STUDIES MOCK P1

ANSWERS

1)

(a) 3.14×10^{-2} *or s*   *(A1)*   *(C1)*

(b) 0.00314 *or* 3.14×10^{-3} *or p*   *(M1)(A1)*   *(C2)*

> **Note:** Award *(M1)* for indication of comparing numbers where at least one of them is converted. The converted number does not have to be correct. A single converted number is sufficient for *(M1)* to be awarded.

(c) $0.3454\ (0.345)$ *(A1)*   *(C1)*

(d) 3.454×10^{-1} (3.45×10^{-1}) *(A1)(A1)(ft)*   *(C2)*

> **Notes:** Follow through from their (c).
> Award *(A1)* for 3.454 (3.45) *(A1)* for 10^{-1}.

2)

(a)

p	q	$\neg p$	$(p \wedge q)$	$(\neg p \underline{\vee} q)$	$(p \wedge q) \Rightarrow (\neg p \underline{\vee} q)$
T	T	F	T	T	T
T	F	F	F	F	T
F	T	T	F	F	T
F	F	T	F	T	T

(A1)(A1)(A1)(ft)(A1)(ft)   *(C4)*

> **Notes:** Award *(A1)* for each correct column.
> Award first *(A1)(ft)* from their third column in the table.
> Award second *(A1)(ft)* from their fourth and fifth column in the table.

(b)   (i)   Tautology   *(A1)(ft)*   *(C1)*

> **Note:** Answer must be consistent with last column in table.

      (ii)   All entries (in the final column) are true.   *(R1)(ft)*   *(C1)*

> **Note:** Answer must be consistent with their answer to part (b)(i).

> **Note:** Special case *(A1)(R0)* may be awarded.

[6 marks]

3)

	$\sqrt{3}$	6	$2\frac{1}{2}$	π	-5
$\mathbb{N}$		✔			
$\mathbb{Z}$		✔			✔
$\mathbb{Q}$		✔	✔		✔

Accept any symbol for ticks. Do not penalize if candidate had also indicated, by a different symbol, that the number is not an element of the set.

Row $\mathbb{N}$ correct, no extra entries.   *(A1)*   *(C1)*

Row $\mathbb{Z}$ *(A1)(A1)*
Award (A1) for each correct tick and no extra entries. Award (A1) only for both ticks correct and 1 extra entry, (A0) otherwise.   *(C2)*

Row $\mathbb{Q}$ *(A1)(A1)(A1)*
Award (A1) for each correct tick and no extra entries. Award (A2) only for all 3 correct and one extra entry. Award (A1) only for 2 correct and one extra entry. (A0) otherwise.   *(C3)*

[6 marks]

4)

QUESTION 10   *Unit penalty applies in part (b).*

(a) $\sin A\hat{B}D = \dfrac{4}{9}$ *(M1)*

$100 + \text{their } (A\hat{B}D)$ *(M1)*

126° *(A1)*   *(C3)*

Notes: Accept an equivalent trigonometrical equation involving angle
ABD for the first *(M1)*.
Radians used gives 100°. Award at most *(M1)(M1)(A0)* if
working shown.
$BD = 8\,\text{m}$ leading to 127°. Award at most *(M1)(M1)(A0)*
(premature rounding).

(b) $AC^2 = 10^2 + 9^2 - 2 \times 10 \times 9 \times \cos(126.38\ldots)$ *(M1)(A1)*

Notes: Award *(M1)* for substituted cosine formula.
Award *(A1)* for correct substitution using their answer to part (a).

(UP) $AC = 17.0\,\text{m}$ *(A1)(ft)*   *(C3)*

Notes: Accept 16.9 m for using 126.
Follow through from their answer to part (a).
Radians used gives 5.08. Award at most *(M1)(A1)(A0)(ft)* if
working shown.

[6 marks]

5)
a) Ho: film genre is independent of gender
   H1: film genre is not independent of gender

b) 39 x 21/80 =10.2

c) 3

d)19.1

e)19.1 > 11.345 so reject the null hypothesis

6)

(a)   240 $\left(\dfrac{4}{3}\pi\right)$ (A1)   (C1)

(b)   1.4   (A1)   (C1)

(c) $q = \dfrac{360}{240}$ (M1)

       $= 1.5$ (A1)(ft)   (C2)

Note: Follow through from (a).

(d)   344°   (A2)   (C2)
                                                                                                [6 marks]

Note: Award (A1) if any additional correct answers (63.0°,161°) seen.
      If answer given as coordinate pair award (A1)(A0).

7)

(a)   (i) $\dfrac{0-2}{6-0}$ (M1)

              $= -\dfrac{1}{3} \left(-\dfrac{2}{6}, -0.333\right)$ (A1)   (C2)

       (ii) $y = -\dfrac{1}{3}x + 2$ (A1)(ft)   (C1)

Notes: Follow through from their gradient in part (a)(i).
       Accept equivalent forms for the equation of a line.

(b)   area $= \dfrac{6 \times 1.5}{2}$ (A1)(M1)

Note: Award (A1) for 1.5 seen, (M1) for use of triangle formula with 6 seen.

              $= 4.5$ (A1)   (C3)
                                                                                           [6 marks]

8)

(a) $AC^2 = 7.2^2 + 9.6^2$ **(M1)**

Note: Award **(M1)** for correct substitution in Pythagoras Theorem.

(UP) $AC = 12\,\text{m}$ **(A1)**   **(C2)**

(b) $AG^2 = 12^2 + 3.5^2$ **(M1)**

Note: Award **(M1)** for correct substitution in Pythagoras Theorem.

(UP) $AG = 12.5\,\text{m}$ **(A1)(ft)**   **(C2)**

Note: Follow through from their answer to part (a).

(c) $\tan\theta = \dfrac{3.5}{12}$ or $\sin\theta = \dfrac{3.5}{12.5}$ or $\cos\theta = \dfrac{12}{12.5}$ **(M1)**

Note: Award **(M1)** for correct substitutions in trig ratio.

     $\theta = 16.3°$ **(A1)(ft)**   **(C2)**

Notes: Follow through from parts (a) and/or part (b) where appropriate.
Award **(M1)(A0)** for use of radians (0.284).

[6 marks]

9)

(a) $I = \dfrac{200000 \times 15 \times 1.5}{100}$ **(M1)**

Note: Award **(M1)** for correctly substituted simple interest formula.

     $= 45000\,\text{INR}$ **(A1)**   **(C2)**

(b) $A = 200000\left(1 + \dfrac{15}{100 \times 12}\right)^{1.5 \times 12}$ **(M1)(A1)**

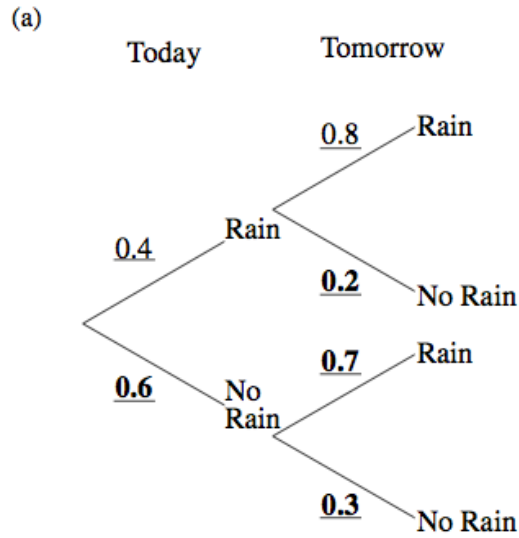**Note:** Award **(M1)** for substituted compound interest formula, **(A1)** for correct substitutions.

     $= 250115.4788\,\text{INR}$ **(A1)**
     $= 250115\,\text{INR}$ **(A1)**   **(C4)**

Note: Award final **(A1)** for their answer correct to the nearest rupee.

[6 marks]

10)

(a)

Today   Tomorrow

0.8 Rain

Rain

0.4

0.2 No Rain

0.7 Rain

0.6 No Rain

0.3 No Rain

(A1)(A1)(A1)   (C3)

| Note: Award (A1) for each correct pair. |

(b) $0.4 \times 0.8 + 0.6 \times 0.7$ (A1)(ft)(M1)

Notes: Award (A1)(ft) for two consistent products from tree diagram, (M1) for addition of their products. Follow through from their tree diagram provided all probabilities are between 0 and 1.

$= 0.74$ (A1)(ft)   (C3)
[6 marks]

11) $x^2 + 4x - 12$

12)

(a) 1200×0.8154 (M1)

$= 978.48$ EUR   (A1)   (C2)

(b) 160×0.045 (M1)

$= 7.20$ EUR   (A1)   (C2)

(c) $152.80 \times \dfrac{1}{0.8202}$ (M1)

Note: Follow through from their answer to part (b).

$= 186.30$ USD   (A1)(ft)   (C2)

Note: Follow through from part (b).

[6 marks]

13)

(a) $p + q = 47$ *(A1)*

      $4p + q = 53$ *(A1)*   *(C2)*

(b)   Reasonable attempt to solve their equations   *(M1)*
       $p = 2, q = 45$ *(A1)*   *(C2)*

> **Note:**   Accept only the answers $p = 2, q = 45$.

(c) $C = 2 \times 2^{0.5\,(10)} + 45$ *(M1)*
       $C = 109$ *(A1)(ft)*   *(C2)*

> **Note:**   Award *(M1)* for substitution of 10 into the formula with their values of p and q.

[6 marks]

14)

(a) $\dfrac{8 + 5 + 5 + 10 + 8 + 4 + 9 + 7 + p + q}{10} = 6.8$ **or** *equivalent*   *(M1)(A1)*   *(C2)*

> **Note:** Award *(M1)* for correct substituted mean formula, *(A1)* for correct substitution.

(b)   (i) $p = 5$ *(A1)(ft)*

     (ii) $q = 7$ *(A1)(ft)*   *(C2)*

> **Note:** Follow through from their answers to parts (a) and (b) (i).

(c)   7   *(M1)(A1)(ft)*   *(C2)*

> **Notes:** Award *(M1)* for an attempt to order their numbers.
>   Follow through from their answers to parts (b)(i) and (ii).