

High School Mathematics Test 2015

Year 9

Basic Probability

Non Calculator

Skills and Knowledge Assessed:

- Identify complementary events and use the sum of probabilities to solve problems (ACMSP204)
- Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and'. (ACMSP205)
- Represent events in two-way tables and Venn diagrams and solve related problems (ACMSP292)

Name _____

Section 1 Short Answer Section

Write all working and answers in the spaces provided on this test paper.

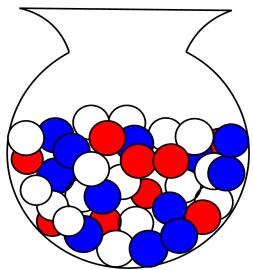
1. The weather report says there is an 85% chance of rain tomorrow.
Describe this probability in words, using no numbers at all.

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.....



2. A container for a guessing competition holds 150 sweets.
Forty are coloured red, sixty are coloured white and the rest are green.
If one is chosen at random, what is the probability that it is green?

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3. A horse trainer says of his entry in the next race: "*It is a certainty to win*".
What probability indicates a certainty, and do you think his statement is accurate?

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4. A boat hire shop has 15 kayaks, 12 canoes, 10 catamarans and 23 dinghies.

John chooses a boat at random, from the shop.

What is the probability that it is a Dinghy?

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Questions 5 and 6 refer to the following graph.



A researcher completed the graph of weekly earnings for the years shown.

She then chose a year at random, from those collected.

5. What is the probability that the year was before 2011?

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6. What is the probability that the year had average earnings greater than \$400?

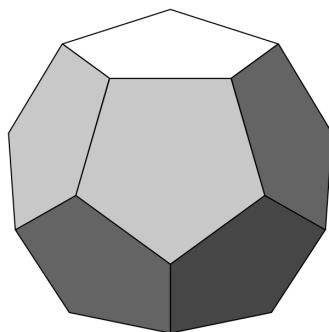
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Questions 7 and 8 refer to the following.

A docecahedral die has 12 faces. They are coloured as follows:

Four are yellow, five are red, two are green and one is blue.

The docecahedral die is rolled once.



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7. What is the probability that it does **not** land showing a red face upmost?

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8. What is the probability that it lands showing either a yellow or green face?

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Questions 9 and 10 refer to the following.

A guitarist in a band has 25 guitars which are kept on stage for him to use in a concert.

Twelve of the guitars are solid electric, eight are semi-acoustic, and the rest are acoustic.

He asks an audience member to choose a guitar at random for the next song.



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9. What is the probability that it is either acoustic or semi-acoustic?

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10. What is the probability that it is not semi-acoustic?

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.....

Questions 11 and 12 refer to the following.

The table below shows the first language spoken by students in a college.

Language	Number of Speakers
English	250
Vietnamese	50
Sudanese	20
Mandarin	90
Cantonese	10
Indigenous Australian	20
Indonesian	10



A person is chosen at random from the college.

11. What is the probability that their first language was either English or Sudanese?

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12. What is the probability that their first language was not Mandarin?

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Questions 13 – 15 refer to the following:

The table shows who bought the two types of item sold at an art auction.

	Painting	Sculpture	Total
Businesses	8	14	22
Individuals	12	16	28
Total	20	30	50



Beatrice looked in on the auction at a random time and saw one sale.

13. What is the probability that she saw a sculpture which was sold to an individual?

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14. What is the probability that she saw a sculpture sold?

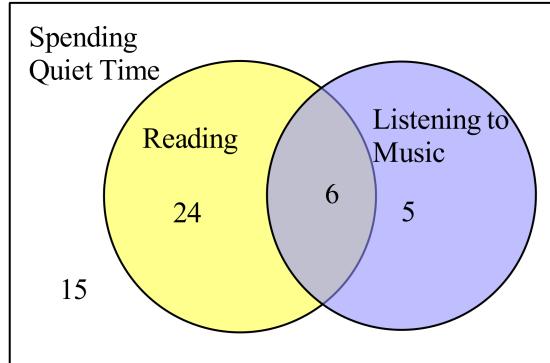
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15. If we know that it was a painting that she saw sold, what is the probability that it was sold to a business?

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.....

Questions 16 – 18 refer to the following:

The Venn diagram illustrates the results of a survey on how people spent quiet time.



A person is chosen at random from the survey group.

16. What is the probability that the person liked to read without music?

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17. What is the probability that the person liked to read while listening to music?

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18. What is the probability that the person spent quiet time without reading or music?

.....
.....

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Section 2 Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. A card is drawn from a normal pack of 52 cards.

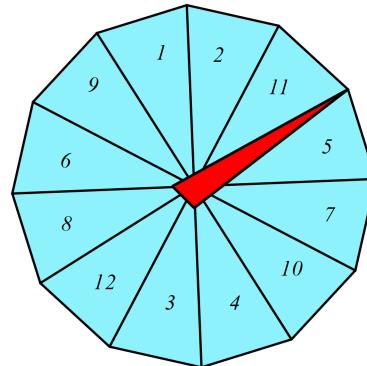
What is the probability that it is a 7?

- A. $\frac{1}{52}$ B. $\frac{1}{26}$ C. $\frac{1}{13}$ D. $\frac{1}{4}$

Questions 2 and 3 refer to the following.

The spinner shown has the numbers 1-12.

It is spun once.



2. What is the probability that it lands on a multiple of 3?

- A. $\frac{1}{3}$ B. $\frac{1}{2}$ C. $\frac{2}{3}$ D. $\frac{3}{4}$

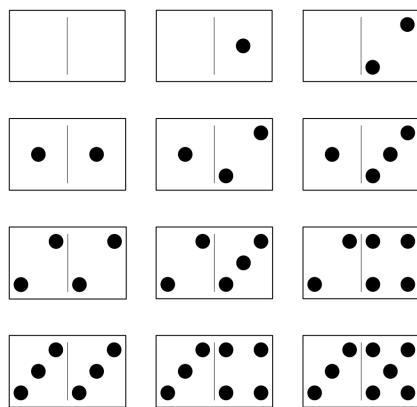
3. What is the probability that it lands on a number less than 4?

- A. $\frac{1}{6}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$

Question 4 – 6 refer to the following.

Dominoes have two sections and each section can have from 0 to 6 dots on it.

One domino is chosen at random from the dominos shown below.



4. What is the probability that the domino has no dots on it at all on either section?
- A. $\frac{1}{12}$ B. $\frac{1}{6}$ C. $\frac{1}{4}$ D. $\frac{5}{12}$
5. What is the probability that the domino has a total of 6 dots on its two sections?
- A. $\frac{1}{12}$ B. $\frac{1}{6}$ C. $\frac{1}{4}$ D. $\frac{5}{12}$
6. What is the probability that at least one section of the domino has exactly 3 dots?
- A. $\frac{1}{12}$ B. $\frac{1}{6}$ C. $\frac{1}{4}$ D. $\frac{5}{12}$
7. Sharlene has 5 pairs of sneakers, 7 pairs of heels and 8 pairs of sandals in her shoe box. She chooses one pair at random. What is the probability that it is a pair of sandals?
- A. 0.08 B. 0.1 C. 0.25 D. 0.4

Questions 8 and 9 refer to the following:

The table shows the genres of movies on Petra's DVD shelf.

A DVD is chosen at random.



Movie Genre	Frequency
Fantasy	7
Thriller	9
Comedy	12
Documentary	4
Horror	8

8. What is the probability that it is either a horror or fantasy movie?

A. $\frac{1}{5}$

B. $\frac{3}{8}$

C. $\frac{1}{2}$

D. $\frac{3}{4}$

9. What is the probability that it is not a documentary?

A. $\frac{1}{10}$

B. $\frac{1}{5}$

C. $\frac{4}{5}$

D. $\frac{9}{10}$

Questions 10 – 12 refer to the following:

The table shows the grades for a Geography assignment achieved by the students in year 8.

Grade	Boys	Girls
A	24	27
B	18	24
C	34	26
D	12	11
Total	88	88



10. Based on these results, which gender is more likely to get an A in Geography?

- A. Boys are more likely.
 - B. Girls are more likely.
 - C. They are equally likely.
 - D. There isn't enough information to decide.
-

11. One of the students in year 8 is selected at random.

What is the probability that they got a B on the geography assignment?

A. $\frac{24}{88}$

B. $\frac{27}{88}$

C. $\frac{42}{88}$

D. $\frac{21}{88}$

12. A boy from year 8 is selected at random.

What is the probability that they scored a C or better?

A. $\frac{1}{22}$

B. $\frac{7}{8}$

C. $\frac{19}{22}$

D. $\frac{153}{176}$

Questions 13 -15 refer to the following:

The table below records the number of sick and well people in a hospital on a given day.

	Male	Female	Total
Sick	45	38	83
Well	12	25	37
Total	57	63	120



Heath chose one person at random to interview about the care provided by the hospital.

13. What is the probability that the person is a sick male?

A. $\frac{3}{8}$ B. $\frac{45}{83}$ C. $\frac{19}{40}$ D. $\frac{15}{19}$

14. What is the probability that the person is sick?

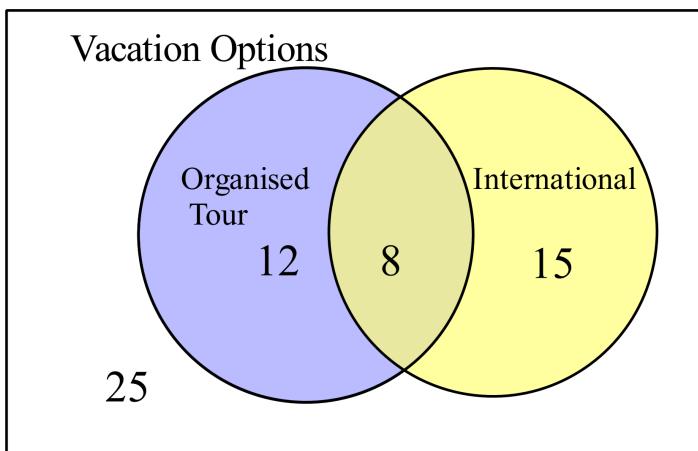
A. $\frac{3}{8}$ B. $\frac{45}{83}$ C. $\frac{83}{120}$ D. $\frac{15}{19}$

15. If we know that the person he chose was female, what is the probability that she was well?

A. $\frac{5}{24}$ B. $\frac{25}{63}$ C. $\frac{25}{37}$ D. $\frac{37}{120}$

Questions 16 – 18 refer to the following:

The Venn diagram shows the results of a survey on two aspects of their latest vacation.



One person who took the survey is chosen at random.

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16. What is the probability that their vacation was an international organised tour?
- A. $\frac{2}{15}$ B. $\frac{1}{5}$ C. $\frac{1}{4}$ D. $\frac{7}{12}$
17. What is the probability that their vacation was either an organised tour, or international but not both?
- A. $\frac{5}{12}$ B. $\frac{23}{60}$ C. $\frac{9}{20}$ D. $\frac{7}{12}$
18. What is the probability that their vacation was neither an organised tour nor international?
- A. $\frac{5}{12}$ B. $\frac{23}{60}$ C. $\frac{9}{20}$ D. $\frac{7}{12}$
-

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Multiple Choice Answer Sheet

Basic Probability

Name _____

Completely fill the response oval representing the most correct answer.

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

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Section 1 Short Answer Section

ANSWERS

No.	WORKING	ANSWER
1.	85% probability could be described as very likely or words to that effect.	Very Likely
2.	There are $150 - (40 + 60) = 50$ green sweets. $P(\text{Green}) = \frac{50}{150} = \frac{1}{3}$	$\frac{1}{3}$
3.	Certainty is indicated by a probability of 1. The term is used colloquially by the trainer, the horse may be <i>almost certainly</i> going to win, but it cannot be certain as other events can effect the result.	Description to the effect at left.
4.	There are $15 + 12 + 10 + 23 = 60$ boats. $P(\text{Dinghy}) = \frac{23}{60}$	$\frac{23}{60}$
5.	There are 10 years altogether and 6 before 2011. $P(\text{Before 2011}) = \frac{6}{10} = \frac{3}{5}$	$\frac{3}{5}$
6.	All the years had average earnings above \$400, so $P(\text{Over \$400}) = 1$	1
7.	$P(\text{Not red}) = 1 - \frac{5}{12} = \frac{7}{12}$	$\frac{7}{12}$
8.	$P(\text{Green or Yellow}) = \frac{4 + 2}{12} = \frac{6}{12} = \frac{1}{2}$	$\frac{1}{2}$
9.	$P(\text{Acoustic or semi acoustic}) = \frac{12 + 5}{25} = \frac{17}{25}$	$\frac{17}{25}$
10.	$P(\text{Not semi acoustic}) = 1 - \frac{8}{25} = \frac{17}{25}$	$\frac{17}{25}$

11.	There are 450 altogether. $P(\text{English or Sudanese}) = \frac{250 + 20}{450} = \frac{270}{450} = \frac{3}{5}$	$\frac{3}{5}$
12.	$P(\text{Not Mandarin}) = \frac{450 - 90}{450} = \frac{360}{450} = \frac{4}{5}$	$\frac{4}{5}$
13.	$P(\text{Sculpture to individual}) = \frac{16}{50} = \frac{8}{25}$	$\frac{8}{25}$
14.	$P(\text{Sculpture}) = \frac{30}{50} = \frac{3}{5}$	$\frac{3}{5}$
15.	$P(\text{Business given Painting}) = \frac{8}{20} = \frac{2}{5}$	$\frac{2}{5}$
16.	$P(\text{Read without Music}) = \frac{24}{50} = \frac{12}{25}$	$\frac{12}{25}$
17.	$P(\text{Read with Music}) = \frac{6}{50} = \frac{3}{25}$	$\frac{3}{25}$
18.	$P(\text{No Reading or Music}) = \frac{15}{50} = \frac{3}{10}$	$\frac{3}{10}$

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Section 2 Multiple Choice Section

ANSWERS

No.	WORKING	ANSWER												
1.	$P(7) = \frac{4}{52} = \frac{1}{13}$	C												
2.	3, 6, 9 and 12 are multiples of 3. $P(\text{Multiple of 3}) = \frac{4}{12} = \frac{1}{3}$	A												
3.	Numbers less than 4 are 1, 2 and 3. $P(\text{Less than 4}) = \frac{3}{12} = \frac{1}{4}$	B												
4.	<p>There are 9 dominos</p> <table style="margin-left: 100px;"> <tr> <td></td> <td></td> <td></td> </tr> </table> <p>Only this one has no dots.</p>													A
5.	<p>These 2 have 6 dots in total.</p> <table style="margin-left: 100px;"> <tr> <td></td> <td></td> </tr> </table> $P(6 \text{ dots}) = \frac{2}{12} = \frac{1}{6}$			B										
6.	<p>5 have a section with 3 dots.</p> $P(6 \text{ dots}) = \frac{5}{12}$	D												
7.	<p>Total number of shoes = 15</p> $P(\text{sandals}) = \frac{8}{20} = \frac{4}{10} = 0.4$	D												
8.	<p>There are $7 + 9 + 12 + 8 + 4 = 40$ DVD's</p> $P(\text{Horror or fantasy}) = \frac{8 + 7}{40} = \frac{15}{40} = \frac{3}{8}$	B												

9.	$P(\text{ documentary}) = \frac{4}{40} = \frac{1}{10}$ $P(\text{ not documentary}) = 1 - \frac{1}{10} = \frac{9}{10}$	D
10.	$P(\text{ A Boys}) = \frac{24}{88}$ $P(\text{ A Girls}) = \frac{27}{88}$ Based on this girls are more likely.	B
11.	Number who got B = $18+24 = 42$ Total = $88 + 88 = 176$ $P(B) = \frac{42}{176}$	D
12.	Number of boys with C or better = $88 - 12 = 76$ $P(\text{ Boy with C or better}) = \frac{76}{88} = \frac{19}{22}$	C
13.	Number of sick males = 45 $P(\text{ sick male}) = \frac{45}{120} = \frac{3}{8}$	A
14.	Number of sick people = 83 $P(\text{ sick}) = \frac{83}{120}$	C
15.	Number of females = 63 Number of well females = 25 $P(\text{ well given female}) = \frac{25}{63}$	B
16.	There are 60 in the survey altogether. $P(\text{International Organised}) = \frac{8}{60} = \frac{2}{15}$	A
17.	$P(\text{International or Organised}) = \frac{12 + 15}{60} = \frac{27}{60} = \frac{9}{20}$	C
18.	$P(\text{Not International nor Organised}) = \frac{25}{60} = \frac{5}{12}$	A

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Multiple Choice Answer Sheet

Basic Probability

Name _____ ANSWERS

Completely fill the response oval representing the most correct answer.

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