2.12 Probability and Data Handling: 1-hour Pack

ISEB CE 13+ Mathematics · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A biased die is rolled 120 times and lands on a six 53 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- ☐ A) 1/6
- ☐ B) 53/120
- ☐ C) 53/173
- ☐ D) 120/53
- ☐ E) 1/53

---

2 A bag contains 5 white, 6 yellow and 5 green marbles, and nothing else. Freddie takes one at random. What is the probability that it is not white? Give your answer as a fraction in its simplest form.

- ☐ A) 5/8
- ☐ B) 5/16
- ☐ C) 1/16
- ☐ D) 11/16
- ☐ E) 11/15

---

3 A spinner lands on blue with probability 0.26. It is spun 100 times. How many times would you expect it to land on blue?

- ☐ A) 2.6
- ☐ B) 260
- ☐ C) 1300
- ☐ D) 75
- ☐ E) 26

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4 A bag contains 5 blue, 1 green and 1 black cubes, and nothing else. Harriet takes one at random. What is the probability that it is blue or green? Give your answer as a fraction in its simplest form.

- [ ] A) 1/7
- [ ] B) 3/4
- [ ] C) 6/7
- [ ] D) 5/49
- [ ] E) 6

---

5 The probability that a seed grows is 3/20. A gardener plants 400 seeds. How many seeds would you expect to grow?

- [ ] A) 60
- [ ] B) 6
- [ ] C) 341
- [ ] D) 1200
- [ ] E) 340

---

6 A bag contains 6 orange, 3 white, 6 pink and 5 green cubes, and nothing else. Ben takes one at random. What is the probability that it is not orange? Give your answer as a fraction in its simplest form.

- [ ] A) 13/20
- [ ] B) 1/20
- [ ] C) 14/19
- [ ] D) 7/10
- [ ] E) 3/7

---

7 The probability that a bus is late is 1/10. What is the probability that this does not happen? Give your answer as a fraction in its simplest form.

- [ ] A) 1/10
- [ ] B) 1
- [ ] C) 1/11
- [ ] D) 9
- [ ] E) 9/10

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8 A bag contains 4 green, 2 white, 6 orange and 6 pink marbles, and nothing else. Archie takes one at random. What is the probability that it is green or white? Give your answer as a fraction in its simplest form.

- [ ] A) 1/3
- [ ] B) 2/3
- [ ] C) 2/9
- [ ] D) 2/81
- [ ] E) 1/2

---

9 A biased die is rolled 50 times and lands on a six 20 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- [ ] A) 1/6
- [ ] B) 2/3
- [ ] C) 2/5
- [ ] D) 3/5
- [ ] E) 1/20

---

10 A biased die is rolled 250 times and lands on a six 48 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- [ ] A) 24/125
- [ ] B) 101/125
- [ ] C) 24/101
- [ ] D) 1/6
- [ ] E) 125/24

---

11 A bag contains 8 orange, 9 pink and 6 black beads, and nothing else. Fergus takes one at random. What is the probability that it is orange or pink? Give your answer as a fraction in its simplest form.

- [ ] A) 8/23
- [ ] B) 17/23
- [ ] C) 17/6
- [ ] D) 72/529
- [ ] E) 6/23

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12 The probability that a bus is late is 1/8. A pupil takes the bus on 400 days. On how many of these days would you expect the bus to be late?

- [ ] A) 500
- [ ] B) 351
- [ ] C) 400
- [ ] D) 50
- [ ] E) 5

---

13 A bag contains 4 blue, 5 white, 8 black and 3 pink counters, and nothing else. Tom takes one at random. What is the probability that it is blue or white? Give your answer as a fraction in its simplest form.

- [ ] A) 1/5
- [ ] B) 11/20
- [ ] C) 9/11
- [ ] D) 9/19
- [ ] E) 9/20

---

14 The probability that a bus is late is 1/10. A pupil takes the bus on 400 days. On how many of these days would you expect the bus to be late?

- [ ] A) 360
- [ ] B) 400
- [ ] C) 40
- [ ] D) 361
- [ ] E) 4

---

15 A bag contains 8 orange, 4 pink, 9 black and 2 blue cubes, and nothing else. Tom takes one at random. What are the odds against it being orange, written as a ratio of not-orange to orange?

- [ ] A) 9:15
- [ ] B) 8:16
- [ ] C) 15:8
- [ ] D) 8:15
- [ ] E) 15:9

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16 The probability that a bus is late is 7/20. A pupil takes the bus on 100 days. On how many of these days would you expect the bus to be late?

- [ ] A) 35
- [ ] B) 65
- [ ] C) 3.5
- [ ] D) 700
- [ ] E) 350

---

17 A bag contains 7 blue, 1 white and 7 orange beads, and nothing else. Isla takes one at random. What is the probability that it is blue or white? Give your answer as a fraction in its simplest form.

- [ ] A) 7/225
- [ ] B) 7/15
- [ ] C) 8/7
- [ ] D) 4/7
- [ ] E) 8/15

---

18 The probability that a bus is late is 1/5. A pupil takes the bus on 300 days. On how many of these days would you expect the bus to be late?

- [ ] A) 120
- [ ] B) 600
- [ ] C) 240
- [ ] D) 60
- [ ] E) 6

---

19 A bag contains 2 pink, 3 red and 2 blue sweets, and nothing else. Hamza takes one at random. What is the probability that it is not pink? Give your answer as a fraction in its simplest form.

- [ ] A) 4/7
- [ ] B) 5/7
- [ ] C) 5/6
- [ ] D) 1/7
- [ ] E) 2/5

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20 A fair spinner has 8 equal sections numbered 1 to 8. Ravi spins the spinner once. Calculate the probability that the spinner lands on a multiple of 3.

(2)

---

21 A bag contains 6 black and 5 yellow beads, and nothing else. Ben takes one at random. What is the probability that it is not black? Give your answer as a fraction in its simplest form.

- ☐ A) 1/2
- ☐ B) 4/11
- ☐ C) 5/6
- ☐ D) 5/11
- ☐ E) 6/11

---

22 A spinner lands on blue with probability 5/12. It is spun 600 times. How many times would you expect it NOT to land on blue?

- ☐ A) 25
- ☐ B) 250
- ☐ C) 3000
- ☐ D) 50
- ☐ E) 350

---

23 A bag contains 7 pink, 4 orange and 9 white counters, and nothing else. Nia takes one at random. What is the probability that it is not pink? Give your answer as a fraction in its simplest form.

- ☐ A) 7/20
- ☐ B) 13/20
- ☐ C) 1/20
- ☐ D) 7/13
- ☐ E) 13/19

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24 The probability that a seed grows is 3/10. A gardener plants 400 seeds. How many seeds would you expect to grow?

- [ ] A) 240
- [ ] B) 12
- [ ] C) 120
- [ ] D) 281
- [ ] E) 40

---

25 A bag contains 2 pink, 4 red and 7 green counters, and nothing else. Ben takes one at random. What is the probability that it is not pink? Give your answer as a fraction in its simplest form.

- [ ] A) 2/13
- [ ] B) 1/13
- [ ] C) 2/11
- [ ] D) 11/13
- [ ] E) 11/12

---

26 The probability of rain on any day in a town is 0.45. Consider 300 days. On how many of these days would you expect it to rain?

- [ ] A) 15
- [ ] B) 135
- [ ] C) 2700
- [ ] D) 1350
- [ ] E) 13.5

---

27 A bag contains 4 green, 2 orange and 1 black marbles, and nothing else. Jack takes one at random. What is the probability that it is not green? Give your answer as a fraction in its simplest form.

- [ ] A) 3/7
- [ ] B) 4/7
- [ ] C) 3/4
- [ ] D) 1/7
- [ ] E) 1/2

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28 The probability that a seed grows is 7/20. A gardener plants 100 seeds. How many seeds would you expect to grow?

- [ ] A) 66
- [ ] B) 350
- [ ] C) 3.5
- [ ] D) 65
- [ ] E) 35

---

29 A bag contains 2 yellow, 1 black, 5 blue and 5 red sweets, and nothing else. Isla takes one at random. What is the probability that it is yellow or black? Give your answer as a fraction in its simplest form.

- [ ] A) 3/10
- [ ] B) 2/13
- [ ] C) 10/13
- [ ] D) 3/14
- [ ] E) 3/13

---

30 A biased die is rolled 40 times and lands on a six 6 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- [ ] A) 3/23
- [ ] B) 1
- [ ] C) 1/6
- [ ] D) 3/20
- [ ] E) 3/17

---

31 A bag contains 5 green and 6 yellow counters, and nothing else. Archie takes one at random. What is the probability that it is not green? Give your answer as a fraction in its simplest form.

- [ ] A) 5/11
- [ ] B) 5/6
- [ ] C) 6/11
- [ ] D) 3/5
- [ ] E) 1/11

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32 A biased die is rolled 50 times and lands on a six 18 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- [ ] A) 9/25
- [ ] B) 25/9
- [ ] C) 9/16
- [ ] D) 1/6
- [ ] E) 9/34

---

33 A bag contains 4 black, 5 green, 6 white and 2 pink cubes, and nothing else. Freddie takes one at random. What is the probability that it is black or green? Give your answer as a fraction in its simplest form.

- [ ] A) 8/17
- [ ] B) 9/17
- [ ] C) 9/16
- [ ] D) 1/2
- [ ] E) 4/17

---

34 The probability that a bus is late is 3/8. A pupil takes the bus on 80 days. On how many of these days would you expect the bus to be late?

- [ ] A) 51
- [ ] B) 60
- [ ] C) 30
- [ ] D) 3
- [ ] E) 10

---

35 A bag contains 9 white and 5 blue cubes, and nothing else. Uma takes one at random. What is the probability that it is not white? Give your answer as a fraction in its simplest form.

- [ ] A) 5/14
- [ ] B) 1/14
- [ ] C) 2/7
- [ ] D) 5/13
- [ ] E) 5/9

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36 A bag contains 2 pink, 4 red, 6 white and 9 black marbles, and nothing else. Lucy takes one at random. What is the probability that it is pink or red? Give your answer as a fraction in its simplest form.

- [ ] A) 3/11
- [ ] B) 2/7
- [ ] C) 8/441
- [ ] D) 5/7
- [ ] E) 3/10

---

37 The probability that a seed grows is 2/3. A gardener plants 72 seeds. How many seeds would you expect to grow?

- [ ] A) 480
- [ ] B) 96
- [ ] C) 25
- [ ] D) 144
- [ ] E) 48

---

38 A bag contains 6 pink, 7 yellow and 9 blue beads, and nothing else. Zainab takes one at random. What is the probability that it is pink or yellow? Give your answer as a fraction in its simplest form.

- [ ] A) 13/23
- [ ] B) 21/242
- [ ] C) 13/22
- [ ] D) 13/21
- [ ] E) 3/11

---

39 The probability that a bus is late is 1/10. A pupil takes the bus on 100 days. On how many of these days would you expect the bus to be late?

- [ ] A) 10
- [ ] B) 1
- [ ] C) 100
- [ ] D) 90
- [ ] E) 20

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40 A bag contains 1 yellow, 5 green and 3 white counters, and nothing else. Sophie takes one at random. What is the probability that it is yellow or green? Give your answer as a fraction in its simplest form.

- [ ] A) 3/5
- [ ] B) 2
- [ ] C) 3/4
- [ ] D) 2/3
- [ ] E) 1/9

---

41 A biased die is rolled 250 times and lands on a six 103 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- [ ] A) 1/6
- [ ] B) 103/250
- [ ] C) 147/250
- [ ] D) 103/353
- [ ] E) 103/147

---

42 A bag contains 8 red, 2 pink and 7 green marbles, and nothing else. Dev takes one at random. What is the probability that it is red or pink? Give your answer as a fraction in its simplest form.

- [ ] A) 5/9
- [ ] B) 10/7
- [ ] C) 8/17
- [ ] D) 7/17
- [ ] E) 10/17

---

43 The probability that a seed grows is 3/20. A gardener plants 240 seeds. How many seeds would you expect to grow?

- [ ] A) 204
- [ ] B) 720
- [ ] C) 36
- [ ] D) 205
- [ ] E) 3.6

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44 A bag contains 6 red, 1 yellow and 1 black cubes, and nothing else. Tom takes one at random. What is the probability that it is red or yellow? Give your answer as a fraction in its simplest form.

- [ ] A) 3/4
- [ ] B) 7/8
- [ ] C) 7/9
- [ ] D) 1
- [ ] E) 7

---

45 The probability that a seed grows is 3/10. A gardener plants 400 seeds. How many seeds would you expect NOT to grow?

- [ ] A) 40
- [ ] B) 240
- [ ] C) 120
- [ ] D) 280
- [ ] E) 1200

---

46 A bag contains 4 pink, 6 yellow and 9 red marbles, and nothing else. Oliver takes one at random. What is the probability that it is not pink? Give your answer as a fraction in its simplest form.

- [ ] A) 15/19
- [ ] B) 14/19
- [ ] C) 4/19
- [ ] D) 5/6
- [ ] E) 1/19

---

47 The probability that a bus is late is 1/5. A pupil takes the bus on 200 days. On how many of these days would you expect the bus to be late?

- [ ] A) 4
- [ ] B) 160
- [ ] C) 80
- [ ] D) 400
- [ ] E) 40

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48 In her last 5 matches, a tennis player recorded the following number of aces: 2, 3, 1, 4, 5

(a) Calculate the mean number of aces per match. **(2)**

.....

(b) In her sixth match she records 3 aces. Without recalculating the whole mean, state whether the mean will increase, decrease or stay the same, giving a reason. **(1)**

---

49 A bag contains 2 blue, 2 pink, 1 red and 8 orange beads, and nothing else. Zainab takes one at random. What are the odds against it being blue, written as a ratio of not-blue to blue?

- ☐ A) 11:2
- ☐ B) 2:11
- ☐ C) 2:12
- ☐ D) 3:11
- ☐ E) 2:13

---

50 A biased die is rolled 200 times and lands on a six 12 times. Use this to estimate the probability that it lands on a six. Give your answer as a fraction in its simplest form.

- ☐ A) 1/12
- ☐ B) 3/50
- ☐ C) 3/47
- ☐ D) 1/6
- ☐ E) 47/50

---

51 The probability that a seed grows is 1/5. What is the probability that this does not happen? Give your answer as a fraction in its simplest form.

- ☐ A) 1/6
- ☐ B) 4
- ☐ C) 9/10
- ☐ D) 1/5
- ☐ E) 4/5

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52 A bag contains 3 green, 1 pink, 6 yellow and 2 black sweets, and nothing else. Mohammed takes one at random. What is the probability that it is green or pink? Give your answer as a fraction in its simplest form.

- [ ] A) 1/48
- [ ] B) 1/2
- [ ] C) 2/3
- [ ] D) 1/3
- [ ] E) 4/13

---

53 The probability that a bus is late is 3/10. A pupil takes the bus on 60 days. On how many of these days would you expect the bus to be late?

- [ ] A) 43
- [ ] B) 180
- [ ] C) 6
- [ ] D) 42
- [ ] E) 18

---

54 A bag contains 3 black and 7 orange marbles, and nothing else. Hamza takes one at random. What is the probability that it is not black? Give your answer as a fraction in its simplest form.

- [ ] A) 7/9
- [ ] B) 7/10
- [ ] C) 3/10
- [ ] D) 3/7
- [ ] E) 3/5

---

55 The probability of rain on any day in a town is 3/10. What is the probability that this does not happen? Give your answer as a fraction in its simplest form.

- [ ] A) 4/5
- [ ] B) 3/11
- [ ] C) 1/13
- [ ] D) 7/10
- [ ] E) 7/3

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56 A bag contains 9 blue, 6 red, 1 yellow and 6 green cubes, and nothing else. Archie takes one at random. What is the probability that it is blue or red? Give your answer as a fraction in its simplest form.

- [ ] A) 15/23
- [ ] B) 5/7
- [ ] C) 15/22
- [ ] D) 15/7
- [ ] E) 7/22

---

57 A spinner lands on blue with probability 2/3. It is spun 120 times. How many times would you expect it to land on blue?

- [ ] A) 80
- [ ] B) 240
- [ ] C) 160
- [ ] D) 41
- [ ] E) 8

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58 A bag contains 2 pink, 6 green and 1 black marbles, and nothing else. Chloe takes one at random. What is the probability that it is not pink? Give your answer as a fraction in its simplest form.

- ☐ A) 7/8
- ☐ B) 1/9
- ☐ C) 2/7
- ☐ D) 2/9
- ☐ E) 7/9

---

59 The probability that a particular machine produces a faulty component on any given day is 0.35.

(a) Write down the probability that the machine does not produce a faulty component on a given day. **(1)**

.....

(b) Assuming the outcomes on different days are independent, find the probability that the machine produces a faulty component on both of the next two days. **(2)**

.....

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Mark scheme · 2.12 Probability and Data Handling: 1-hour Pack

Question 1

B cao (53/120); use relative frequency / 1 minus probability **B1**

Answer: B) 53/120

Question 2

D cao (11/16); favourable outcomes / total outcomes **B1**

Answer: D) 11/16

Question 3

E cao (26); expected = probability x number of trials **B1**

Answer: E) 26

Question 4

C cao (6/7); favourable outcomes / total outcomes **B1**

Answer: C) 6/7

Question 5

A cao (60); expected = probability x number of trials **B1**

Answer: A) 60

Question 6

D cao (7/10); favourable outcomes / total outcomes **B1**

Answer: D) 7/10

Question 7

E cao (9/10); use relative frequency / 1 minus probability **B1**

Answer: E) 9/10

Question 8

A cao (1/3); favourable outcomes / total outcomes **B1**

Answer: A) 1/3

Question 9

C cao (2/5); use relative frequency / 1 minus probability **B1**

Answer: C) 2/5

Question 10

A cao (24/125); use relative frequency / 1 minus probability **B1**

Answer: A) 24/125

Question 11

B cao (17/23); favourable outcomes / total outcomes **B1**

Answer: B) 17/23

Question 12

D cao (50); expected = probability x number of trials **B1**

Answer: D) 50

Question 13

E cao (9/20); favourable outcomes / total outcomes **B1**

Answer: E) 9/20

Question 14

C cao (40); expected = probability x number of trials **B1**

Answer: C) 40

Question 15

C cao (15:8); odds against = not-colour : colour **B1**

Answer: C) 15:8

Question 16

A cao (35); expected = probability x number of trials **B1**

Answer: A) 35

Question 17

E cao (8/15); favourable outcomes / total outcomes **B1**

Answer: E) 8/15

Question 18

D cao (60); expected = probability x number of trials **B1**

Answer: D) 60

Question 19

B cao (5/7); favourable outcomes / total outcomes **B1**

Answer: B) 5/7

Question 20

identifies the multiples of 3 from 1 to 8 as 3 and 6 (2 outcomes) **M1**

1/4 oe (accept 2/8, 0.25, 25%) **A1**

Answer: 1/4

Question 21

D cao (5/11); favourable outcomes / total outcomes **B1**

Answer: D) 5/11

Question 22

E cao (350); expected = probability x number of trials **B1**

Answer: E) 350

Question 23

B cao (13/20); favourable outcomes / total outcomes **B1**

Answer: B) 13/20

Question 24

C cao (120); expected = probability x number of trials **B1**

Answer: C) 120

Question 25

D cao (11/13); favourable outcomes / total outcomes **B1**

Answer: D) 11/13

Question 26

B cao (135); expected = probability x number of trials **B1**

Answer: B) 135

Question 27

A cao (3/7); favourable outcomes / total outcomes **B1**

Answer: A) 3/7

Question 28

E cao (35); expected = probability x number of trials **B1**

Answer: E) 35

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Question 29

E cao (3/13); favourable outcomes / total outcomes **B1**

Answer: E) 3/13

Question 30

D cao (3/20); use relative frequency / 1 minus probability **B1**

Answer: D) 3/20

Question 31

C cao (6/11); favourable outcomes / total outcomes **B1**

Answer: C) 6/11

Question 32

A cao (9/25); use relative frequency / 1 minus probability **B1**

Answer: A) 9/25

Question 33

B cao (9/17); favourable outcomes / total outcomes **B1**

Answer: B) 9/17

Question 34

C cao (30); expected = probability x number of trials **B1**

Answer: C) 30

Question 35

A cao (5/14); favourable outcomes / total outcomes **B1**

Answer: A) 5/14

Question 36

B cao (2/7); favourable outcomes / total outcomes **B1**

Answer: B) 2/7

Question 37

E cao (48); expected = probability x number of trials **B1**

Answer: E) 48

Question 38

C cao (13/22); favourable outcomes / total outcomes **B1**

Answer: C) 13/22

Question 39

A cao (10); expected = probability x number of trials **B1**

Answer: A) 10

Question 40

D cao (2/3); favourable outcomes / total outcomes **B1**

Answer: D) 2/3

Question 41

B cao (103/250); use relative frequency / 1 minus probability **B1**

Answer: B) 103/250

Question 42

E cao (10/17); favourable outcomes / total outcomes **B1**

Answer: E) 10/17

Question 43

C cao (36); expected = probability x number of trials **B1**

Answer: C) 36

Question 44

B cao (7/8); favourable outcomes / total outcomes **B1**

Answer: B) 7/8

Question 45

D cao (280); expected = probability x number of trials **B1**

Answer: D) 280

Question 46

A cao (15/19); favourable outcomes / total outcomes **B1**

Answer: A) 15/19

Question 47

E cao (40); expected = probability x number of trials **B1**

Answer: E) 40

Question 48

(a) sum = 2 + 3 + 1 + 4 + 5 = 15 **M1**

(a) mean = 15 / 5 = 3 **A1**

(a) Answer: 3

(b) stays the same, because 3 equals the current mean of 3, oe **B1**

(b) Answer: Stays the same

Question 49

A cao (11:2); odds against = not-colour : colour **B1**

Answer: A) 11:2

Question 50

B cao (3/50); use relative frequency / 1 minus probability **B1**

Answer: B) 3/50

Question 51

E cao (4/5); use relative frequency / 1 minus probability **B1**

Answer: E) 4/5

Question 52

D cao (1/3); favourable outcomes / total outcomes **B1**

Answer: D) 1/3

Question 53

E cao (18); expected = probability x number of trials **B1**

Answer: E) 18

Question 54

B cao (7/10); favourable outcomes / total outcomes **B1**

Answer: B) 7/10

Question 55

D cao (7/10); use relative frequency / 1 minus probability **B1**

Answer: D) 7/10

Question 56

C cao (15/22); favourable outcomes / total outcomes **B1**

Answer: C) 15/22

Question 57

A cao (80); expected = probability x number of trials **B1**

Answer: A) 80

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Question 58

E cao (7/9); favourable outcomes / total outcomes **B1**

Answer: E) 7/9

Question 59

(a) 0.65 **B1**

(a) Answer: 0.65

(b) 0.35 x 0.35 **M1**

(b) 0.1225 (accept 0.123 to 3sf) oe **A1**

(b) Answer: 0.1225

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