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

4MA1 Nov 2026 Paper 2 Best Guess Paper
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 2H. The paper should be excellent at helping students revise for exams. This paper is specifically targeted at high-attaining students aiming for a Grade 9, so it is intentionally more rigorous and challenging than a standard 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

4MA1 Nov 2026 Paper 2 (Higher) - Step-by-Step Worked Solutions

Question 1: Statistics

- **Step 1:** The list has 8 numbers. The median is halfway between the 4th and 5th values (10 and q).

$$\frac{10+q}{2}=11$$

$$10+q=22 \Longrightarrow q=12$$

- **Step 2:** The mode is 19. For 19 to appear the most, both r values must be 19.

$$r=19$$

- **Step 3:** The range is 16. The range is the largest value minus the smallest value.

$$19-p=16 \Longrightarrow p=3$$

- **Final Answer:** $p=3, q=12, r=19$

Question 2: Compound Measures

- **Step 1:** Convert kilometres to metres.

$$90 \text{ km} = 90 \times 1000 = 90{,}000 \text{ metres}$$

- **Step 2:** Convert hours to seconds.

$$1 \text{ hour} = 60 \times 60 = 3600 \text{ seconds}$$

- **Step 3:** Divide distance by time to find m/s.

$$\frac{90{,}000}{3600}=\frac{900}{36}=25$$

- **Final Answer:** 25 m/s

Question 3: Algebra

- **(a)** Apply the power of 5 to both the coefficient and the index.

$$2^5=32$$

$$(p^3)^5=p^{3\times5}=p^{15}$$

Answer: $32p^{15}$

- **(b)** Expand both brackets carefully, watching the negative sign on the second bracket.

$$2p(4p-3)=8p^2-6p$$

$$-p(p-4)=-p^2+4p$$

Collect like terms: $(8p^2-p^2)+(-6p+4p)=7p^2-2p$

Answer: $7p^2-2p$

- **(c)** Clear the fraction by multiplying both sides by 4.

$$3x-2=4(5-x)$$

$$3x-2=20-4x$$

Add $4x$ to both sides: $7x-2=20$

Add 2 to both sides: $7x=22$

Answer: $x=\frac{22}{7}$

Question 4: Rectangle Area

- **Step 1:** Opposite sides of a rectangle are equal in length.

$$5x-1=3x+5$$

- **Step 2:** Solve for x.

$$2x=6 \Longrightarrow x=3$$

- **Step 3:** Substitute $x=3$ back into either expression to find the height.

$$5(3)-1=15-1=14 \text{ cm}$$

- **Step 4:** Calculate the area.

$$\text{Area} = \text{base} \times \text{height} = 24 \times 14 = 336$$

- **Final Answer:** 336 cm^2

Question 5: Ratio and Fractions

- **Step 1:** Find the total number of ratio parts.

$$7 + 3 + 2 = 12 \text{ parts}$$

- **Step 2:** Find the value of one part.

$$720 \div 12 = 60 \text{ bulbs per part}$$

- **Step 3:** Calculate the total number of each bulb type.

Tulips: $7 \times 60 = 420$
Crocus: $3 \times 60 = 180$
Daffodils: $2 \times 60 = 120$

- **Step 4:** Calculate the number of yellow flowers for each type.

Yellow Tulips: 40% of $420 = 0.4 \times 420 = 168$
Yellow Crocus: $\frac{2}{3} \times 180 = 120$
Yellow Daffodils: $\frac{3}{4} \times 120 = 90$

- **Step 5:** Sum the yellow flowers.

$$168 + 120 + 90 = 378$$

- **Final Answer:** 378

Question 6: Percentage Decrease

- **Step 1:** Calculate the absolute decrease.

$$600 - 432 = 168$$

- **Step 2:** Divide the decrease by the original amount (October) and multiply by 100.

$$\frac{168}{600} \times 100 = 0.28 \times 100 = 28$$

- **Final Answer:** 28%

Question 7: Transformations

- **(a)** A 90° anticlockwise rotation about $(0,0)$ maps (x, y) to $(-y, x)$.

Point $(3,1) \rightarrow (-1,3)$
Point $(5,1) \rightarrow (-1,5)$
Point $(3,2) \rightarrow (-2,3)$
Plot Triangle C at these new coordinates.

- **(b)** A scale factor of -2 means the image is twice as large and projected in the opposite direction through the centre of enlargement $(3,0)$.

Vector from $(3,0)$ to $(3,1)$ is $\begin{pmatrix}0\\1\end{pmatrix}$. Multiply by $-2 \rightarrow \begin{pmatrix}0\\-2\end{pmatrix}$. New point: $(3,-2)$.
Vector from $(3,0)$ to $(5,1)$ is $\begin{pmatrix}2\\1\end{pmatrix}$. Multiply by $-2 \rightarrow \begin{pmatrix}-4\\-2\end{pmatrix}$. New point: $(-1,-2)$.
Vector from $(3,0)$ to $(3,2)$ is $\begin{pmatrix}0\\2\end{pmatrix}$. Multiply by $-2 \rightarrow \begin{pmatrix}0\\-4\end{pmatrix}$. New point: $(3,-4)$.
Plot Triangle B at these new coordinates.

Question 8: Inequalities

- **(a)** Create a quick table of values for $y = -2x + 4$.

If $x = -2$, $y = -2(-2) + 4 = 8$
If $x = 0$, $y = 4$
If $x = 3$, $y = -2(3) + 4 = -2$
Plot points $(-2,8), (0,4), (3,-2)$ *and draw a solid straight line.*

- **(b)** Draw the boundary lines $x = 0$ (the y-axis) and $y = -1$ (a horizontal line at -1). Shade the triangular region bounded to the right of the y-axis, above $y = -1$, and below the diagonal line $y = -2x + 4$.

Question 9: Cumulative Frequency

- **(a)** Add the frequencies successively:

$$8$$
$$8 + 15 = 23$$

$$23 + 37 = 60$$
$$60 + 10 = 70$$
$$70 + 7 = 77$$
$$77 + 3 = 80$$

- **(b)** Plot the cumulative frequencies against the **upper bounds** of each class interval: $(200,8), (300,23), (400,60), (500,70), (600,77), (700,80)$. Connect with a smooth curve.
- **(c)** Median is at $\frac{80}{2} = 40$ on the y-axis. Read across to the curve and down to the x-axis. $\approx £345$.
- **(d)** Upper Quartile is at 60 ($x \approx 400$). Lower Quartile is at 20 ($x \approx 280$).

IQR $= 400 - 280 = £120$.

- **(e)** Find $£430$ on the x-axis, read up to the curve and across to the y-axis (≈ 63).

Workers earning *more* than $£430 = 80 - 63 = 17$.

Question 10: 11-Sided Polygon

- **Step 1:** Find a single interior angle of the regular 11-sided polygon.

$$\text{Sum of angles} = (11 - 2) \times 180° = 9 \times 180° = 1620°$$
$$\text{One interior angle} = \frac{1620}{11} = 147.2727\ldots°$$

- **Step 2:** Analyze the quadrilateral $BCDE$. Because the polygon is regular, $BCDE$ is an isosceles trapezium. The total sum of its internal angles is $360°$.

Angle C and Angle D are full interior angles ($\frac{1620°}{11}$).

- **Step 3:** Find the internal angles CBE and DEB of the trapezium.

$$360° - 2\left(\frac{1620}{11}\right) = 360° - \frac{3240}{11} = \frac{720°}{11}$$

Because the trapezium is isosceles, $\angle DEB = \frac{1}{2} \times \frac{720}{11} = \frac{360°}{11}$.

- **Step 4:** Calculate angle BEF. This is the full interior angle DEF minus the trapezium angle DEB.

$$\angle BEF = \frac{1620}{11} - \frac{360}{11} = \frac{1260}{11} = 114.5454\ldots°$$

- **Final Answer:** $114.5°$

Question 11: Probability Tree

- **(a)** First branches: 0.35 (rains) and 0.65 (does not rain).

Top secondary branches: 0.8 (cancelled) and 0.2 (not cancelled).
Bottom secondary branches: 0.1 (cancelled) and 0.9 (not cancelled).

- **(b)** Multiply along the branches for both "cancelled" scenarios, then add them.

$$P(\text{Rains and Cancelled}) = 0.35 \times 0.8 = 0.28$$
$$P(\text{No Rain and Cancelled}) = 0.65 \times 0.1 = 0.065$$
$$P(\text{Total Cancelled}) = 0.28 + 0.065 = 0.345$$

- **Final Answer:** 0.345

Question 12: Bearings

- **Step 1:** Draw the scenario. Establish the interior angle at B. The North lines are parallel, so the co-interior angle to $045°$ is $180° - 45° = 135°$.
- **Step 2:** The angles around B sum to $360°$. The bearing to C is $135°$.

Interior $\angle ABC = 360° - 135°$ (bearing) $- 135°$ (co-interior) $= 90°$.

- **Step 3:** Use SOHCAHTOA on the right-angled triangle ABC to find $\angle BAC$.

Opposite $= 20$ km, Adjacent $= 15$ km.

$$\tan(A) = \frac{20}{15} \Longrightarrow A = \tan^{-1}\left(\frac{4}{3}\right) = 53.13°$$

- **Step 4:** Calculate the final bearing by adding this interior angle to the original bearing.

$$\text{Bearing} = 045° + 53.13° = 098.13°$$

- **Final Answer:** 098.1°

Question 13: Cubic Graphs

- **(a)** Substitute $x = -2, x = 0$, and $x = 2$ into $y = x^3 - 3x + 1$.

$$x = -2 \Longrightarrow y = (-2)^3 - 3(-2) + 1 = -8 + 6 + 1 = -1$$
$$x = 0 \Longrightarrow y = (0)^3 - 3(0) + 1 = 1$$
$$x = 2 \Longrightarrow y = (2)^3 - 3(2) + 1 = 8 - 6 + 1 = 3$$

- **(b)** Plot the coordinates and connect them with a smooth, continuous curve.
- **(c)** Rearrange $x^3 - 3x - 1 = 0$ to match the original graph's equation.

Add 2 to both sides: $x^3 - 3x + 1 = 2$.
Draw the horizontal line $y = 2$ on the grid. Find the x-coordinates where this line intersects your curve.

- **Final Answer:** $x \approx -1.5, x \approx -0.4, x \approx 1.9$

Question 14: Indices

- **Step 1:** Express all bases as powers of 2.

$$16 = 2^4, \quad 8 = 2^3, \quad 32 = 2^5$$

- **Step 2:** Substitute these into the equation.

$$(2^4)^x \times 2^3 = (2^5)^{x-1}$$
$$2^{4x} \times 2^3 = 2^{5x-5}$$

- **Step 3:** Use index laws to combine the terms.

$$2^{4x+3} = 2^{5x-5}$$

- **Step 4:** Equate the indices and solve.

$$4x + 3 = 5x - 5$$
$$x = 8$$

- **Final Answer:** $x = 8$

Question 15: Tangent to a Curve

- **Step 1:** Differentiate the equation to find the gradient function $\frac{dy}{dx}$.

$$\frac{dy}{dx} = 3x^2 - 4x - 4$$

- **Step 2:** Substitute $x = 3$ to find the specific gradient (m) of the tangent.

$$m = 3(3^2) - 4(3) - 4 = 27 - 12 - 4 = 11$$

- **Step 3:** Find the y-coordinate of the curve at $x = 3$.

$y = 3^3 - 2(3^2) - 4(3) + 7 = 27 - 18 - 12 + 7 = 4$. Coordinate is $(3,4)$.

- **Step 4:** Substitute m, x, and y into $y = mx + c$ (or $y - y_1 = m(x - x_1)$).

$$4 = 11(3) + c$$
$$4 = 33 + c \Longrightarrow c = -29$$

- **Final Answer:** $y = 11x - 29$

Question 16: Fractional and Negative Indices

- **Step 1:** Apply the negative sign by flipping the fraction.

$$\left(\frac{27y^6}{64x^9}\right)^{\frac{2}{3}}$$

- **Step 2:** Apply the denominator of the index (3) by cube-rooting every term.

$$\sqrt[3]{27} = 3, \quad \sqrt[3]{y^6} = y^2$$
$$\sqrt[3]{64} = 4, \quad \sqrt[3]{x^9} = x^3$$

Result: $\left(\frac{3y^2}{4x^3}\right)^2$

- **Step 3:** Apply the numerator of the index (2) by squaring every term.

$$\frac{3^2(y^2)^2}{4^2(x^3)^2} = \frac{9y^4}{16x^6}$$

- **Final Answer:** $\frac{9y^4}{16x^6}$

Question 17: Algebraic Proof

- **Step 1:** Define two consecutive odd integers algebraically.

Let them be $(2n-1)$ and $(2n+1)$.

- **Step 2:** Set up the sum of their squares.

$$(2n-1)^2 + (2n+1)^2$$

- **Step 3:** Expand both brackets.

$$(4n^2 - 4n + 1) + (4n^2 + 4n + 1)$$

- **Step 4:** Collect like terms. The $-4n$ and $+4n$ cancel out.

$$8n^2 + 2$$

- **Step 5:** Factorize to prove it is a multiple of 8, plus 2.

$$8(n^2) + 2$$

Since n^2 is an integer, $8(n^2)$ is a multiple of 8. Therefore, the result is always 2 more than a multiple of 8.

Question 18: Intersecting Chords/Secants

- **Step 1:** Apply the intersecting secants theorem: $PB \times PA = PD \times PC$.

$$5 \times (5 + x) = x \times (x + 7)$$

- **Step 2:** Expand and form a quadratic equation equal to 0.

$$25 + 5x = x^2 + 7x$$
$$x^2 + 2x - 25 = 0$$

- **Step 3:** Use the quadratic formula to solve for x.

$$x = \frac{-2 \pm \sqrt{2^2 - 4(1)(-25)}}{2(1)}$$
$$x = \frac{-2 \pm \sqrt{104}}{2} = -1 \pm \sqrt{26}$$

- **Step 4:** Discard the negative root (length must be positive) and calculate.

$$x = \sqrt{26} - 1 = 4.0990\ldots$$

- **Final Answer:** 4.10 cm

Question 19: Histograms

- **Step 1:** Find the frequency for each block (Frequency = Frequency Density × Class Width).

0 to 10: $1 \times 10 = 10$
10 to 30: $2 \times 20 = 40$
30 to 45: $5 \times 15 = 75$
45 to 60: $4 \times 15 = 60$
Total frequency = $10 + 40 + 75 + 60 = 185$

- **Step 2:** Find the frequency specifically between 25 and 50.

From 25 to 30 (part of 2nd bar): width $5 \times$ FD $2 = 10$
From 30 to 45 (all of 3rd bar): 75
From 45 to 50 (part of 4th bar): width $5 \times$ FD $4 = 20$
Target frequency = $10 + 75 + 20 = 105$

- **Step 3:** Form the probability fraction.

$$P = \frac{105}{185}$$

- **Final Answer:** $\frac{21}{37}$

Question 20: Similar Solids

- **Step 1:** Find the Area Scale Factor (ASF).

$$\text{ASF} = \frac{80\pi}{45\pi} = \frac{16}{9}$$

- **Step 2:** Square root the ASF to find the Linear Scale Factor (LSF).

$$\text{LSF} = \sqrt{\frac{16}{9}} = \frac{4}{3}$$

- **Step 3:** Cube the LSF to find the Volume Scale Factor (VSF).

$$\text{VSF} = \left(\frac{4}{3}\right)^3 = \frac{64}{27}$$

- **Step 4:** Multiply the volume of Solid A by the VSF.

$$\text{Volume B} = 810 \times \frac{64}{27} = 1920$$

- **Final Answer:** 1920 cm^3

Question 21: Completing the Square

- **(a)** Factorise the coefficient of x^2 out of the first two terms.

$$2(x^2 - 6x) + 23$$

Complete the square inside the bracket: half of -6 is -3.

$$2[(x-3)^2 - 9] + 23$$

Expand the outer bracket and simplify.

$$2(x-3)^2 - 18 + 23 = 2(x-3)^2 + 5$$

Answer: $2(x-3)^2 + 5$

- **(b)** The turning point is found by taking the negated value inside the bracket, and the constant outside the bracket.

Answer: $(3,5)$

Question 22: Circle Tangents

- **Step 1:** Find the gradient of the radius from the origin $(0,0)$ to point $A(4,-7)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-7-0}{4-0} = -\frac{7}{4}$$

- **Step 2:** Find the perpendicular gradient for the tangent (negative reciprocal).

$$\text{Perpendicular } m = \frac{4}{7}$$

- **Step 3:** Substitute the gradient and point $A(4,-7)$ into $y - y_1 = m(x - x_1)$.

$$y - (-7) = \frac{4}{7}(x-4)$$

$$y + 7 = \frac{4}{7}(x-4)$$

- **Step 4:** Rearrange into the format $ax + by + c = 0$.

Multiply by 7: $7y + 49 = 4(x-4)$

$$7y + 49 = 4x - 16$$

$$4x - 7y - 65 = 0$$

- **Final Answer:** $4x - 7y - 65 = 0$

Question 23: Kinematics

- **Step 1:** Differentiate displacement (s) to find velocity (v).

$$v = \frac{ds}{dt} = 3t^2 - 24t + 45$$

- **Step 2:** The particle changes direction when $v = 0$. Solve for t.

$$3t^2 - 24t + 45 = 0$$

Divide by 3: $t^2 - 8t + 15 = 0$

$$(t-3)(t-5) = 0 \Rightarrow t = 3, t = 5$$

- **Step 3:** Calculate the displacement (s) at $t = 0, t = 3, t = 5$, and the final time $t = 7$.

At $t = 0$: $s = 0$

At $t = 3$: $s = 3^3 - 12(3^2) + 45(3) = 27 - 108 + 135 = 54$ m

At $t = 5$: $s = 5^3 - 12(5^2) + 45(5) = 125 - 300 + 225 = 50$ m

At $t = 7$: $s = 7^3 - 12(7^2) + 45(7) = 343 - 588 + 315 = 70$ m

- **Step 4:** Find the absolute distance travelled between each turning point.

0 to 3 seconds: moves from 0 to 54 (distance = 54 m)

3 to 5 seconds: moves from 54 back to 50 (distance = 4 m)

5 to 7 seconds: moves from 50 to 70 (distance = 20 m)

- **Step 5:** Sum the distances.

$$\text{Total distance} = 54 + 4 + 20 = 78$$

- **Final Answer:** 78 m