REG-PROB-2223-ASM-SET 1-MATH
Suggested solutions

Multiple Choice Questions

1. C	2. A	3. C	4. A	5. B
6. B	7. C	8. C	9. C	10. A
11. D	12. D	13. C	14. B	15. A
16. B	17. B	18. B	19. A	20. C
21. D				

1. C

Note that all elements in T are also contained in S.
Consider the equation $2x^2 - 3x + 1 = 0$.

$$2x^2 - 3x + 1 = 0$$
$$x = \frac{1}{2} \quad \text{or} \quad 1$$

The roots of equation $2x^2 - 3x + 1 = 0$ contain a non-integer element.
The answer is C.

2. A

$M = \{2, 3, 5, 7\}$, $N = \{2, 4, 6, 8, 10\}$ and $L = \{2, 3, \ldots, 8\}$.

I. ✗. $M \cap N = \{2\}$

II. ✗. $M \cup N = \{2, 3, 4, 5, 6, 7, 8, 10\} \neq L$

III. ✓.

3. C

$E = \{1, 2, 3, 6, 9, 18\}$ and $F = \{2, 4, 6, \ldots, 18\}$
$E \cap F = \{2, 6, 18\}$.

4. A

$P = \{1, 2, 3, 4, 5\}$
$Q = \{1, 2, 3, 4, 6, 12\}$
$P \cup Q = \{1, 2, 3, 4, 5, 6, 12\}$
$P \cap Q = \{1, 2, 3, 4\}$
Thus, $x = 7$ and $y = 4$.

5. B

$$\text{Required probability} = \frac{7 \times 6}{8 \times 7} = \frac{3}{4}$$

6. B

$$\text{Probability} = \frac{6^2\pi \times \frac{50^\circ}{360^\circ} - 3^2\pi \times \frac{50^\circ}{360^\circ}}{6^2\pi} = \frac{5}{48}$$

7. C

$$\text{Required probability} = 1 - \left(\frac{4}{7}\right)^2 = \frac{33}{49}$$

8. C

$$\text{Required probability} = \frac{2 + 4 + 2}{6 \times 5} = \frac{4}{15}$$

9. C

$$\text{Required probability} = \frac{1 + 1}{3 \times 2} = \frac{1}{3}$$

10. A

$$\text{Required probability} = \frac{3 + 2 + 2 + 1}{8 \times 7} = \frac{1}{7}$$

11. D

The only concern is the unit digit.

$$\text{Required probability} = \frac{4}{7}$$

12. D

Only when ■ = 3 (number 532), the 3-digit number is divisible by 7.

$$\text{Required probability} = \frac{1}{10}$$

13. C

$$\text{Required probability} = \frac{4 \times 4}{C_2^8} = \frac{4}{7}$$

14. B

$$\frac{1}{3} = \frac{x}{x+18}$$

$$x = 9$$

15. A

$$\text{Required probability} = \frac{4+2+2+1+1}{6 \times 5}$$

$$= \frac{1}{3}$$

16. B

$$\text{Required probability} = \frac{6}{20}$$

$$= 0.3$$

17. B

$$\text{Required probability} = \frac{8}{12+16+8+4+4}$$

$$= \frac{2}{11}$$

18. B

With \$10 banknote selected, the remaining two banknotes have to be at least \$80.

Only unfavourable case is \$20 + \$50.

Required probability $= 1 - \frac{1}{3} = \frac{2}{3}$.

19. A

$$\text{Required probability} = \frac{C_2^4}{C_2^7}$$

$$= \frac{2}{7}$$

20. C

$$\text{Required probability} = \frac{3+5}{6^2}$$

$$= \frac{2}{9}$$

21. D

$$\text{Required probability} = \frac{17}{24}$$

Conventional Questions

22. (a) Since $7 \in A \cap B$, $7 \in A$.

$x^2 - 6x + 16 = 7$ 1M

$x^2 - 6x + 9 = 0$

$x = 3$ 1A

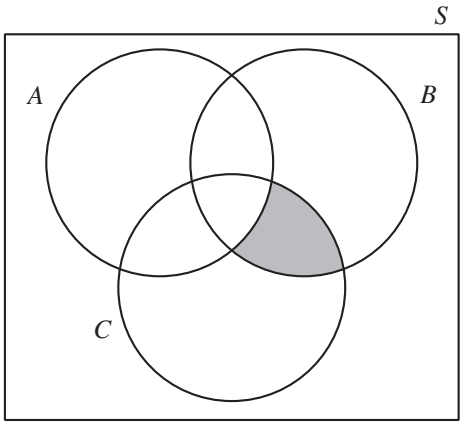
$B = \{2y,\ -4,\ 7\}$. Since $-1 \in A \cap B$, $-1 \in B$.

$2y = -1$ 1M

$y = -\frac{1}{2}$ 1A

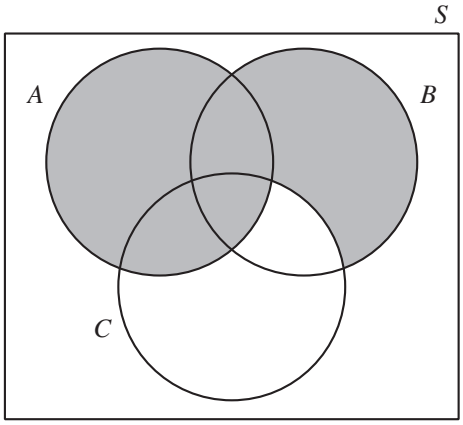
(b) $\{-4, -1, 2, 7\}$ 1A

23. (a)



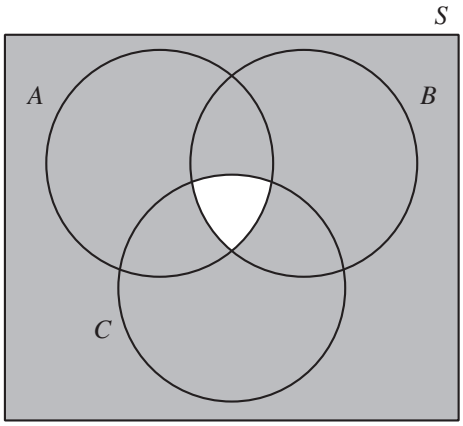
1A

(b)



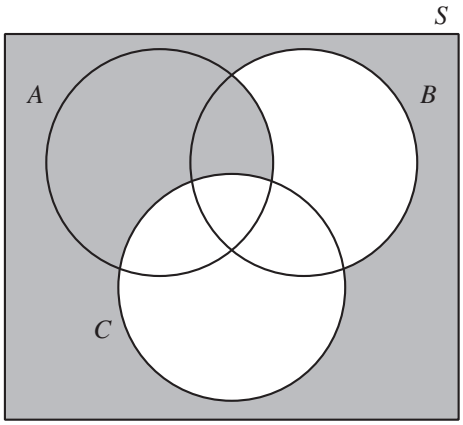
1A

(c)



1A

(d)



1A

24. (a) $x^2 + 4x - 5 = 0$

$x = -5$ or 1 1A

So, $A = \{-5, 1\}$.

$x^2 - x - 6 \leq 0$

$-2 \leq x \leq 3$ 1A

So, $B = \{-2, -1, 0, 1, 2, 3\}$.

$(A \cup B)' = \{-4, -3, 4\}$ 1A

(b) $(A' \cap B) \cap C = \{-2, -1\}$ 1A

(c) $A \cup (B' \cap C) = \{-5, -4, -3, 1\}$ 1A

(d) $(A \cap B) \cup C' = \{0, 1, 2, 3, 4\}$ 1A

25. (a) $A' = \{1, 3, 5, 7, 9, 10\}$ 1A

$B' = \{1, 2, 4, 5, 7, 8, 10\}$ 1A

(b) $\{1, 2, 4, 5, 6, 7, 8, 10\}$ 1A

(c) $\{3, 9\}$ 1A

 END OF PAPER