

REG-PROB-2324-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 $L = \{2, 3, \dots, 8\}$.

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 $F = \{2, 4, 6, \dots, 18\}$

$E \cap F = \{2, 6, 18\}$.

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

$$\begin{aligned}\text{Required probability} &= \frac{7 \times 6}{8 \times 7} \\ &= \frac{3}{4}\end{aligned}$$

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

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

8. C

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

9. C

$$\begin{aligned}\text{Required probability} &= \frac{1+1}{3 \times 2} \\ &= \frac{1}{3}\end{aligned}$$

10. A

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

11. D

The only concern is the unit digit.

$$\text{Required probability} = \frac{3}{7}$$

12. D

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

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

13. C

$$\begin{aligned}\text{Required probability} &= \frac{4 \times 4}{C_2^8} \\ &= \frac{4}{7}\end{aligned}$$

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.

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

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

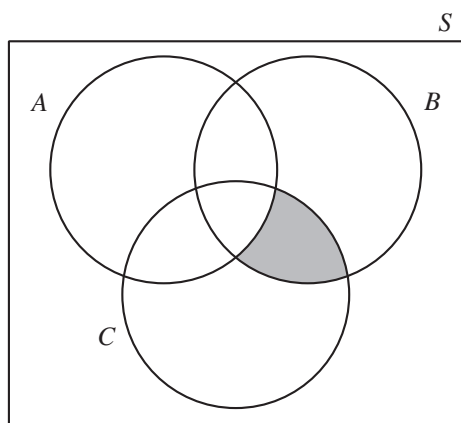
$$y = -\frac{1}{2}$$

1A

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

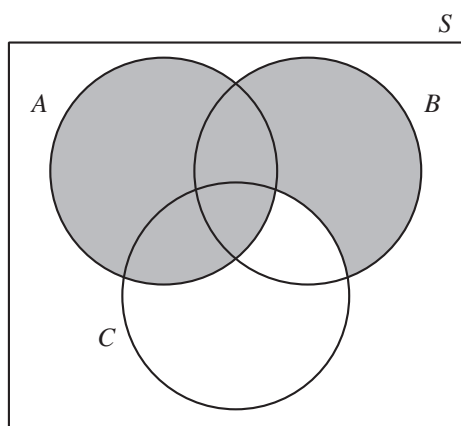
1A

23. (a)



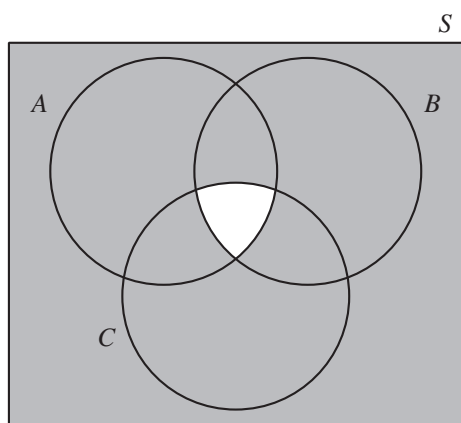
1A

- (b)

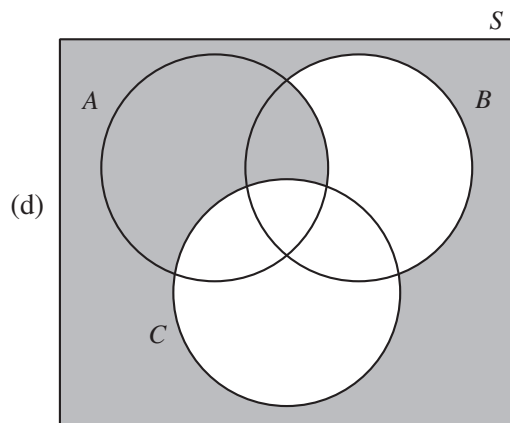


1A

- (c)



1A



1A

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

$$x = -5 \quad \text{or} \quad 1$$

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