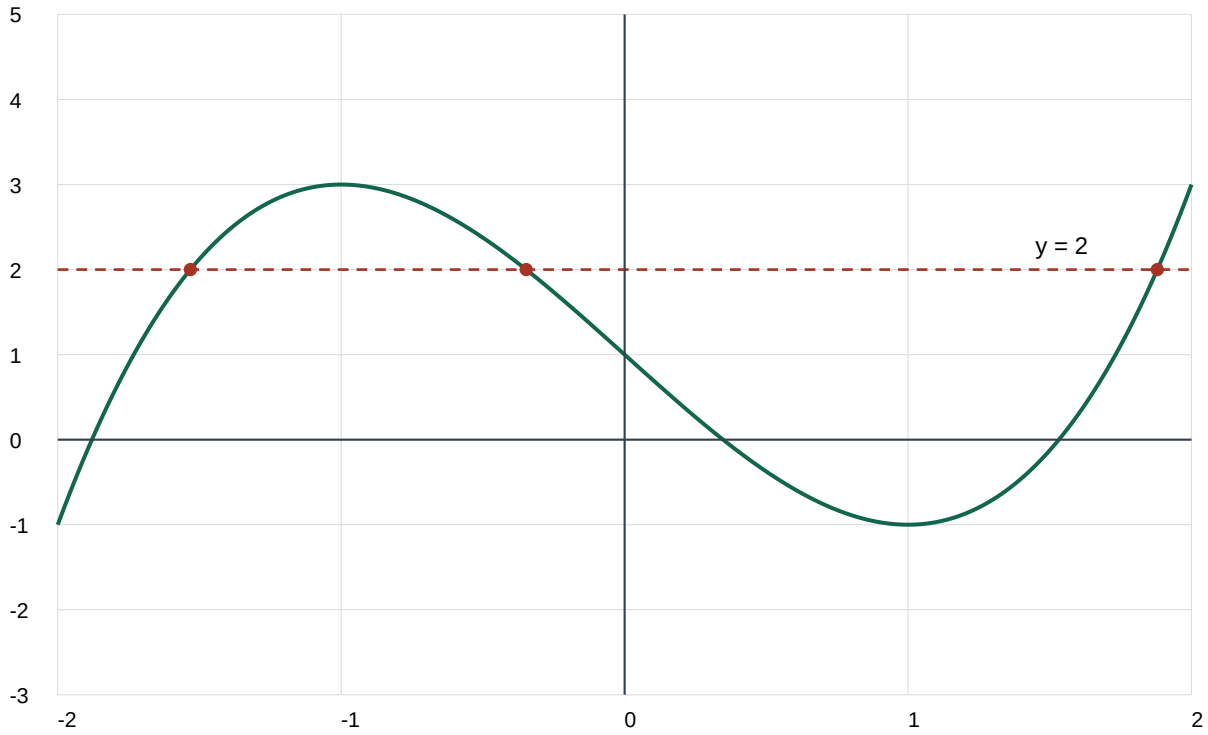
Read all three intersections: x ≈ –1.532…, –0.347… and 1.879…. Round each to one decimal place.

Answer: Missing values: –1, 1, 3; solutions: –1.5, –0.3, 1.9

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 14 · annotated graph



Intersections give x = -1.5, -0.3, 1.9 (1 decimal place).

Q14 clip

Practice worksheet

Question 15 · Straight Line Equations

Step 1: Find the gradient of line L_1 by rearranging its equation into the format y = mx + c.
3y – 2x = 12 ⇒ 3y = 2x + 12 ⇒ y = (2/3)x + 4.
The gradient m is 2/3.

Step 2: Because L_2 is parallel, it has the exact same gradient: m = 2/3.

Step 3: Because L_2 passes directly through the y-axis at coordinate (0, 5), its y-intercept c = 5.

Answer: y = (2/3)x + 5

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Q15 clip

Practice worksheet

Question 16 · Combined Proportion

$y \propto t^2$, so $y = kt^2$. With $y = 20$ and $t = 2$, $k = 20/4 = 5$.

$t \propto 1/\sqrt{x}$, so $t = c/\sqrt{x}$. With $t = 3$ and $x = 4$, $c = 3\sqrt{4} = 6$.

Substitute into $y = 5t^2$: $y = 5(6/\sqrt{x})^2 = 5 \times 36/x = 180/x$.

Answer: $y = 180/x$

Q16 clip

Practice worksheet

Question 17 · 3D Pythagoras and Trigonometry

Step 1: Length VM: half base = 5 cm, height = 15 cm. VM = $\sqrt{(15^2 + 5^2)} = \sqrt{250} = 15.8$ cm.

Step 2: Angle with base: $\tan(\theta) = 15 / 5 = 3 \Rightarrow \theta = 71.6°$.

Answer: VM = 15.8 cm, Angle = 71.6°

Q17 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 18 · Non-Right-Angled Trigonometry

(a) QR is opposite the included 52° angle. Use the cosine rule:
$QR^2 = 18^2 + 24^2 - 2\times18\times24\cos 52°$.

QR = 19.185111… cm, so QR = 19.2 cm to three significant figures.

(b) Area = $\frac{1}{2}ab\sin C = \frac{1}{2}\times18\times24\times\sin 52° = 170.210322…$ cm².

Answer: QR = 19.2 cm; area = 170 cm² (3 s.f.)

Q18(a) clip

Practice worksheet

Q18(b) clip

Practice worksheet

Question 19 · Completing the Square

(a) Factor 2 from the x-terms: $2(x^2 - 6x) + 23$.

$x^2 - 6x = (x - 3)^2 - 9$, so $2[(x - 3)^2 - 9] + 23 = 2(x - 3)^2 + 5$.

(b) The square is zero at x = 3, giving y = 5. The minimum turning point is (3, 5).

Answer: (a) $2(x - 3)^2 + 5$; (b) (3, 5)

Q19 clip

Practice worksheet

Higher Paper 3H · Worked Solutions

GCSE Mathematics 1MA1 · November 2026 · Target 4/5 · 20 questions · 80 marks

Question 20 · Iterative Population Decay

From the start of 2018 to the start of 2020 there are two annual transitions.

$P_{2020} = k^2 P_{2018}$, so $4050 = 5000k^2$.

$k^2 = 4050/5000 = 0.81$. The population multiplier is positive, so $k = \sqrt{0.81} = 0.9$.

Check: $5000 \times 0.9 = 4500$ after one year, then $4500 \times 0.9 = 4050$ after two.

Answer: k = 0.9

Q20 clip

Practice worksheet