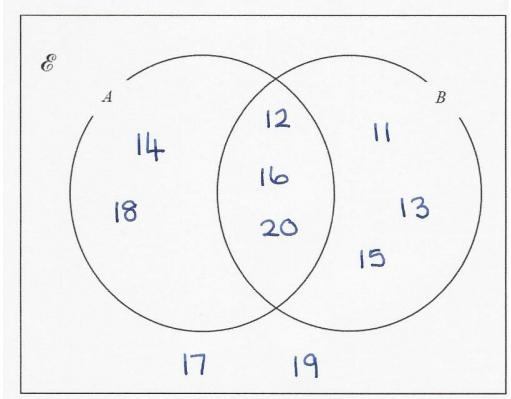
**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **1** | $6-12x$ or<br>$2-4x=\frac{5}{3}-\frac{8}{3}x$ | | 3 | M1 for expansion of bracket on the LHS or dividing the RHS by 3 with two terms |
| | $6-5=12x-8x$ or $1=4x$ or<br>$-12x+8x=5-6$ oe or $-4x=-1$ or<br>$\frac{8}{3}x-4x=\frac{5}{3}-2$ oe or $2-\frac{5}{3}=-\frac{8}{3}x+4x$ oe | | | M1 ft (dep on 4 terms) for terms in $x$ on one side of equation; number terms on the other |
| | *Working required* | $\frac{1}{4}$ | | A1 oe dep on M1 awarded |
| | | | | **Total 3 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **2** | |  | 3 | B3 Fully correct<br>(B2 for 2 or 3 'regions' correct,<br>B1 for one 'region' correct) |
| | | | | |
| | | | | **Total 3 marks** |

**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | | Answer | Mark | Notes |
|---|---|---|---|---|---|
| **3** | eg $5x + 4y = -2$<br>$+ 8x - 4y = 17.6$<br>$(13x = 15.6)$<br>eg<br>$[x = \frac{4.4 + y}{2}]$ oe<br>$5\left(\frac{4.4 + y}{2}\right) + 4y = -2$ oe | eg $10x + 8y = -4$<br>$- 10x - 5y = 22$<br>$(13y = -26)$<br>eg<br>$[y = 2x - 4.4]$ oe<br>$5x + 4(2x - 4.4) = -2$ oe | | 3 | M1 multiplication of one or both equation(s) with correct operation selected (allow one arithmetic error) (if + or – is not shown then assume it is the operation that at least 2 of the 3 terms have been calculated for)<br>**or**<br>correct rearrangement of one equation with substitution into second |
| | eg $5 \times$ "1.2" $+ 4y = -2$ **or**<br>$2 \times$ "1.2" $- y = 4.4$ | eg $5x + 2 \times$ "−2" $= 4.4$ **or**<br>$2x -$ "−2" $= 4.4$ | | | M1 (dep on previous M1 but not on a correct first value) correct method to find second unknown – this could be a correct substitution into one of the equations given or calculated or starting again with the same style of working as for the first method mark |
| | *Working required* | | $x = 1.2$<br>$y = -2$ | | A1 oe eg $x = \frac{6}{5}$<br>for both solutions dependent on first M1 |
| | | | | | **Total 3 marks** |

| Question | | Working | Answer | Mark | Notes |
|---|---|---|---|---|---|
| **4** | (a) | | $\frac{9}{10}$ | 1 | B1 oe |
| | (b) | | −6 | 1 | B1 |
| | | | | | **Total 2 marks** |

**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **5** (a) | | $\frac{2}{9}, \frac{7}{9}$ | 2 | B1 for correct probabilities for the first card<br>Allow equivalent probabilities e.g $0.\dot{2}$ |
| | | $\frac{1}{8}, \frac{7}{8}, \frac{2}{8}, \frac{6}{8}$ | | B1 for correct probabilities for the second card<br>Allow equivalent probabilities |
| (b) | "$\frac{2}{9}$"×"$\frac{1}{8}$" or<br>1 – "$\frac{2}{9}$"×"$\frac{7}{8}$" – "$\frac{7}{9}$"×"$\frac{2}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" | | 2 | M1ft<br>(All probabilities must be less than 1) |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $\frac{1}{36}$ | | A1ft oe probability must be less than 1<br>Allow equivalent decimal to at least 2 sf<br>(truncated or rounded) for $\frac{1}{36}$ (= 0.027(77..)) |
| (c) | "$\frac{2}{9}$"×"$\frac{7}{8}$" or "$\frac{7}{9}$"×"$\frac{2}{8}$"oe or<br>"$\frac{2}{9}$"×"$\frac{1}{8}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe or<br>"$\frac{1}{36}$"**and** "$\frac{7}{9}$"×"$\frac{6}{8}$"oe | | 3 | M1ft<br>(All probabilities must be less than 1) |
| | "$\frac{2}{9}$"×"$\frac{7}{8}$"+"$\frac{7}{9}$"×"$\frac{2}{8}$" or $2\times\frac{14}{72}$oe or<br>1 – "$\frac{2}{9}$"×"$\frac{1}{8}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe or<br>1 – "$\frac{1}{36}$"– "$\frac{7}{9}$"×"$\frac{6}{8}$" oe | | | M1ft |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $\frac{7}{18}$ | | A1ft oe probability must be less than 1<br>Allow equivalent decimal to at least 2 sf<br>(truncated or rounded) for $\frac{7}{18}$ (= 0.38(88..)) |
| | | | | **Total 7 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **6** | $\frac{26}{7}, \frac{13}{8}$ oe | | 3 | M1 both fractions expressed as improper fractions, no need for ÷ or × may be equivalent to those given eg $\frac{52}{14}, \frac{26}{16}$ etc. A student could invert $\frac{13}{8}$ and show multiplication - as shown in the 2nd M1, this mark is then implied. |
| | $\frac{26}{7} \times \frac{8}{13}$ oe or eg $\frac{208}{56} \div \frac{91}{56}$ | | | M1 **or** for both fractions expressed as equivalent fractions with denominators that are a common multiple of 7 and 8 eg $\frac{208}{56} \div \frac{91}{56}$ |
| | eg $\frac{26}{7} \times \frac{8}{13} = \frac{208}{91} = \frac{16}{7} = 2\frac{2}{7}$<br>**or** $\frac{26}{7} \times \frac{8}{13} = \frac{208}{91} = 2\frac{26}{91} = 2\frac{2}{7}$<br>**or** $\frac{\cancel{26}^{2}}{7} \times \frac{8}{\cancel{13}^{1}} = \frac{16}{7} = 2\frac{2}{7}$<br>**or** $\frac{208}{56} \div \frac{91}{56} = \frac{208}{91} = \frac{16}{7} = 2\frac{2}{7}$<br>**or** correct working to $\frac{16}{7}$ **and** writing $2\frac{2}{7} = \frac{16}{7}$ (usually on the first line of working)<br>*working required* | shown | | A1 dep on M2<br><br>**NB: use of decimals scores no marks (unless used as a check)** |
| | | | | **Total 3 marks** |

**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **7** (a) | | 1 | 1 | B1 |
| (b) | | $27a^6b^{12}$ | 2 | B2 (B1 for 2 of 3 parts in a product) |
| (c) | | $7x^2y^2(2y^2+3x)$ | 2 | B2 B1 for a correct factorisation with at least 2 factors outside (eg $7x$, $x^2$, $xy$, etc) eg $7x(2xy^4+3x^2y^2)$ eg $x^2y^2(14y^2+21x)$ or for the correct common factor with just one mistake inside the bracket eg $7x^2y^2(2y+3x)$ which is missing the squared on the $y$ term |
| (d) | $y = mx + 4$ where $m \neq 0$ oe (eg $y = 2x + 4$) **or** $y = -2x + c$ or $y + 2x = c$ oe **or** $-2x + 4$ or $f(x) = -2x + 4$ oe | | 2 | M1 |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $y = -2x + 4$ | | A1 oe eg $y + 2x = 4$ |
| | | | | **Total 7 marks** |

**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **8** | (54 – 24) ÷ 2 (=15) [may be marked on diagram] | | 5 | M1 |
| | $"15"^2-(24\div 2)^2(=81)$ | | | M1 ft their "15" (if > 12) |
| | [height =] $\sqrt{"15"^2-(24\div 2)^2}(=9)$ | | | M1 ft their "15" (if > 12) |
| | $(24\times "9")\div 2$ oe | | | M1 figures must be from correct working |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | 108 | | A1 allow 107.9 – 108.1 |
| | **ALTERNATIVES BELOW** | | | **Total 5 marks** |
| | (54 – 24) ÷ 2 (=15) [may be marked on diagram] | | 5 | M1 |
| | **or** $x=\cos^{-1}\left(\frac{"12"}{"15"}\right)(=36.86...)$<br>**or** $y=\sin^{-1}\left(\frac{24\div 2}{"15"}\right)(=53.13...)$<br>**or** $A=\cos^{-1}\left(\frac{15^2+15^2-24^2}{2\times 15\times 15}\right)(=106.2...)$<br>**or** $B=\cos^{-1}\left(\frac{15^2+24^2-15^2}{2\times 15\times 24}\right)(=36.8....)$ | | | M1 ft their "15" (if > 12)<br>[ using Hero's formula S = 0.5 × 54 (= 27) and ]<br>27 × (27 – 24) × (27 – "15") × (27 – "15") |
| | **or** "12"tan"36.86…" (= 9) (allow 8.9… for these)<br>"12" ÷ tan"53.13…" (= 9)<br>**or** "15" × sin "36.86…" (= 9)<br>**or** "15" × cos "53.13…" (= 9) | | | M1 ft their "15" (if > 12)<br>M2 for 0.5 × 24 × "15" × sin"36.86…" or 0.5 × "15" × "15" × sin(2 × "53.13…") or $0.5\times "15"\times "15"\times \sin("106.2...")$ **or** $\sqrt{"27"("27"-24)("27"-"15")("27"-"15")}$ |
| | $(24\times "9")\div 2$ oe | | | M1 |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | 108 | | A1 allow 107.9 – 108.1 |
| | | | | **Total 5 marks** |

<table>
<tr><th colspan="2">Question</th><th>Working</th><th>Answer</th><th>Mark</th><th colspan="2">Notes</th></tr>
<tr><td>9</td><td>(a)</td><td></td><td>43.5 - 44.5</td><td>1</td><td>B1</td><td>±0.5 small square</td></tr>
<tr><td></td><td>(b)</td><td>eg reading of 48 - 49</td><td></td><td>2</td><td>M1</td><td>For correct method to start the question eg a vertical line from 55 up to the line and a horizontal line from the correct point on the curve or a mark on the curve at the correct point and a mark on the vertical axis at the correct point<br>or a correct reading of 48 to 49</td></tr>
<tr><td></td><td></td><td>Correct answer scores full marks (unless from obvious incorrect working)</td><td>11 or 12</td><td></td><td>A1</td><td>Allow an answer of 11 or 12 (ie must be whole number)</td></tr>
<tr><td></td><td>(c)</td><td><table><tr><th>Time taken to shop in the market (m minutes)</th><th>Frequency</th></tr><tr><td>$0 < m \leq 10$</td><td>3</td></tr><tr><td>$10 < m \leq 20$</td><td>5</td></tr><tr><td>$20 < m \leq 30$</td><td>7</td></tr><tr><td>$30 < m \leq 40$</td><td>10</td></tr><tr><td>$40 < m \leq 50$</td><td>15</td></tr><tr><td>$50 < m \leq 60$</td><td>15</td></tr><tr><td>$60 < m \leq 70$</td><td>5</td></tr></table></td><td></td><td>2</td><td>B2</td><td>All values correctly filled in (NB: first 2 are already completed)<br>(B1 for 3 or 4 correct values from 7, 10, 15, 15, 5)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td colspan="2">Total 5 marks</td></tr>
</table>

**Practice Tests Set 23 – Paper 1H mark scheme**

| Qn | Working | Answer | | Notes |
|---|---|---|---|---|
| **10** | $3x(2x-5)=6x^2-15x$ **or** | | 3 | M1 for multiplying $3x$ by $(2x-5)$ with **both** terms correct or |
| | $(2x-5)^2=4x^2-10x-10x+25$**or** | | | for multiplying $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or |
| | $(2x-5)^2=4x^2-20x+25$ | | | for multiplying $(2x-5)$ by $(2x-5)$ and getting $4x^2-20x\ldots$ **or** $\ldots -20x+25$ (not for $4x^2+25$) |
| | $(6x^2-15x)(2x-5)=12x^3-30x^2-30x^2+75x$ oe **or** | | | M1ft (dep) for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ with 3 out of 4 terms correct or |
| | $(6x^2-15x)(2x-5)=12x^3-60x^2+75x$ oe **or** | | | for multiplying the product of $3x$ and $(2x-5)$ by $(2x-5)$ and getting $12x^3-60x^2\ldots$ **or** $\ldots -60x^2+75x$ |
| | $3x(4x^2-10x-10x+25)=12x^3-30x^2-30x^2+75x$ oe **or** | | | for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 3 out of 4 terms correct or |
| | $3x(4x^2-20x+25)=12x^3-60x^2+75x$ | | | for multiplying the product of $(2x-5)$ and $(2x-5)$ by $3x$ with 2 out of 3 terms correct or |
| | | | | Expansion in one stage will lead to $12x^3-30x^2-30x^2+75x$ without firstly expanding two factors – award M2 for 3 out of 4 terms correct M1 for 2 out of 4 terms correct |
| | *Working required* | $12x^3-60x^2+75x$ | | A1 dep on M1 |
| | | | | **Total 3 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **11** | **Two pairs** of intersecting arcs with equal radii centre *A* and *B* | | 2 | M1 for arcs that intersect within or on the guidelines **or** correct perpendicular bisector without arcs. |
| | *Working required* | Bisector with construction arcs | | A1 for a fully correct bisector with two intersecting arcs |
| | | | | **Total 2 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **12** | | **B** | 3 | B1 |
| | | **A** | | B1 |
| | | **F** | | B1 |
| | | | | **Total 3 marks** |

| | Working | | Answer | M | Notes |
|---|---|---|---|---|---|
| **13** | $x^2+(7-2x)^2=34$ | $\left(\frac{7-y}{2}\right)^2+y^2=34$ | | 5 | M1 substitution of linear equation into quadratic |
| | $5x^2-28x+15[=0]$ oe | $5y^2-14y-87[=0]$ oe | | | M1 dep on previous M1 for multiplying out and collecting terms, forming a three term quadratic in any form of $ax^2 + bx + c$ (= 0) **where at least 2 coefficients** ($a$ or $b$ or $c$) **are correct** and all are non-zero |
| | $(5x-3)(x-5)$ [= 0]<br>or<br>$\frac{-(-28)\pm\sqrt{(-28)^2-4\times5\times15}}{2\times5}$<br>or<br>$5[(x-\frac{28}{10})^2-\frac{784}{100}]+15=0$ oe<br>or<br>$x = 0.6$ **and** $x = 5$<br>(allow incorrect labels for $x$/$y$) | $(5y-29)(y+3)$ [= 0]<br>or<br>$\frac{-(-14)\pm\sqrt{(-14)^2-4\times5\times(-87)}}{2\times5}$<br>or<br>$5[(y-\frac{14}{10})^2-\frac{196}{100}]-87=0$ oe<br>or<br>$y = 5.8$ **and** $y = -3$<br>(allow incorrect labels for $x$/$y$) | | | M1ft dep on M1 for solving *their* 3 term quadratic equation using any correct method (if factorising, allow brackets which expanded give 2 out of 3 terms correct ) (if using formula allow one sign error and some simplification – allow as far as $\frac{28\pm\sqrt{784-300}}{10}$ or $\frac{14\pm\sqrt{196+1740}}{10}$) (if completing the square allow as far as shown) or **correct values for $x$** or **correct values for $y$ dep on correct quadratic** |
| | eg $y = 7 - 2 \times 5$ and $y = 7 - 2 \times 0.6$<br>(correct labels for $x$/$y$) | eg $5.8 = 7 - 2x$ and $-3 = 7 - 2x$<br>(correct labels for $x$/$y$) | | | M1ft dep on previous M1 for substituting **their** 2 found values of $x$ or $y$ in a suitable equation **or** correct values for the other variable |
| | *Working must be shown* | | $x = 0.6$, $y = 5.8$<br>$x = 5$, $y = -3$ | | A1 dep on M1 and **the correct quadratic** (allow coordinates) must be paired correctly |
| | | | | | **Total 5 marks** |
| | | | | | |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **14** | eg $1000x = 438.38\ldots$<br>$\underline{\quad 10x = \quad 4.38\ldots}$<br><br>**or** $100x = 43.838\ldots$<br>$\underline{\quad x = \quad 0.438\ldots}$<br><br>oe | | 2 | M1 For **selecting** 2 correct recurring decimals that when subtracted give a whole number or terminating decimal (43.4 or 434 etc)<br>eg $1000x = 438.38...$ and $10x = 4.38....$<br>**or** $100x = 43.838\ldots$ and $x = 0.438\ldots$<br>with intention to subtract.<br>(if recurring dots not shown then showing at least **one** of the numbers to at least 5sf)<br>**or**<br>$0.4 + 0.0\dot{3}\dot{8}$ **and** eg $1000x = 38.38...$<br>& $10x = 0.3838...,$ with intention to subtract. |
| | eg $1000x - 10x = 438.38\ldots - 4.38\ldots = 434$ **and** $\frac{434}{990} = \frac{217}{495}$<br>**or**<br>eg $100x - x = 43.838\ldots - 0.438\ldots = 43.4$ **and** $\frac{43.4}{99} = \frac{217}{495}$<br>**or**<br>eg $1000x - 10x = 38.38\ldots - 0.3838 = 38$ and<br>$0.4 + \frac{38}{990} = \frac{4\times99+38}{990} = \frac{434}{990} = \frac{217}{495}$ oe<br><br>*working required* | Clearly shown | | A1 For completion to $\frac{217}{495}$ dep on M1 and use of some algebra |
| | | | | **Total 2 marks** |

| Question | Working | Answer | Mark | Notes | |
|---|---|---|---|---|---|
| **15** | $y = \frac{k}{\sqrt{x}}$ or $ky = \frac{1}{\sqrt{x}}$ or $\sqrt{x} = \frac{k}{y}$ oe | | 3 | M1<br>(NB. Not for $y = \frac{1}{\sqrt{x}}$)<br>Constant of proportionality must be a symbol such as $k$<br>(Allow $c$ for $k$ for this mark only) | M2 for $c^4 = \frac{k}{\sqrt{c^2}}$ oe |
| | $c^4 = \frac{k}{\sqrt{c^2}}$ oe or $k = c^4 \times \sqrt{c^2}$ oe | | | M1 for substitution of $x$ and $y$ into a correct formula | |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $y = \frac{c^5}{\sqrt{x}}$ | | A1 oe e.g $y = c^5 \times \frac{1}{\sqrt{x}}$<br><br>Award 3 marks if answer is $y = \frac{k}{\sqrt{x}}$ on the answer line and $k = c^5$ clearly given in the body of working of the script | |
| | | | | | **Total 3 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **16** | $(6x - 5)(x + 7)(=0)$ **or**<br><br>$\frac{-37 \pm \sqrt{37^2 - 4 \times 6 \times -35}}{2 \times 6}$<br><br>$6\left[\left(x + \frac{37}{12}\right)^2 - \left(\frac{37}{12}\right)^2\right]$... oe | | 3 | M1 A correct method to solve the quadratic equation $6x^2 + 37x - 35(= 0)$ using any correct method (if factorising, allow brackets which expanded give 2 out of 3 terms correct ) (if using formula allow one sign error in substitution and some simplification – allow as far as $\frac{-37 \pm \sqrt{1369 + 840}}{12}$) or completing the square as far as shown on left |
| | $\frac{5}{6}$ oe **and** $-7$ | | | A1 dep on M1<br>correct critical values (allow 0.83…) |
| | *Working must be seen for both accuracy marks as asked for in question* | $-7 \le x \le \frac{5}{6}$ | | A1 dep on M1<br><br>oe eg $-7 \le x \le 0.83\ldots$ ,<br>$\left[-7, \frac{5}{6}\right]$ Accept $x \le \frac{5}{6}$, $x \ge -7$ |
| | | | | **Total 3 marks** |

**Practice Tests Set 23 – Paper 1H mark scheme**

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **17** (a) | | 12 | 1 | B1 |
| (b) | $\frac{5-\sqrt{18}}{1-\sqrt{2}}\times\frac{1+\sqrt{2}}{1+\sqrt{2}}$ **or** $\frac{5-\sqrt{18}}{1-\sqrt{2}}\times\frac{-1-\sqrt{2}}{-1-\sqrt{2}}$ oe | | 3 | M1 Multiplying numerator and denominator by $1+\sqrt{2}$ |
| | $\frac{5-\sqrt{36}+5\sqrt{2}-\sqrt{18}}{1+\sqrt{2}-\sqrt{2}-2}$ **or** $\frac{5-6-3\sqrt{2}+5\sqrt{2}}{-1}$ **or** $\frac{-5+6+3\sqrt{2}-5\sqrt{2}}{1}$ oe<br>NB:allow $\sqrt{18}$ or $3\sqrt{2}$ $\sqrt{36}$ or 6 or $\sqrt{6}\sqrt{6}$ | | | M1 Showing correct expansions (not necessarily as a fraction) |
| | *working required* | $1-2\sqrt{2}$ | | A1 dep on M2 (ie all stages of working must be shown convincingly)<br>or for stating $a = 1$ and $b = -2$ |
| | | | | **Total 4 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **18** (a) | | $\frac{k}{x}$ | 1 | B1 allow $kx^{-1}$ |
| (b)(i) | | −46 | 1 | B1 cao |
| (ii) | $\frac{3\left(2-3x^4\right)}{2-\left(2-3x^4\right)}$ or $\frac{6-9x^4}{2-2+3x^4}$ oe or $\frac{6-9x^4}{3x^4}$ oe | | 2 | M1 |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | $\frac{2-3x^4}{x^4}$ | | A1 allow $\frac{2}{x^4}-3$ oe |
| | | | | **Total 4 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **19** (a)(i) | | 140 | 1 | B1 |
| (a)(ii) | | opposite angles of a cyclic quadrilateral (add to 180º) oe | 1 | B1 dep on B1 in (a)(i) or seeing 180 – 40 with no contradiction<br>oe eg angle at centre is double (2 ×) angle at circumference oe **AND**<br>angles around a point (or point 360) |
| (b) | *ADB* = 66 or<br>*ABO* = 90 – 66 (=24) or<br>*BAO* = 90 – 66 (=24) or<br>*ODB* = $\frac{180-80}{2}(=50)$ or<br>*DOB* reflex = 280 | | 3 | M1 Clearly labelled in working or shown on diagram |
| | For 2 of:<br>*ADB* = 66 or<br>*ABO* = 90 – 66 (=24) or<br>*BAO* = 90 – 66 (=24) or<br>*ODB* = $\frac{180-80}{2}(=50)$<br>*DOB* reflex = 280 | | | M1 (award M2 for $360-(280+40+24)$ oe |
| | *Correct answer scores full marks (unless from obvious incorrect working)* | 16 | | A1 |
| | | | | **Total 5 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **20** | | $2x+y\le 6$<br>$2y\le 5x+1$<br>$3y+2x\ge 4$ | 3 | B3 oe for all three correct<br>(B2 oe for any two correct)<br>(B1 oe for any one correct)<br><br>$2x+y\le 6$ equivalent to $y\le -2x+6$oe<br>$2y\le 5x+1$ equivalent to $y\le 2.5x+0.5$oe<br>$3y+2x\ge 4$ equivalent to $y\ge -\frac{2}{3}x+\frac{4}{3}$oe<br><br>Allow the following inequalities<br>$2x+y<6$ oe<br>$2y<5x+1$ oe<br>$3y+2x>4$ oe |
| | | | | **Total 3 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **21** | e.g.<br>$\left(\overrightarrow{AB}=\right)2\mathbf{b}-2\mathbf{a}$ oe or<br>$\left(\overrightarrow{BA}=\right)2\mathbf{a}-2\mathbf{b}$ oe or<br>$\left(\overrightarrow{BD}=\right)2\left(2\mathbf{b}-2\mathbf{a}\right)\left(=4\mathbf{b}-4\mathbf{a}\right)$ oe or<br>$\left(\overrightarrow{AD}=\right)3\left(2\mathbf{b}-2\mathbf{a}\right)\left(=6\mathbf{b}-6\mathbf{a}\right)$ oe | | 5 | M1 |
| | e.g.<br>$\left(\overrightarrow{OE}=\right)2\mathbf{b}+2\left(2\mathbf{b}-2\mathbf{a}\right)+7\mathbf{a}+3\mathbf{b}\left(=3\mathbf{a}+9\mathbf{b}\right)$ oe or<br>$\left(\overrightarrow{OC}=\right)2\mathbf{a}+\lambda\left(2\mathbf{b}-2\mathbf{a}\right)=\left(2-2\lambda\right)\mathbf{a}+2\lambda\mathbf{b}$ oe **or** $2\mathbf{b}+\lambda\left(2\mathbf{a}-2\mathbf{b}\right)$ or<br>$\left(\overrightarrow{CE}=\right)\left(2\mathbf{b}-2\mathbf{a}\right)-\lambda\left(2\mathbf{b}-2\mathbf{a}\right)+2\left(2\mathbf{b}-2\mathbf{a}\right)+7\mathbf{a}+3\mathbf{b}=\left(1+2\lambda\right)\mathbf{a}+\left(9-2\lambda\right)\mathbf{b}$ | | | M2 for 2 correct paths seen<br>M1 for 1 correct path seen<br><br>Any correct path for *OC* passing through *A* or *B* involving a variable |
| | e.g.<br>$\frac{2-2\lambda}{2\lambda}=\frac{1+2\lambda}{9-2\lambda}$ oe or $\frac{2-2\lambda}{2\lambda}=\frac{3}{9}$ oe or $\frac{\left(1+2\lambda\right)}{\left(9-2\lambda\right)}=\frac{1}{3}$ oe or $\lambda=\frac{3}{4}$<br>or<br>$\left(2-2\lambda\right)\mathbf{a}+2\lambda\mathbf{b}=\mu\left(3\mathbf{a}+9\mathbf{b}\right)$ or $\lambda=\frac{3}{4}$ or $\mu=\frac{1}{6}$<br>or<br>$2\mathbf{b}+\lambda\left(2\mathbf{a}-2\mathbf{b}\right)=\mu\left(3\mathbf{a}+9\mathbf{b}\right)$ or $\lambda=\frac{1}{4}$ or $\mu=\frac{5}{6}$ | | | M1 for comparing coefficients of **a** and **b** for<br><br>(*OC* and *CE*) **or**<br>**(***OC* and *OE*) **or**<br>(*CE* and *OE*)<br><br>*OC* is a multiple of *OE*<br><br>Two different paths for *OC* |
| | | 1 : 5 | | A1 dep M2 oe e.g 2 : 10 |
| | *Working required* | | | **Total 5 marks** |

| Question | Working | Answer | Mark | Notes |
|---|---|---|---|---|
| **21**<br>**ALT** | e.g.<br>$\left(\overrightarrow{AB} =\right) 2\mathbf{b} - 2\mathbf{a}$ oe or<br>$\left(\overrightarrow{BA} =\right) 2\mathbf{a} - 2\mathbf{b}$ oe or<br>$\left(\overrightarrow{BD} =\right) 2\left(2\mathbf{b} - 2\mathbf{a}\right)\left(= 4\mathbf{b} - 4\mathbf{a}\right)$ oe or<br>$\left(\overrightarrow{AD} =\right) 3\left(2\mathbf{b} - 2\mathbf{a}\right)\left(= 6\mathbf{b} - 6\mathbf{a}\right)$ oe | | 5 | M1 |
| | e.g.<br>$\left(\overrightarrow{OE} =\right) 2\mathbf{b} + 2\left(2\mathbf{b} - 2\mathbf{a}\right) + 7\mathbf{a} + 3\mathbf{b}\ \left(= 3\mathbf{a} + 9\mathbf{b}\right)$ oe | | | M1 |
| | e.g.<br>$\left(\overrightarrow{AE} =\right) 2\mathbf{b} - 2\mathbf{a} + 2\left(2\mathbf{b} - 2\mathbf{a}\right) + 7\mathbf{a} + 3\mathbf{b}\left(= \mathbf{a} + 9\mathbf{b}\right)$ oe | | | M1 |
| | $\left[\overrightarrow{AE} = \lambda\overrightarrow{AD} + \mu\overrightarrow{OE}\right]$<br>$\mathbf{a} + 9\mathbf{b} = \lambda\left(6\mathbf{b} - 6\mathbf{a}\right) + \mu\left(3\mathbf{a} + 9\mathbf{b}\right)$ oe or<br>$1 = -6\lambda + 3\mu$ oe and $9 = 6\lambda + 9\mu$ oe or or $\lambda = \frac{1}{4}$ or $\mu = \frac{5}{6}$ | | | M1 |
| | | 1 : 5 | | A1 dep on M2 oe e.g 2 : 10 |
| | *Working required* | | | **Total 5 marks** |

| | | | | | Edexcel averages: scores of candidates who achieved grade: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qn** | **Skill tested** | **Mean score** | **Max score** | **Mean %** | **ALL** | **9** | **8** | **7** | **6** | **5** | **4** | **3** | **U** |
| **1** | Linear equations | 2.52 | 3 | 84 | 2.52 | 2.96 | 2.92 | 2.86 | 2.76 | 2.45 | 2.01 | 1.38 | 0.57 |
| **2** | Set language and notation | 2.44 | 3 | 81 | 2.44 | 2.94 | 2.83 | 2.68 | 2.56 | 2.36 | 1.90 | 1.46 | 0.79 |
| **3** | Simultaneous linear equations | 2.17 | 3 | 72 | 2.17 | 2.95 | 2.83 | 2.68 | 2.32 | 1.80 | 1.30 | 0.49 | 0.07 |
| **4** | Powers and roots | 1.50 | 2 | 75 | 1.50 | 1.88 | 1.79 | 1.72 | 1.59 | 1.40 | 1.15 | 0.73 | 0.25 |
| **5** | Probability | 4.49 | 7 | 64 | 4.49 | 6.80 | 6.43 | 5.91 | 4.67 | 3.03 | 1.39 | 0.46 | 0.12 |
| **6** | Fractions | 2.18 | 3 | 73 | 2.18 | 2.76 | 2.68 | 2.52 | 2.28 | 1.91 | 1.47 | 1.14 | 0.61 |
| **7** | Powers and roots | 4.57 | 7 | 65 | 4.57 | 6.74 | 6.17 | 5.46 | 4.42 | 3.31 | 2.30 | 1.36 | 0.55 |
| **8** | Mensuration of 2D shapes | 3.05 | 5 | 61 | 3.05 | 4.84 | 4.5 | 4.02 | 2.98 | 1.64 | 0.87 | 0.37 | 0.18 |
| **9** | Graphical representation of data | 3.2 | 5 | 64 | 3.2 | 4.58 | 4.14 | 3.59 | 3.14 | 2.68 | 1.83 | 0.98 | 0.55 |
| **10** | Algebraic manipulation | 1.74 | 3 | 58 | 1.74 | 2.76 | 2.55 | 2.12 | 1.66 | 1.13 | 0.59 | 0.27 | 0.05 |
| **11** | Construction | 1.08 | 2 | 54 | 1.08 | 1.72 | 1.51 | 1.27 | 0.94 | 0.72 | 0.50 | 0.19 | 0.08 |
| **12** | Calculus | 1.58 | 3 | 53 | 1.58 | 2.72 | 2.11 | 1.68 | 1.17 | 0.86 | 0.71 | 0.64 | 0.43 |
| **13** | Quadratic equations | 2.35 | 5 | 47 | 2.35 | 4.71 | 3.87 | 2.65 | 1.51 | 0.72 | 0.28 | 0.07 | 0.01 |
| **14** | Applying number | 0.92 | 2 | 46 | 0.92 | 1.82 | 1.45 | 1.02 | 0.66 | 0.32 | 0.13 | 0.03 | 0.00 |
| **15** | Proportion | 1.19 | 3 | 40 | 1.19 | 2.54 | 1.85 | 1.29 | 0.69 | 0.35 | 0.13 | 0.05 | 0.01 |
| **16** | Inequalities | 1.10 | 3 | 37 | 1.10 | 2.40 | 1.77 | 1.11 | 0.61 | 0.26 | 0.12 | 0.03 | 0.00 |
| **17** | Powers and roots | 1.54 | 4 | 39 | 1.54 | 3.43 | 2.31 | 1.42 | 0.89 | 0.48 | 0.18 | 0.06 | 0.05 |
| **18** | Function notation | 1.43 | 4 | 36 | 1.43 | 3.00 | 2.06 | 1.39 | 0.97 | 0.56 | 0.22 | 0.14 | 0.07 |
| **19** | Circle properties | 1.8 | 5 | 36 | 1.8 | 3.9 | 2.68 | 1.72 | 1.05 | 0.62 | 0.23 | 0.05 | 0.03 |
| **20** | Inequalities | 1.00 | 3 | 33 | 1.00 | 2.45 | 1.54 | 0.77 | 0.44 | 0.19 | 0.04 | 0.04 | 0.00 |
| **21** | Vectors | 0.94 | 5 | 19 | 0.94 | 2.71 | 1.23 | 0.54 | 0.18 | 0.09 | 0.01 | 0.00 | 0.00 |
| | | **42.79** | **80** | **53** | **42.79** | **70.61** | **59.22** | **48.42** | **37.49** | **26.88** | **17.36** | **9.94** | **4.42** |

**Suggested grade boundaries**

| **Grade** | **9** | **8** | **7** | **6** | **5** | **4** | **3** |
|---|---|---|---|---|---|---|---|
| Mark | 65 | 54 | 43 | 32 | 22 | 14 | 7 |