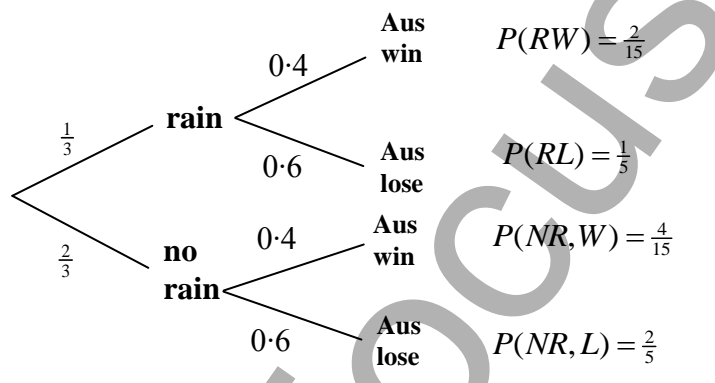


**Outcomes Addressed in this Question**

H5 - makes predictions about the behaviour of situations based on simple models

Outcome	Solutions	Marking Guidelines																
(a)(i) <b>H5</b>	<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Test indicated drugs used</th> <th>Test indicated drugs not used</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>People who use drugs</td> <td style="text-align: center;">48</td> <td style="text-align: center;">7</td> <td style="text-align: center;">55</td> </tr> <tr> <td>People who don't use drugs</td> <td style="text-align: center;">5</td> <td style="text-align: center;"><b>60</b></td> <td style="text-align: center;"><b>65</b></td> </tr> <tr> <td>Total</td> <td style="text-align: center;">53</td> <td style="text-align: center;"><b>67</b></td> <td style="text-align: center;">120</td> </tr> </tbody> </table>		Test indicated drugs used	Test indicated drugs not used	Total	People who use drugs	48	7	55	People who don't use drugs	5	<b>60</b>	<b>65</b>	Total	53	<b>67</b>	120	<p><u>2 marks</u> : all three values correct</p> <p><u>1 mark</u> : two values correct</p>
	Test indicated drugs used	Test indicated drugs not used	Total															
People who use drugs	48	7	55															
People who don't use drugs	5	<b>60</b>	<b>65</b>															
Total	53	<b>67</b>	120															
(a)(ii) <b>H5</b>	$\frac{12}{120} \text{ OR } \frac{1}{10}$	<p><u>1 mark</u> : correct answer</p>																
(a)(iii) <b>H5</b>	$\frac{12}{120} \times 100 = 12.7\%$	<p><u>1 mark</u> : correct answer</p>																
(b) <b>H5</b>	 <p>The diagram shows a tree starting from a root point. The first branch is labeled <math>\frac{1}{3}</math> and leads to the event 'rain'. From 'rain', two branches emerge: one labeled '0.4' leading to 'Aus win' with probability <math>P(RW) = \frac{2}{15}</math>, and another labeled '0.6' leading to 'Aus lose' with probability <math>P(RL) = \frac{1}{5}</math>. The second main branch from the root is labeled <math>\frac{2}{3}</math> and leads to the event 'no rain'. From 'no rain', two branches emerge: one labeled '0.4' leading to 'Aus win' with probability <math>P(NR, W) = \frac{4}{15}</math>, and another labeled '0.6' leading to 'Aus lose' with probability <math>P(NR, L) = \frac{2}{5}</math>.</p> <p>Financial expectation  <math>= \\$20 \times P(RW) + \\$12 \times P(RL) + \\$12 \times P(NR, W)</math>  <math>= \\$20 \times \frac{2}{15} + \\$12 \times \frac{1}{5} + \\$12 \times \frac{4}{15}</math>  <math>= \\$8.27</math></p>	<p><u>2 marks</u> : correct answer</p> <p><u>1 mark</u> : substantially correct (eg. Determining correct probabilities)</p>																
(c)(i) <b>H5</b>	$P(1^{\text{st}} \text{ draw}) = \frac{1}{12}$	<p><u>1 mark</u> : correct answer</p>																
(c)(ii) <b>H5</b>	$P(2^{\text{nd}} \text{ draw}) = P(\text{not } 1^{\text{st}}) \times P(2^{\text{nd}})$ $= \frac{11}{12} \times \frac{1}{11} = \frac{1}{12}$	<p><u>1 mark</u> : correct answer</p>																
(c)(iii) <b>H5</b>	$P(\text{not in first three}) = P(\text{not } 1^{\text{st}}) \times P(\text{not } 2^{\text{nd}}) \times P(\text{not } 3^{\text{rd}})$ $= \frac{11}{12} \times \frac{10}{11} \times \frac{9}{10} = \frac{3}{4}$	<p><u>2 marks</u> : correct answer</p> <p><u>1 mark</u> : partially correct</p>																

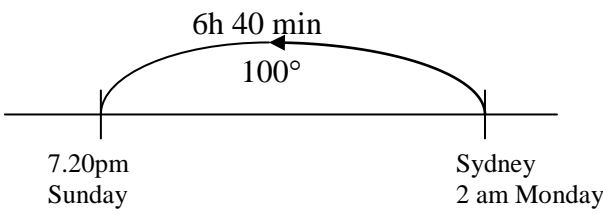
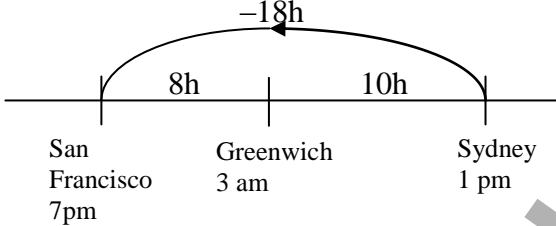
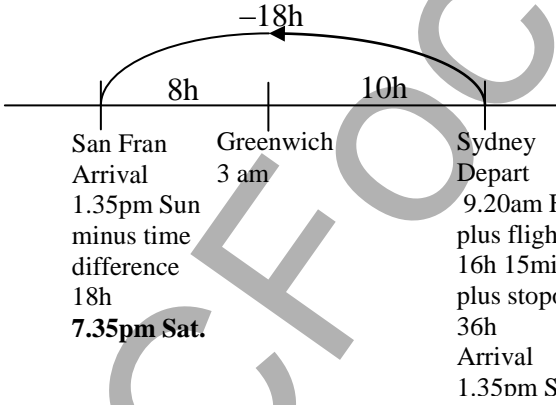
Question 16 (cont)		
(d)(i) <b>H5</b>	<p>First Putt</p> <p>Second Putt</p> <p>0.15 IN</p> <p>0.85 MISS</p> <p>0.8 IN</p> <p>0.2 MISS</p> <p><math>P(\text{in}) = 0.15</math></p> <p><math>P(\text{miss, in}) = 0.68</math></p> <p><math>P(\text{miss, miss}) = 0.17</math></p>	<p><u>2 marks</u> : correct solution</p> <p><u>1 mark</u> : substantially correct</p>
(d)(ii) <b>H5</b>	<p><math>P(2 \text{ putt}) = P(\text{miss, in}) = 0.68</math></p>	<p><u>1 mark</u> : correct answer</p>
(d)(iii) <b>H5</b>	<p><math>P(3 \text{ or more putt}) = P(\text{miss, miss}) = 0.17</math></p>	<p><u>1 mark</u> : correct answer</p>
(d)(iv) <b>H5</b>	<p>The ball should be closer to the hole after first putt, creating an easier second putt.</p>	<p><u>1 mark</u> : legitimate reasoning</p>

**Multiple Choice (1 mark each)**

1. D	2. A	3. B	4. D	5. B
6. B	7. B	8. D	9. C	10. B
11. B	12. A	13. D	14. D	15. B

**Outcomes Addressed in this Question**

**H7** interprets the results of measurements and calculations and makes judgements about reasonableness

Outcome	Solutions	Marking Guidelines
<b>H7</b>	<p>(a) <math>1^\circ = 4</math> minutes  <math>\therefore 100^\circ = 400</math> minutes  <math>= 6\text{h } 40\text{min}</math></p>  <p><b><math>\therefore</math> Time will be 7.20pm Sunday.</b></p>	<p><b>2 marks</b>                  Correct answer  <b>1 mark</b>                  States correct time difference</p>
<b>H7</b>	<p>(b) (i)</p>  <p><b><math>\therefore</math> Sonja should make her phone call at 1pm</b></p>	<p><b>2 marks</b>                  Correct answer  <b>1 mark</b>                  States correct time difference</p>
<b>H7</b>	<p>(ii)</p>  <p><b><math>\therefore</math> Sonja and Barry expected arrival in San Francisco is 7.35pm Saturday.</b></p>	<p><b>3 marks</b>                  Correct solution  <b>2 mark</b>                  Incorrect answer with a valid method of solution with minor errors in calculating time differences or flight/stopover times.  <b>1 mark</b>                  Calculates total stopover/flight time or correct arrival time based upon other incorrect working</p>
<b>H7</b>	<p>(c) (i) Buoy travels along <math>142^\circ\text{E}</math> meridian (ie. A great circle)  <math>\therefore 1^\circ = 60\text{M}</math>, so <math>2.8^\circ = 168\text{M}</math></p> <p><b>Buoy has travelled 168 nautical miles.</b></p> <p>(ii) <math>168\text{M} = (168 \times 1.852)\text{km}</math>  <math>= 311.136\text{km}</math>                  Av. speed of current <math>= (311.136 \div 24)\text{km/h}</math>  <math>= 13\text{km/h}</math> (to nearest km/h)</p> <p>Question 17 (cont)</p>	<p><b>2 marks</b>                  Correct answer  <b>1 mark</b>                  States correct time equivalence between arc on great circle and distance.</p> <p><b>2 marks</b>                  Correct answer  <b>1 mark</b>                  States correct time equivalence between arc on great circle and distance.</p>

<b>H7</b>	(d) 10°S parallel of latitude is a small circle. The shortest distance between two points on the surface of a sphere is along a great circle. Therefore, the distance along the 10°S parallel would be further than along a great circle between these points.	<b>2 marks</b> Correct reasoning, making reference to both small circles and great circles. <b>1 mark</b> Some correct reasoning in solution but may only refer to one only of great circles and small circles.
<b>H7</b>	(e) 10°N 70°E	<b>2 marks</b> Latitude and longitude both stated correctly. <b>1 mark</b> One of latitude or longitude stated correctly.

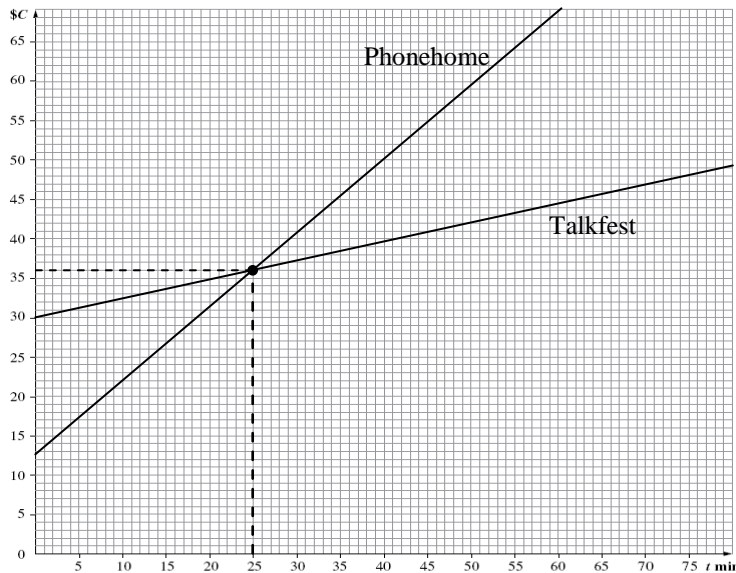
**Outcomes Addressed in this Question****H5** represents the relationships between changing quantities in algebraic and graphical form

Outcome	Solutions	Marking Guidelines
<b>H5</b>	(a) (i) A = \$246 B = \$49 444 C = \$48 794	<b>1 mark</b> for each correct answer
	(ii) \$50 000 – \$48 388 = \$1612	<b>1 mark</b> for identifying \$48 388 as amount owing after 4 months <b>2 marks</b> for correct answer
	(iii) D = \$43 630	<b>1 mark</b> for correct answer
<b>H5</b>	(b) (i) \$193.82 x 20 x 12 = \$46 516.80	<b>1 mark</b> for identifying \$193.82 as repayment amount <b>2 marks</b> for correct answer
	(ii) \$46 516.80 - \$25 000 = \$21 516.80	<b>1 mark</b> for correct answer
<b>H5</b>	(c) (i) 18 x \$185 = \$3330	<b>1 mark</b> for correct answer
	(ii) \$3330 - \$2495 = \$835	<b>1 mark</b> for correct answer
	(iii) $I = P r n$ $835 = 2495 \times r \times 2$ $r = \frac{835}{2495 \times 2}$ $r = 0.167$ $r = 16.7\%$	<b>1 mark</b> for correct answer
<b>H5</b>	(d) (i) A = -275 t + 4950	<b>1 mark</b> for correct answer
	(ii) The vertical intercept is \$4950 This represents the original amount borrowed.	<b>1 mark</b> for correct answer
	(iii) When t = 15 A = -275 x 15 + 4950 = \$825	<b>1 mark</b> for correct answer
	(iv) When A = 0 0 = -275 x t + 4950 t = 4950 / 275 t = 18 After 18 <i>months</i>	<b>1 mark</b> for correct answer

Year 12	General Mathematics	Half Yearly Exam 2007
Question No. 19	Solutions and Marking Guidelines	
Outcomes Addressed in this Question		
P5 - represents the relationships between changing quantities in algebraic and graphical form H3 - develops and tests a general mathematical relationship from observed patterns		
Outcome	Solutions	Marking Guidelines
(a)(i) <b>P5</b>	$\frac{2t+1}{3} + \frac{t-4}{2} = 5$ $6 \times \frac{2t+1}{3} + 6 \times \frac{t-4}{2} = 5 \times 6$ $2(2t+1) + 3(t-4) = 30$ $4t + 2 + 3t - 12 = 30$ $7t - 10 = 30$ $7t = 40$ $t = \frac{40}{7} = 5\frac{5}{7} = 5.71$	<u>2 marks</u> : correct solution  <u>1 mark</u> : partially correct working
(a)(ii) <b>P5</b>	$2^{x+1} = 17$ $x+1 = \frac{\log 17}{\log 2}$ $= 4.087$ $x = 3.087$ $= 3.09$	<u>2 marks</u> : correct answer  <u>1 mark</u> : substantially correct
(b)(i) <b>P5</b>	independent variable is $C$	<u>1 mark</u> : correct answer
(b)(ii) <b>P5,H3</b>	$b = 840$ (from $C$ intercept)  graph passes through $(0, 840)$ & $(160, 120)$ so $m = \frac{\text{rise}}{\text{run}} = \frac{120 - 840}{160 - 0}$ $= -4.5$ (other similar answers are possible)  $\therefore C = -4.5P + 840$	<u>2 marks</u> : correct answer  <u>1 mark</u> : substantially correct (eg. $m$ or $b$ correctly)
(b)(iii) <b>P5,H3</b>	$C = -4.5P + 840$ $= -4.5 \times 100 + 840$ $= 390$ (or read from graph)	<u>1 mark</u> : in the range 380-398 or correct substitution into function found in (ii) NB: graph is below 400 when $P = 100$
(b)(iv) <b>P5,H3</b>	$C = -4.5P + 840$ $0 = -4.5P + 840$ $P = 187$ (or read from graph)	<u>1 mark</u> : in the range 183-189 or correct substitution into function found in (ii)

Question 19 (cont)

(c)(i)  
P5,H3



2 marks : both graphs correct  
(and reasonably accurate)

1 mark : one graph correct or  
both graphs partially correct (eg  
correct intercept)

(c)(ii)  
P5,H3

Point of intersection is (25, 36)

2 marks : both values correct  
from graph obtained in (i)

1 mark : one value correct from  
graph obtained in (i)

(c)(iii)  
P5,H3

The coordinates of the point of intersection represent both companies having the same charge (\$C) for that particular total amount of time (t min).

2 marks : legitimate explanation  
(must make mention of what  
each variable/coordinate  
represents)

1 mark : legitimate explanation  
(but only referring to what one  
variable/coordinate represents)

**Outcomes Addressed in this Question****P5** represents the relationships between changing quantities in algebraic and graphical form**H3** develops and tests a general mathematical relationship from observed patterns**H5** makes predictions about the behaviour of situations based on simple models**H7** interprets the results of measurements and calculations and makes judgements about reasonableness

Outcome	Solutions	Marking Guidelines
<b>P5, H3</b>	(a) (i) $T = 2\pi\sqrt{\frac{l}{9.8}}$ if $l = 30\text{cm} = 0.3 \text{ m}$ $T = 2\pi\sqrt{\frac{0.3}{9.8}}$ $= 1.1\text{s}$ (2 sig. figs)	<b>1 mark</b> Correct answer (no need for correct rounding in this instance)
<b>P5, H5</b>	(ii) No. The square root function is involved in the relationship so it cannot be linear.	<b>2 marks</b> Correct answer and reasoning
<b>P5</b>	(iii)	<b>1 mark</b> Correct answer. Reasoning absent or incorrect
	$T = 2\pi\sqrt{\frac{l}{9.8}}$ $\frac{T}{2\pi} = \sqrt{\frac{l}{9.8}}$ $\frac{T^2}{4\pi^2} = \frac{l}{9.8}$ $\therefore l = \frac{9.8 \times T^2}{4\pi^2}$	<b>2 marks</b> Correct solution <b>1 mark</b> Substantial progress towards correct solution.
<b>H7</b>	(b) (i) $P(T) = 0.2$	<b>1 mark</b> Correct answer
	(ii) $P(\text{at least 1H}) = 1 - P(\text{TT})$ $= 1 - 0.2 \times 0.5$ $= 0.9$	<b>2 marks</b> Correct answer <b>1 mark</b> Substantial progress towards correct solution showing correct combination of probabilities.
<b>H7</b>	(iii) No. of normal coins = $24 - k$	<b>1 mark</b> Correct answer
<b>H3, H7</b>	(iv) There must be twice as many biased coins as there are normal coins. ie. $2 \times \text{no. of normal coins} = \text{no. of biased coins}$ $2(24 - k) = k$ $48 - 2k = k$ $3k = 48$ $k = 16$ $\therefore$ There are 16 biased coins in the bag.	<b>2 marks</b> Correct answer obtained by solving an equation involving k. <b>1 mark</b> Correct answer obtained without an equation <b>OR</b> substantial progress towards solution.
<b>H7</b>	(c)	<b>2 marks</b> Correct solution <b>1 mark</b> Shows correct relationship between radius of small circle and arc length, including substitution.
	$l = \frac{\theta}{360} \times 2\pi r$ $3411 = \frac{\theta}{360} \times 2\pi \times 5428$ $\theta = \frac{3411 \times 360}{2\pi \times 5428}$ $= 36^\circ$	
<b>H7</b>	(d) Co-ordinates of Taree: $32^\circ\text{S}, 152^\circ\text{E}$	<b>2 marks</b> Correct answer. <b>1 mark</b> Either latitude or longitude shown correctly.