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| 4G2 | HUA YI SECONDARY SCHOOL Preliminary Examination 2024 MATHEMATICS Paper 1 | 4G2 |
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[Turn Over

| Qn | Suggested Solution | Mark Allocation |
|------------|-------------------------------------------------------------------------------|--------------------------|
| | | |
| 1 | 5(x+2) = 8 - x | |
| | 5x + 10 = 8 - x | M1 (expansion) |
| | 6x = -2 | |
| | $r = -\frac{1}{2}$ | AI (will not |
| | $x = -\frac{1}{3}$ | accept 5sj) |
| 2 | $0.6, 0.60, \frac{5}{2}, \frac{\pi}{2}$ | B1 |
| | 8, 5 | |
| 3 a | $0.000845 = 8.45 \times 10^{-4}$ | B1 |
| 3bi | $(2.5 \times 10^{m}) \times (4.9 \times 10^{n}) = 12.25 \times 10^{m+n}$ | |
| | $=1.225 \times 10 \times 10^{m+n}$ | |
| | $=1.225 \times 10^{m+n+1}$ | |
| | a = 1.225 | B1 |
| 3bii | b = m + n + 1 | B1 |
| 4 | 59×242 6×20 | M1 (any 2 |
| | $\sqrt{\frac{5.5 \times 24.2}{0.333}} \approx \sqrt{\frac{6 \times 20}{0.3}}$ | correct) |
| | $-\sqrt{400}$ | |
| | - 20 | |
| _ | - 20 | A1 |
| 5a | \sim / | |
| | | B1 (5 sides |
| | | drawn) |
| | | B1 (correct |
| | | interior angles) |
| | | |
| | | |
| | | |
| 5b | $=\frac{(5-2)\times180^{\circ}}{1-10^{\circ}}$ | N/1 |
| | Interior angle of pentagon 5 | MII |
| | $=108^{\circ}$ $=260^{\circ}$ 108° 108° | M1 (ecf)(if |
| | Interior angle of polygon $= 500 - 108 - 108$ | students measure the |
| | = 144 | int. angle of polygon, |
| | $=180^{\circ}-144^{\circ}$ | can awara them the mark) |
| | Exterior angle of polygon $= 36^{\circ}$ | M1 (or if they use |
| | 360° | int. angle formula) |
| | $n = \frac{36}{36}$ | A 1 |
| | =10 | A1 |

| 6a | 1 	 1 	 x+5 	 1 | M1 (same |
|------|------------------------------------------------------------------------------------|-------------------|
| | $\frac{1}{x-5} + \frac{1}{x^2-25} = \frac{1}{(x-5)(x+5)} + \frac{1}{(x-5)(x+5)}$ | denominator) |
| | x+6 | |
| | $=\frac{1}{(x-5)(x+5)}$ | A1 |
| 6h | 1 | |
| 0.0 | $a = \frac{1}{3}(h+k)b$ | |
| | 3a = (h+k)b | |
| | 3a | |
| | $\frac{dh}{b} = h + k$ | M1 |
| | , 3 <i>a</i> , | |
| | $h = \frac{1}{b} - k$ | A1 |
| 7a | 65+60+x > 80 Or $65+60+x > 240$ | B1 |
| | $\frac{3}{3} \ge 80$ Of $03 + 00 + x \ge 240$ | |
| | *Students don't have to simplify/solve. If they did and did it wrongly, | |
| | they will still be awarded full marks if they had formed the inequality | |
| | correctly. | |
| 7b | $65 + 60 + x \ge 240$ | |
| | $x \ge 115$ | BI (must have |
| | Mary is wrong because the maximum mark is 100. | oonclusion) |
| 8a-c | 0/ | conclusiony |
| | | B1 |
| | $(\delta a) \text{ Im for } \angle CAB$, $\lim \text{ for } BC \text{ (must)}$ | |
| | show arc) | |
| | (b) | |
| | | |
| | (80) & (8C) Correct construction | B2 |
| | with arcs shown | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | (c) | |
| 8d | 4.6cm (±0.1 <i>cm</i>) | B1 |
| 9a | 5 - (-2) | |
| | $\frac{1}{4 - (-3)} = 1$ | M1, A1 |
| 9b | y = mx + c | |
| | Substitute $x = 4$, $y = 5$, then $c = 1$. | M1 (ecf from (a)) |
| | Equation of $PQ: y = x + 1$ | A1 |
| 9c | R(0,y) | |
| | $\therefore R(0,1)$ | B1 (<i>ecf</i>) |
| | | |

| 9d | Since the line <i>l</i> is parallel to Pq Sub $r = 4$, $v = -5$ | Q, gradient of line | l = 1 | |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------|----------------|
| | Sub x = 4, y = -5, | | | |
| | y = mx + c $-5 - 4 + c$ | | | M1 |
| | -5 = 4 + c | | | |
| | Equation of line <i>l</i> : $v = x - 9$ | | | A1 |
| 10a | x = 2(x-3) = 5x = 8(x-3) | | | |
| | $\frac{1}{4} - \frac{1}{5} = \frac{1}{20} - \frac{1}{20} = \frac{1}{20} = \frac{1}{20} - \frac{1}{20} = $ | | | |
| | 5x - 8x + 24 | | | M1 (expansion) |
| | = | | | |
| | -3x+24 | | | |
| | - 20 | | | A1 |
| 10b | $\frac{10x^2y}{3} \cdot \frac{8x}{3} - \frac{10x^2y}{3} \times \frac{15}{3}$ | | | |
| | $\overline{3y}$ $\overline{15}$ $\overline{3y}$ $\overline{8x}$ | | | M1 |
| | 25x | | | A 1 |
| | - 4 | | | A1 |
| 11a | Since the no. of workers and the time taken for completing the | | | |
| | building are inversely proporti | onal, | dava | |
| | No. of days | 50 | 120 | |
| | $=\frac{120\times50}{20}$ | 1 | 6000 | D1 |
| | 20 | 20 | 300 | B1 |
| | = 500 days Or | 20 | | |
| 11b | No. of workers needed | | | |
| | $=\frac{120 \times 50}{120 \times 50}$ | workers | days | |
| | 100 | 50 | 120 | |
| | = 60 workers Or | 60 | 1 | M1 |
| | | 00 | 100 | |
| | Or use (a) to find the 60 worke | ers | | |
| | | | | A1 |
| | No. of more workers required | | | |
| | = 00 - 50 | | | |
| 12a | 10-3(20) = -50 | | | B1 |
| 12bi | 4n-5 | | B1 | |
| 12bii | 4n-5=121 | | | |
| | 4n = 126 | | | |
| | n = 31.5 | | | M1 |
| | n = 51.5 121 is not a term in this sequence because n is not an integer /whole | | | |
| | number/is a decimal. | | | A1 |
| | | | | |
| | | | | |

| 13 | 100% - \$8 | |
|-----|--------------------------------------------------------------|-------------------|
| | 300% - \$24 | M1 |
| | $92\% \times \$24 = 22.08$ | M1 |
| | $98\% \times \$22.08 = \21.6384 | . 1 |
| | = \$21.64 | Al |
| 14a | 2x - y = 18 | B1 |
| | x + 9 = 2y | B1 |
| 14b | x + 9 = 2y | |
| | x = 2y - 9 | |
| | | |
| | $\therefore 2(2y-9) - y = 18$ | M1 |
| | 4y - 18 - y = 18 | |
| | 3y = 36 | |
| | <i>y</i> = 12 | |
| | x = 2(12) - 9 | |
| | =15 | A1 |
| 15a | $\frac{17.5}{10} = 2.5$ | B1 |
| | 7 2.5 | |
| 15b | $a = 16 \div 2.5$ | |
| | = 6.4 | B1 |
| 16a | $x^2 - 6x - 20 = (x - 3)^2 - 9 - 20$ | M1 |
| | $=(x-3)^2-29$ | |
| | a = -3, b = -29 | A1 (<i>ecf</i>) |
| 16b | $(x-3)^2 - 29 = 0$ | M1 (ecf) |
| | $(x-3)^2 = 29$ | |
| | $x - 3 = \pm \sqrt{29}$ | |
| | x = 8.39 or $-2.39(2dp)$ | A1 |
| 17a | *For Qn 17, overall deduct one mark for wrong/missing reason | |
| | | |
| | <i>p</i> = 126 | |
| | Reason: corresponding angles | B1 |
| 17b | <i>q</i> = 38 | |
| | Reason: interior angles | B1 |
| 17c | r = 88 | D1 |
| | Reason: vertically opp. angles/ alternate angles | B1 |
| | | |
| | | |
| | | |

| 18a | $\sin x = 0.75$ | |
|-----|-----------------------------------------------------------------|-------|
| | x = 48.590 | |
| | Obtuse angle $x = 131.4^{\circ}(1dp)$ | B1 |
| 18b | $\tan 0.5 - \frac{8}{3}$ | M1 |
| | $\frac{1}{AC}$ | |
| | AC = 14.6439 | |
| | Area of $\triangle OAC = \frac{1}{2} \times 14.6439 \times 8$ | M1 |
| | $2 - 585756 \text{ am}^2$ | IVI I |
| | - 58.5750 cm | |
| | $\angle AOC = \pi - \frac{\pi}{2} - 0.5$ | M1 |
| | =1.07079 rad | |
| | $1 - 1 - 1 - 2^2 - 1 - 07070$ | M1 |
| | Area of sec for $AOB = \frac{-\times8^{\circ}\times1.07079}{2}$ | |
| | $=34.2652cm^2$ | |
| | Area of shaded region = $58.5756 - 34.2652$ | |
| | = 24.3104 | A1 |
| | $= 24.3 cm^2 (3sf)$ | |
| 19a | 7 | B1 |
| 19b | 4 | B1 |
| 19c | $\frac{a+2(3)+3(2)+4(4)+5(6)+6(6)}{-3.92}$ | |
| | a+3+2+4+6+6 = 5.72 | M1 |
| | $\frac{a+94}{21} = 3.92$ | |
| | a+21 a+94-3.92a+82.32 | |
| | a + 5 + -5.72a + 62.52 | |
| | a - 4 | A1 |
| 19d | 1.63 (3sf) | B1 |
| | | ~ 1 |