HIGHER

# 7.17 Conditional Probability: 1-hour Pack

EDEXCEL 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** 200 patients are tested for a medical condition. The two-way table shows the test result and whether each patient actually has the condition.

Has condition No condition Total
Tests positive 18 14 32
Tests negative 2 166 168
Total 20 180 200

| | Has condition | No condition | **Total** |
|---|---|---|---|
| Tests positive | 18 | 14 | **32** |
| Tests negative | 2 | 166 | **168** |
| **Total** | **20** | **180** | **200** |

**(a)** One patient is chosen at random. Find the probability that they test positive. **(1)**

.....

**(b)** Given that a patient tests positive, find the probability that they actually have the condition. **(2)**

.....


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**(c)** Given that a patient does not have the condition, find the probability that they test positive. **(2)**

.....

**(Total for Question 1 is 5 marks)**

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**2** A bag contains 5 black, 4 white and 6 grey discs. Two discs are taken at random without replacement. Work out the probability that they are different colours. Give your answer as a fraction in its simplest form.

**(Total for Question 2 is 4 marks)**

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**3** A and B are two events. P(A) = 0.3, P(B) = 0.3 and P(A and B) = 0.2. Work out P(A | B). Give your answer as a fraction in its simplest form.

**(Total for Question 3 is 2 marks)**

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**4** A bag contains 8 gold beads and 8 silver beads. Three beads are taken at random without replacement. Work out the probability that all three beads are the same colour. Give your answer as a fraction in its simplest form.

**(Total for Question 4 is 3 marks)**


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**5** The two way table shows information about students, in the order walk, bus, car. girls: 24, 5, 9. boys: 13, 10, 22. One of the students is chosen at random. Given that the person is one of the boys, work out the probability that the choice is bus. Give your answer as a fraction in its simplest form.

**(Total for Question 5 is 2 marks)**

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**6** A bag contains 6 gold, 6 silver and 4 bronze beads. Two beads are taken at random without replacement. Work out the probability that they are different colours. Give your answer as a fraction in its simplest form.

**(Total for Question 6 is 4 marks)**

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**7** The probability that a match is at home is 0.5. If a match is at home, the probability that the team wins is 0.8. If not, the probability that the team wins is 0.7. Work out the probability that the team wins.

**(Total for Question 7 is 3 marks)**

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**8** A bag contains 3 gold beads and 8 silver beads. Two beads are taken at random without replacement. Work out the probability that the two beads are the same colour. Give your answer as a fraction in its simplest form.

**(Total for Question 8 is 4 marks)**


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**9** A and B are two events. P(A) = 0.7, P(B) = 0.4 and P(A and B) = 0.35. Work out P(B | A). Give your answer as a fraction in its simplest form.

**(Total for Question 9 is 2 marks)**

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**10** A bag contains 5 red counters and 7 blue counters. Three counters are taken at random without replacement. Work out the probability that all three counters are the same colour. Give your answer as a fraction in its simplest form.

**(Total for Question 10 is 4 marks)**

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**11** A bag contains 3 orange, 3 lemon and 5 cherry sweets. Two sweets are taken at random without replacement. Work out the probability that they are different colours. Give your answer as a fraction in its simplest form.

**(Total for Question 11 is 4 marks)**

---

**12** The two way table shows information about students, in the order walk, bus, car. girls: 18, 22, 16. boys: 24, 12, 14. One of the students is chosen at random. Given that the person is one of the boys, work out the probability that the choice is car. Give your answer as a fraction in its simplest form.

**(Total for Question 12 is 2 marks)**


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**13** A bag contains 3 black discs and 5 white discs. Two discs are taken at random without replacement. Work out the probability that the two discs are different colours. Give your answer as a fraction in its simplest form.

**(Total for Question 13 is 4 marks)**

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**14** A factory buys components from three suppliers. Supplier X provides 50% of components, of which 2% are defective. Supplier Y provides 30%, of which 5% are defective. Supplier Z provides 20%, of which 8% are defective. A component is chosen at random and found to be defective.

**(a)** Find the probability that the component came from Supplier Z. **(5)**

**(Total for Question 14 is 5 marks)**


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# Mark scheme · 7.17 Conditional Probability: 1-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

## Question 1

| | |
|---|---|
| (a) 4/25 oe (= 0.16) | **B1** |
| **(a) Answer: 4/25** | |
| (b) 18/32 seen | **M1** |
| (b) 9/16 oe cao | **A1** |
| **(b) Answer: 9/16** | |
| (c) 14/180 seen | **M1** |
| (c) 7/90 oe cao | **A1** |
| **(c) Answer: 7/90** | |

## Question 2

| | |
|---|---|
| P(same colour) probabilities for one colour, e.g. 5/15 x 4/14 | **M1** |
| all three same-colour products added | **M1** |
| 1 - P(same) | **M1** |
| 74/105 oe | **A1** |
| **Answer: 74/105** | |

## Question 3

| | |
|---|---|
| P(A \| B) = P(A and B) / P(B) | **M1** |
| 2/3 oe | **A1** |
| **Answer: 2/3** | |

## Question 4

| | |
|---|---|
| 8/16 x 7/15 x 6/14 | **M1** |
| adds the two products | **M1** |
| 1/5 oe | **A1** |
| **Answer: 1/5** | |

## Question 5

| | |
|---|---|
| denominator 45 | **M1** |
| 2/9 oe | **A1** |
| **Answer: 2/9** | |

## Question 6

| | |
|---|---|
| P(same colour) probabilities for one colour, e.g. 6/16 x 5/15 | **M1** |
| all three same-colour products added | **M1** |
| 1 - P(same) | **M1** |
| 7/10 oe | **A1** |
| **Answer: 7/10** | |

## Question 7

| | |
|---|---|
| 0.5 x 0.8 | **M1** |
| 0.5 x 0.7 | **M1** |
| 0.75 | **A1** |
| **Answer: 0.75** | |

## Question 8

| | |
|---|---|
| 3/11 x 2/10 | **M1** |
| 8/11 x 7/10 | **M1** |
| adds the two products | **M1** |
| 31/55 oe | **A1** |
| **Answer: 31/55** | |

## Question 9

| | |
|---|---|
| P(B \| A) = P(A and B) / P(A) | **M1** |
| 1/2 oe | **A1** |
| **Answer: 1/2** | |

## Question 10

| | |
|---|---|
| 5/12 x 4/11 x 3/10 | **M1** |
| 7/12 x 6/11 x 5/10 | **M1** |
| adds the two products | **M1** |
| 9/44 oe | **A1** |
| **Answer: 9/44** | |

## Question 11

| | |
|---|---|
| P(same colour) probabilities for one colour, e.g. 3/11 x 2/10 | **M1** |
| all three same-colour products added | **M1** |
| 1 - P(same) | **M1** |
| 39/55 oe | **A1** |
| **Answer: 39/55** | |

## Question 12

| | |
|---|---|
| denominator 50 | **M1** |
| 7/25 oe | **A1** |
| **Answer: 7/25** | |

## Question 13

| | |
|---|---|
| 3/8 x 5/7 | **M1** |
| 5/8 x 3/7 | **M1** |
| adds the two products | **M1** |
| 15/28 oe | **A1** |
| **Answer: 15/28** | |

## Question 14

| | |
|---|---|
| (a) P(X and defective) = 0.5 x 0.02 = 0.01 | **M1** |
| (a) P(Y and defective) = 0.3 x 0.05 = 0.015 and P(Z and defective) = 0.2 x 0.08 = 0.016 | **M1** |
| (a) total P(defective) = 0.01 + 0.015 + 0.016 = 0.041 | **M1** |
| (a) forms 0.016 / 0.041 | **M1** |
| (a) 16/41 oe awrt 0.390 | **A1** |
| **(a) Answer: 16/41 (awrt 0.390)** | |


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