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4MA1 Nov 2026 Paper 2 Best Guess Paper

Worked Solutions

————————————- Disclaimer ————————————-

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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

Question 1: Inequalities

- **(a)** Treat the inequality like an equation to isolate x. $3x - 5 > 10$ Add 5 to both sides: $3x > 15$. Divide by 3: $x > 5$.
- **(b)** On the number line, draw an open circle above the number 5 to show the inequality is strictly "greater than" (not equal to). Draw an arrow extending from the circle to the right.

Question 2: Scale Models

- **Step 1:** Convert the real length of the plane from metres to centimetres. $78 \text{ m} \times 100 = 7800$ cm.
- **Step 2:** Apply the 1: 200 scale by dividing the real length by 200. $7800 \div 200 = 39$
- **Final Answer:** 39 cm.

Question 3: Statistical Measures

- **Step 1:** The median is the middle value. In an ordered list of 8 numbers, the median falls halfway between the 4th and 5th values (10 and q). $\frac{10+q}{2} = 11 \Longrightarrow 10 + q = 22 \Longrightarrow q = 12$.
- **Step 2:** The mode is the most frequent number. Since 19 is the mode and r appears twice, r must be 19.
- **Step 3:** The range is the largest value minus the smallest value ($r - p$). $19 - p = 16 \Longrightarrow p = 3$.
- **Final Answer:** $p = 3, q = 12, r = 19$.

Question 4: Algebra

- **(a)** Apply the power of 5 to both the coefficient and the index. $2^5 = 32$ and $(p^3)^5 = p^{15}$. **Answer:** $32p^{15}$.
- **(b)** Expand both brackets. $2p(4p - 3) = 8p^2 - 6p$. $-p(p - 4) = -p^2 + 4p$. Collect terms: $(8p^2 - p^2) + (-6p + 4p) = 7p^2 - 2p$.
- **(c)** Rearrange $t = 4c + d$ to make c the subject. Subtract d from both sides: $4c = t - d$. Divide by 4: $c = \frac{t-d}{4}$.

Question 5: Rectangle Area

- **Step 1:** Opposite sides of a rectangle are equal, so equate the two height expressions. $5x - 1 = 3x + 5$.
- **Step 2:** Solve for x. $2x = 6 \Longrightarrow x = 3$.
- **Step 3:** Substitute $x = 3$ into an expression to find the height. $5(3) - 1 = 14$ cm.
- **Step 4:** Calculate the area using the width of 24 cm. $14 \times 24 = 336$
- **Final Answer:** 336 cm^2.

Question 6: Ratios and Fractions

- **Step 1:** Add the ratio parts to find the total shares. $7 + 3 + 2 = 12$ parts.
- **Step 2:** Find the value of one part by dividing the total 720 bulbs. $720 \div 12 = 60$.
- **Step 3:** Find the total number of each type of bulb. 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. Yellow Tulips: 40% of $420 = 168$. Yellow Crocus: $\frac{2}{3} \times 180 = 120$. Yellow Daffodils: $\frac{3}{4} \times 120 = 90$.
- **Step 5:** Add the yellow bulbs together. $168 + 120 + 90 = 378$.

Question 7: Percentage Decrease

- **Step 1:** Calculate the difference in sales. $600 - 432 = 168$ pairs.

- **Step 2:** Divide the decrease by the original October amount and multiply by 100. $\frac{168}{600} \times 100 = 28$
- **Final Answer:** 28%.

Question 8: Transformations

- **(a)** A $90°$ anticlockwise rotation about $(0,0)$ swaps the coordinates and negates the new x-value: $(x, y) \to (-y, x)$. $(3,1) \to (-1,3)$ $(5,1) \to (-1,5)$ $(3,2) \to (-2,3)$ Plot Triangle C at these new vertices.
- **(b)** For an enlargement of scale factor 3 from centre $(5,1)$, find the vector from the centre to each point and multiply it by 3. Vertex $(5,1)$ is the centre, so it remains at $(5,1)$. Vertex $(3,1)$ is 2 left of centre. 2 left $\times\, 3 = 6$ left. New point: $(-1,1)$. Vertex $(3,2)$ is 2 left, 1 up. $\times\, 3 = 6$ left, 3 up. New point: $(-1,4)$. Plot Triangle B at $(-1,1)$, $(5,1)$, and $(-1,4)$.

Question 9: Sets and Venn Diagrams

- **(a)(i)** Set Q includes all numbers inside the Q circle. **Answer:** $11,13,14,15,16$.
- **(a)(ii)** $P \cup R$ means the union of P and R (all numbers in P, in R, or in both). **Answer:** $10,11,12,13,14,15,16,17,19$.
- **(b)** $P \cap R = \emptyset$ means the intersection of P and R is an empty set. **Answer:** Yes. The statement is correct because the circles for set P and set R do not overlap, meaning they share no numbers.
- **(c)** Q' refers to all numbers *outside* of set Q. There are 10 numbers total in the universal set. There are 5 numbers outside Q $(10,12,17,19,18)$. **Answer:** $\frac{5}{10}$ or $\frac{1}{2}$.

Question 10: Reverse Percentages

- **Step 1:** A 20% reduction means the sale price represents 80% of the normal price. $0.8x = £344$.
- **Step 2:** Divide by 0.8 to find 100%. $344 \div 0.8 = 430$
- **Final Answer:** $£430$.

Question 11: Pythagoras and Trigonometry

- **Step 1:** Find the shared horizontal side using Pythagoras' theorem on the top triangle. base$^2 = 15^2 - 9^2 = 225 - 81 = 144$. Shared side $= \sqrt{144} = 12$ cm.
- **Step 2:** Use SOHCAHTOA on the bottom right-angled triangle. The $40°$ angle is opposite the shared side (12 cm) and x is the hypotenuse. $\sin(40°) = \frac{12}{x}$.
- **Step 3:** Rearrange and solve. $x = \frac{12}{\sin(40°)} = 18.668\ldots$
- **Final Answer:** 18.7 cm.

Question 12: Graphs and Inequalities

- **(a)** Create coordinates for $y = -2x + 4$ by substituting x-values. If $x = 2, y = 0$. If $x = 3, y = -2$. Draw a solid line through these points.
- **(b)** Draw the vertical line $x = 0$ (the y-axis) and the horizontal line $y = -1$. Shade the region that is to the right of the y-axis, above $y = -1$, and below the slanted line drawn in part (a).

Question 13: Indices

- **(a)** Any non-zero number to the power of 0 is 1. $k = 0$.
- **(b)** Express 27 as a base of 3 (3^3). $\frac{3^3}{3^8} = 3^{3-8} = 3^{-5}$. Therefore, $m = -5$.
- **(c)** Multiply powers inside and outside brackets. $(7^{-4})^3 = 7^{-12}$. Add indices when multiplying the same base: $7^{-12} \times 7^5 = 7^{-12+5} = 7^{-7}$. $p = -7$.

Question 14: Polygon Geometry

- **Step 1:** Calculate one interior angle of the regular 11-sided polygon. $\frac{(11-2)\times 180}{11} = 147.2727\ldots^\circ$.
- **Step 2:** Isolate the isosceles trapezium $BCDE$. Its internal angles sum to $360°$. Angles C and D are full interior angles ($147.27\ldots^\circ$).
- **Step 3:** Find angle DEB inside the trapezium. $360^\circ - 2(147.27\ldots^\circ) = 65.45\ldots^\circ$. $\angle DEB = 65.45\ldots \div 2 = 32.7272\ldots^\circ$.
- **Step 4:** Angle BEF is the remainder of the full interior angle at E. $147.27\ldots^\circ - 32.72\ldots^\circ = 114.5454\ldots^\circ$
- **Final Answer:** $114.5°$.

Question 15: Probability Trees

- **(a)** First branches: 0.35 (rains) and $1 - 0.35 = 0.65$ (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 two pathways that end in "cancelled" and sum them. $P(\text{Rains and Cancelled}) = 0.35 \times 0.8 = 0.28$. $P(\text{No Rain and Cancelled}) = 0.65 \times 0.1 = 0.065$. $0.28 + 0.065 = 0.345$
- **Final Answer:** 0.345.

Question 16: Compound Area

- **Step 1:** Calculate the area of the large outer semicircle ($r = 5$ m). Area $= \frac{1}{2}\pi(5^2) = 12.5\pi$.
- **Step 2:** Calculate the area of the small empty inner semicircle ($r = 3$ m). Area $= \frac{1}{2}\pi(3^2) = 4.5\pi$.
- **Step 3:** Subtract to find the patio area. $12.5\pi - 4.5\pi = 8\pi$ m^2.
- **Step 4:** Calculate the total cost at £24 per m^2. $8\pi \times 24 = 192\pi \approx £603.19$.
- **Final Answer:** Yes. The total cost is approximately £603, which is well below Jo's £1200 budget.

Question 17: Density

- **Step 1:** Calculate the volume of the sphere using $V = \frac{4}{3}\pi r^3$. $V = \frac{4}{3} \times \pi \times 2.4^3 = 57.9058\ldots$ cm^3.
- **Step 2:** Apply the density formula (Density = Mass ÷ Volume). Density $= \frac{385}{57.9058\ldots} = 6.648..$
- **Final Answer:** 6.65 g/cm^3.

Question 18: Quadratic Formula

- **Step 1:** Identify $a = 5$, $b = -6$, $c = -3$ from $5x^2 - 6x - 3 = 0$.
- **Step 2:** Substitute into $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. $x = \frac{6 \pm \sqrt{(-6)^2 - 4(5)(-3)}}{10}$.
- **Step 3:** Simplify the discriminant. $x = \frac{6 \pm \sqrt{36+60}}{10} = \frac{6 \pm \sqrt{96}}{10}$.
- **Step 4:** Evaluate both roots to 3 significant figures. $x = 1.579..$ and $x = -0.379..$
- **Final Answer:** 1.58 and -0.380.

Question 19: Interquartile Range

- **Step 1:** Locate the Lower Quartile (LQ) and Upper Quartile (UQ) in the ordered list of 11 items. LQ is the 3rd value: 8. UQ is the 9th value: 20.
- **Step 2:** Subtract the LQ from the UQ. $20 - 8 = 12$
- **Final Answer:** 12.

Question 20: Functions

- **(a)** Replace $f(x)$ with y and make x the subject. $y = \frac{3x-5}{2}$. $2y = 3x - 5 \Longrightarrow 3x = 2y + 5 \Longrightarrow x = \frac{2y+5}{3}$. **Answer:** $f^{-1}(x) = \frac{2x+5}{3}$.
- **(b)** Work from the inside out. Find $f(3)$ first. $f(3) = \frac{3(3)-5}{2} = \frac{4}{2} = 2$. Substitute this result into $g(x)$. $g(2) = 2(2^2) + 1 = 8 + 1 = 9$. **Answer:** 9.

Question 21: Cubic Graphs

- **(a)** Substitute the missing x-values into $y = x^3 - 3x + 1$. $x = -2 \Longrightarrow y = -8 - (-6) + 1 = -1$. $x = 0 \Longrightarrow y = 1$. $x = 2 \Longrightarrow y = 8 - 6 + 1 = 3$.
- **(b)** Plot the coordinates on the grid and join them with a smooth curve.
- **(c)** Rearrange $x^3 - 3x - 1 = 0$ by adding 2 to both sides. $x^3 - 3x + 1 = 2$. Draw the horizontal line $y = 2$ and find the x-coordinates of the intersections.
- **Final Answer:** $\approx -1.5, \approx -0.4, \approx 1.9$.

Question 22: Coordinate Geometry

- **Step 1:** Rearrange L_1 into $y = mx + c$ to find the gradient. $3y = 2x + 12 \Longrightarrow y = \frac{2}{3}x + 4$.
- **Step 2:** L_2 is parallel, so it shares the gradient $m = \frac{2}{3}$.
- **Step 3:** The coordinate $(0,5)$ provides the y-intercept directly ($c = 5$).
- **Final Answer:** $y = \frac{2}{3}x + 5$.

Question 23: Histograms

- **Step 1:** Calculate the frequency of each full bar (Freq = Freq Density × Class Width) to find the total. $(1 \times 10) + (2 \times 20) + (5 \times 15) + (4 \times 15) = 10 + 40 + 75 + 60 = 185$.
- **Step 2:** Calculate the frequency specifically between 25 and 50. 25 to 30: width $5 \times$ FD $2 = 10$. 30 to 45: full bar $= 75$. 45 to 50: width $5 \times$ FD $4 = 20$. Target total $= 10 + 75 + 20 = 105$.
- **Step 3:** Write as a probability fraction.
- **Final Answer:** $\frac{105}{185}$ or $\frac{21}{37}$.

Question 24: Similar Solids

- **Step 1:** Find the Area Scale Factor (ASF). ASF $= \frac{80\pi}{45\pi} = \frac{16}{9}$.
- **Step 2:** Square root to find the Linear Scale Factor (LSF). LSF $= \sqrt{\frac{16}{9}} = \frac{4}{3}$.
- **Step 3:** Cube to find the Volume Scale Factor (VSF). VSF $= \left(\frac{4}{3}\right)^3 = \frac{64}{27}$.
- **Step 4:** Apply the VSF to the volume of Solid A. $810 \times \frac{64}{27} = 1920$
- **Final Answer:** 1920 cm^3.

Question 25: Completing the Square

- **(a)** Factor out the 2 from the x terms. $2(x^2 - 6x) + 23$. Complete the square for $x^2 - 6x$. $2[(x-3)^2 - 9] + 23$. Expand the outer bracket. $2(x-3)^2 - 18 + 23 = 2(x-3)^2 + 5$. **Answer:** $2(x-3)^2 + 5$.
- **(b)** The turning point takes the inverted sign of the bracket constant and the exact outer constant. **Answer:** $(3,5)$