REG-PROB-2324-ASM-SET 2-MATH
Suggested solutions

Multiple Choice Questions

1. B	2. C	3. C	4. C	5. B
6. A	7. D	8. B	9. D	10. B
11. A	12. B	13. C	14. C	15. C
16. D	17. D	18. B	19. B	20. A
21. A	22. C	23. C	24. A	25. A
26. B	27. D	28. C	29. A	30. C
31. C	32. D	33. A	34. A	35. A
36. D	37. D	38. C	39. C	

1. B

Required probability $= 1 - 0.2 - 0.25$

$= 0.55$

2. C

Total number of students $= 14 + 8 + 5 = 27$ and number of boys $= 27 - 16 = 11$

Required probability $= \dfrac{11 + 6}{27} = \dfrac{17}{27}$

3. C

Required probability $= \dfrac{3}{10} + \dfrac{2}{10} - \dfrac{1}{10}$

$= \dfrac{2}{5}$

4. C

It is possible that the sum of two numbers is 6 and the 2 numbers are both odd.

We have $P(A \cap B) > 0$.

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$< P(A) + P(B)$

5. B

Required probability $= \dfrac{3 + 6}{36}$

$= \dfrac{1}{4}$

6. A

$$\text{Required probability} = 1 - \frac{1}{4} - \frac{1}{5} - \frac{1}{6}$$
$$= \frac{23}{60}$$

7. D

$$\frac{p+3}{p+3+2} = \frac{7}{9}$$
$$p = 4$$
$$\text{Required probability} = \frac{4+2}{9}$$
$$= \frac{2}{3}$$

8. B

$$\text{Required probability} = \frac{10}{20} + \frac{4}{20} - \frac{2}{20}$$
$$= \frac{3}{5}$$

9. D

$$\text{Required probability} = \frac{5!2!}{6!}$$
$$= \frac{1}{3}$$

10. B

$$\text{Required probability} = 1 - \frac{C_4^8 C_1^7 + C_5^8}{C_5^{15}}$$
$$= \frac{9}{11}$$

11. A

$$\text{Required probability} = \frac{4!3!}{7!}$$
$$= \frac{1}{35}$$

12. B

$$\text{Required probability} = \frac{2!7!4!}{11!}$$
$$= \frac{1}{165}$$

13. C

$$\text{Required probability} = 1 - \frac{C_6^{11}}{C_6^{19}} = \frac{635}{646}$$

14. C

Required probability $= \frac{8!3!}{10!} = \frac{1}{15}$

15. C

Required number $= \frac{3!(2!)^3}{6!}$

$= \frac{1}{15}$

16. D

Required probability $= \frac{C_4^7 4!6!}{10!}$

$= \frac{1}{6}$

17. D

Required probability $= \frac{2!5!2!}{7!} = \frac{2}{21}$

18. B

Required probability $= 1 - \frac{C_2^5 + C_2^8}{C_2^{14}} = \frac{53}{91}$

19. B

Required probability $= \frac{4!3!}{6!}$

$= \frac{1}{5}$

20. A

Required probability $= \frac{6!3!}{8!} = \frac{3}{28}$

21. A

Required probability $= 1 - \frac{C_5^{12}}{C_5^{22}}$

$= \frac{129}{133}$

22. C

Required probability $= \frac{C_3^8 C_2^4}{C_5^{12}}$

$= \frac{14}{33}$

23. C

Required probability $= \frac{5!2!}{6!}$

$= \frac{1}{3}$

24. A

$$\text{Required probability} = \frac{7!3!}{9!} = \frac{1}{12}$$

25. A

Number of students taking both subjects = 16 + 21 − 30 = 7

$$\text{Required probability} = \frac{7}{30}$$

26. B

$$\text{Required probability} = 1 - \frac{1}{4} - \frac{1}{12} - \frac{1}{24} - \frac{1}{48} = \frac{29}{48}$$

27. D

$$\text{Required probability} = \frac{C_4^4 C_1^7 + C_3^4 C_2^7}{C_5^{11}} = \frac{13}{66}$$

28. C

Probability of Ivan and Jason sit next to each other in the 2nd row = $\frac{2 \times 2! \times 7!}{9!} = \frac{1}{18}$

$$\text{Required probability} = \frac{\left(\frac{1}{18}\right)}{\left(\frac{3}{9}\right)} = \frac{1}{6}$$

29. A

$$\text{Required probability} = 1 - \frac{5 \times 4 \times 7 \times 6}{C_4^{22}} = \frac{185}{209}$$

30. C

$$\text{Required probability} = \frac{C_1^4 C_2^6}{C_3^{10}} = \frac{1}{2}$$

31. C

$$\text{Required probability} = \frac{4!4!}{8!} = \frac{1}{70}$$

32. D

$$\text{Required probability} = 1 - \frac{C_2^8}{C_2^{10}}$$
$$= \frac{17}{45}$$

33. A

$$\text{Required probability} = \frac{C_2^3 C_2^9 + C_3^3 C_1^9}{C_4^{12}} = \frac{13}{55}$$

34. A

$$\text{Required probability} = \frac{C_4^5 \times 4! \times 4!}{8!} = \frac{1}{14}$$

35. A

$$\text{Required probability} = \frac{C_3^{11} 3! 10!}{13!} = \frac{15}{26}$$

36. D

$$\text{Required probability} = 1 - \text{P(same colour)}$$
$$= 1 - \left(\frac{(2)(3) + (5)(4)}{(11)(10)} \right) = \frac{42}{55}$$

37. D

Needs at least 3 draws $\Leftrightarrow$ no gold coins obtained in first 2 draws

$$\text{Required probability} = \frac{C_2^3}{C_2^7} = \frac{1}{7}$$

38. C

$$\text{Required probability} = \frac{C_2^{12}}{C_2^{15}}$$
$$= \frac{22}{35}$$

39. C

$$\text{Required probability} = 1 - 0.8^5$$
$$= 0.672\,32$$

Conventional Questions

40. (a) Required probability $= \left(1 - \frac{1}{10}\right)\left(\frac{1}{2}\right)$ 1M

$= \frac{9}{20}$ 1A

(b) (i) Required probability $= \left(1 - \frac{2}{25}\right)\left(\frac{1}{2}\right)$ 1M

$= \frac{23}{50}$ 1A

(ii) (1) Required probability $= \left(\frac{2}{3}\right)\left(\frac{9}{20}\right) + \left(\frac{1}{3}\right)\left(\frac{23}{50}\right)$ 1M+1M

$= \frac{34}{75}$ 1A

(2) Required probability $= 1 - \frac{34}{75}$ 1M+2M

$= \frac{41}{75}$ 1A

41. (a) (i) $p = 1 - \frac{4}{5} = \frac{1}{5}$ 1A

(ii) $q = 0$ and $r = 1$ 1A+1A

(b) (i) Required probability $= \frac{1}{2} \times \frac{1}{2}$ 1M

$= \frac{1}{4}$ 1A

(ii) (I) Required probability $= \frac{1}{2} \times \frac{1}{3} + \frac{1}{2}$ 2M+1A

$= \frac{2}{3}$ 1A

(II) Required probability $= \frac{2}{3} \times \frac{4}{5}$ 1M+1A

$= \frac{8}{15}$ 1A