Year 11 Practice Paper 3H Calculator Mark Scheme

Question	Answer	Marks	Notes and guidance
1a	$10g + 1$	2	Award 1 mark for at least one bracket expanded correctly e.g. $3g + 15$ or $7g - 14$ seen
1b	$5x(y + 3)$	2	Award 1 mark for a correct partial factorisation e.g. $5(xy + 3x)$ or $x(5y + 15)$ OR $5x$ identified as the highest common factor and one term inside the bracket correct
2	£25.60	3	Award 1 mark for $96 \div 12$ $(= 8)$ Award 1 mark for "8" $\times$ 3.20
3a	15	2	Award 1 mark for $10 - (-5)$ seen or implied
3b	23.75	2	Award 1 mark for $25 - (1.25)$ seen or implied
4a	3 : 4	2	Award 1 mark for partial simplification of 18 : 24 e.g. 9 : 12 or 6 : 8
4b	1 : 0.75	1	

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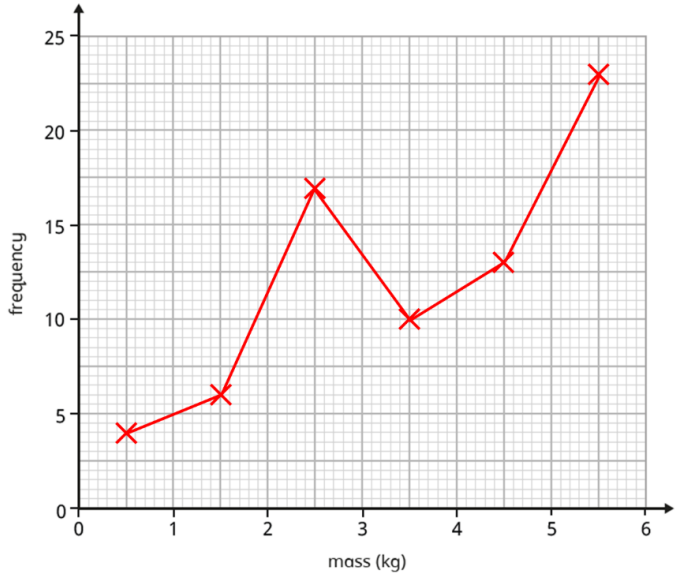
5		2	Award 1 mark for points plotted at correct midpoints of intervals with no joining line segments OR correct frequency polygon with one error
6a	$9p - 12$	1	Accept $3(3p - 4)$
6b	17 (cm)	2	Award 1 mark for forming and attempting to solve an equation in p e.g. $9p - 12 = 141$
7a	22 m/s	2	Award 1 mark for $330 \div 15$ seen or implied
7b	79.2 km/h	2	Award 1 mark for $22 \times \frac{3600}{1000}$ seen or implied. Follow through their answer to part a for 1 or 2 marks
7c	8.73 m/s	2	Award 1 mark for $100 \div 11.45$ seen or implied Condone use of 99.5 or 100.5 for 100 for first mark Accept awrt 8.73

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8a	£15 300	2	Award 1 mark for 18 000 × 0.85 seen or implied Condone missing £
8b	£21 000	2	Award 1 mark for 17 850 ÷ 0.85 seen or implied Condone missing £
9	$h = 4$	3	Award 1 mark for a correct use of formula for area of a trapezium e.g. $\frac{1}{2}(13 + 7)h = 40$ Award 1 mark for correct first step to solve e.g. $(13 + 7)h = 40$
10	13.4 cm	3	Award 1 mark for a correct use of Pythagoras' theorem Award 1 mark for correct rearrangement e.g. e.g. $\sqrt{18^2 - 12^2}$ seen or implied Accept 13.41… etc.
11	$w = \sqrt[3]{2q + 14}$	3	Award 1 mark for a correct first step to rearrange e.g. $q + 7 = \frac{w^3}{2}$ or $2q = w^3 - 14$ Award 2nd mark for w^3 correct isolated e.g. $2(q + 7) = w^3$ or $2q + 14 = w^3$
12	12	2	Award 1 mark for a correct using of the product rule for counting e.g. 1 × 3 × 2 × 2 seen or attempt to list combinations with no more than 2 omissions/errors

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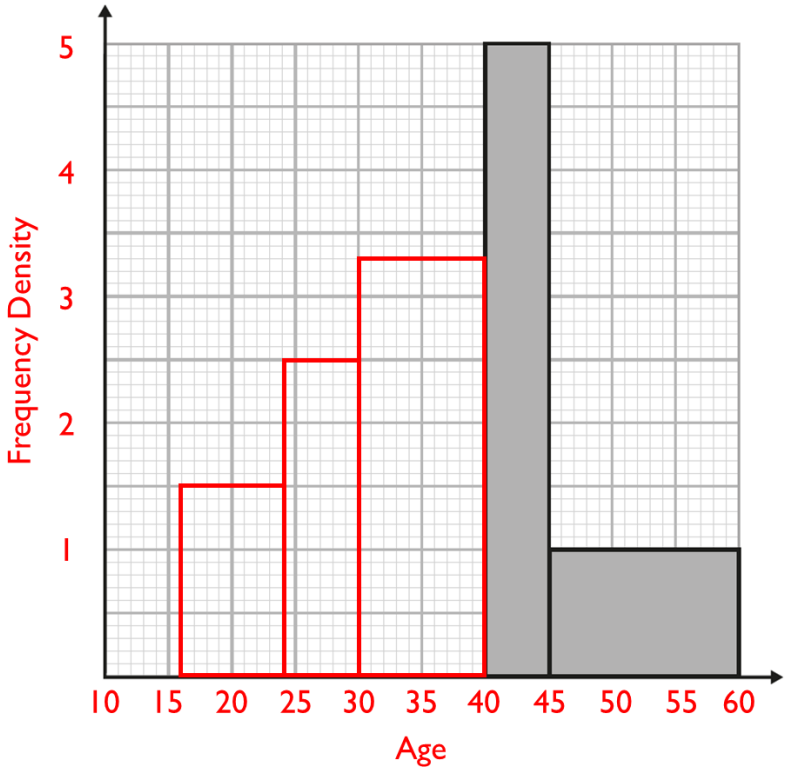
13a	$\frac{9t^6}{2}$	2	Award 1 mark for a correct evaluation of the numerator i.e. $18t^9$ OR either t^6 or $\frac{9}{2}$ correct
13b	e.g. $(2x-3)^2 \equiv (2x-3)(2x-3)$ $\equiv 4x^2 - 12x + 9$ which is not the same as $4x^2 - 9$	2	Award 1 mark for an attempt to expand with 3 out of 4 terms correct. Must have conclusion for 2nd mark Condone use of $=$ rather than $\equiv$ Accept any correct alternative method e.g. • factorise $4x^2 - 9 \equiv (2x+3)(2x-3)$ and conclusion • substituting a suitable value of x into both expressions and conclusion
13c	$(7+2y)(7-2y)$	2	Award 1 mark for one sign error
14	(£)8250	3	Award 1 mark identifying the ratio of Mr Trent : Mr Khan $= 9 : 5$ oe Award 2nd mark for 23 100 shared in their ratio e.g. $23\,100 \div (9+5) = 1650$
15	$\begin{pmatrix} 16 \\ -8 \end{pmatrix}$	2	Award 1 mark for either $\begin{pmatrix} 8 \\ -12 \end{pmatrix}$ or $\begin{pmatrix} 8 \\ 4 \end{pmatrix}$ seen or implied and attempt to add both their products

16	<table><tr><th>Age (years)</th><th>Frequency</th></tr><tr><td>$16 < a \leq 24$</td><td>12</td></tr><tr><td>$24 < a \leq 30$</td><td>15</td></tr><tr><td>$30 < a \leq 40$</td><td>33</td></tr><tr><td>$40 < a \leq 45$</td><td>25</td></tr><tr><td>$45 < a \leq 60$</td><td>15</td></tr></table> 	4	Award 1 mark for a correct method, seen or implied, using the graph and or the table to find the frequency density scale e.g. $15 \div (60-45) = 1$ or 1 cm^2 = 2.5 people Award 1 mark for frequency density axis fully correct. Award 1 mark for at least one other correct bar drawn or 25 seen in table Award full marks for a correct completed table and histogram.

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17	28.4°	4	Award 1 mark for a correct use of Pythagoras theorem to find the length of AC i.e. $\sqrt{20^2 + 15^2}$ (= 25 cm) Award 1 mark for a correct method seen to find the length of CF i.e. 15 tan(42°) or 13.5(06…) seen or implied. Award 1 mark for a correct method seen to find ∠FAC i.e. $\tan^{-1}\left(\frac{"13.5"}{"25"}\right)$ Award final mark for awrt 28.4
18a	$P_3 = 621\ 116$	2	Award 1 mark for a correct method to find the population of fish in the lake after one year seen or implied e.g. $P_1 = 1.02(600\ 000 - 5000) = 606\ 900$ Accept 621 117 or other (integer) rounding if correct method seen
18b	B	1	Accept any clear indication
18c	77 868	2	Award 1 mark for correct method $100\ 000 \times (0.92)^3$ seen or implied or correct build up method Accept 77 869 or other (integer) rounding if correct method seen
19	e.g. ∠AFG = ∠ABC = 62° because corresponding angles are equal ∠BAC = 47° because angles in a triangle sum to 180° x = 47° (Alternate segment theorem)	4	Award 1 mark for indicating either ∠ABC = 62° or ∠AGF = 71° Award 1 mark for ∠BAC = 47° found Award 1 mark for all reasons stated correctly.

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20	$p = 4$	3	Award 1 mark for correct method to find gradient e.g. $\frac{17-2}{p-1}$ seen Award 2nd mark for attempt to solve $\frac{17-2}{p-1} = 5$
21	$\frac{1}{3}$	2	Award 1 mark for forming an expression for the shaded area as a proportion of the rectangle e.g. $\frac{x^2+4x}{3x(x+4)}$ and attempt to factorise the numerator
22	$\frac{6}{n(n-1)}$	3	Award 1 mark for $\frac{3}{n}$ seen Award 2nd mark for $\frac{3}{n} \times \frac{2}{n-1}$
23	$x = 5, x = -2$ $y = 2, y = -5$	4	Award 1 mark for substituting linear equation into quadratic e.g. $(y+3)^2 + y^2 = 29$ or $x^2 + (x-3)^2 = 29$ Award 2nd mark for simplifying and rearranging their quadratic to solvable form e.g. $y^2 + 3y - 10 = 0$ or $x^2 - 3x - 10 = 0$ Award 3rd mark for any correct method to solve their quadratic