

High School Mathematics Test 2015

Year 7

Sample Space and Probability

Non Calculator
Section

Skills and Knowledge Assessed:

- Construct sample spaces for single- step experiments with equally likely outcomes (ACMSP167)
- Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)
- Identify complementary events and use the sum of probabilities to solve problems (ACMSP204)

Name _____

Answer all questions in the spaces provided on this test paper by:

Writing the answer in the box provided.

or

Shading in the bubble for the correct answer from the four choices provided.

Show any working out on the test paper. Calculators are **not** allowed.

Questions 1 – 3 refer to the following:

A pack of cards for a game has four different coloured cards.

There are 19 green cards, 17 red cards, 13 blue cards and 11 yellow cards.

Sylvia draws one card out of the pack.

1. How many are there in the sample space for her drawing the card?

☐ 24

☐ 30

☐ 49

☐ 60

2. What is the probability that she draws a red card?

☐ $\frac{11}{60}$

☐ $\frac{13}{60}$

☐ $\frac{17}{60}$

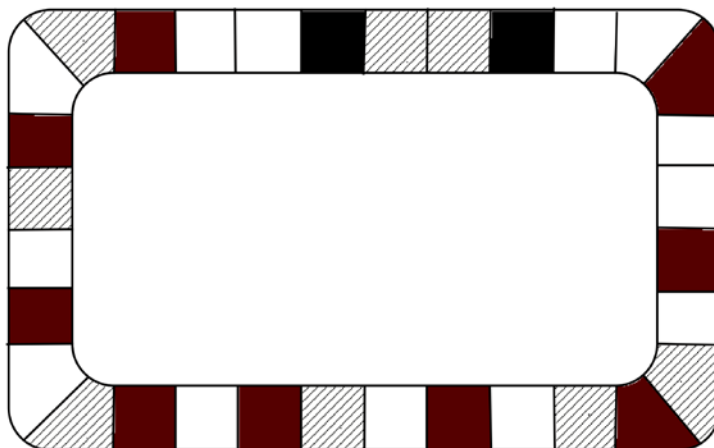
☐ $\frac{19}{60}$

3. What is the probability that she draws a yellow card?

Questions 4 – 6 refer to the following:

In a board game there are 32 sections and during an entire game, each player has an equal chance of landing on any section on a given turn.

Landing on a white section earns a player points and landing on the black or grey lose the player points.



4. What is the size of the sample space for the game?

5. What is the probability that a player lands on a grey section on a random turn?

☐ $\frac{8}{32}$

☐ $\frac{11}{32}$

☐ $\frac{13}{32}$

☐ $\frac{19}{32}$

6. What is the probability that a player earns points on a random turn?

☐ $\frac{8}{32}$

☐ $\frac{11}{32}$

☐ $\frac{13}{32}$

☐ $\frac{19}{32}$

7. How would you describe the likelihood that a normal family car will be involved in an accident on a given day?

☐ Impossible

☐ Very unlikely

☐ Very likely

☐ Certain

8. Which event could be described as having an “even chance” of occurring?

☐ An Ace being drawn from a pack of cards.

☐ A coin landing on “heads”.

☐ A die landing on six.

☐ A dart hitting a bullseye.

Questions 9 – 11 refer to the following:

A shelf in a bookcase contains 14 novels, 5 biographies, 3 self-help books, 12 textbooks and 2 dictionaries. A book is drawn at random from the shelf.



9. What is the probability that it is a textbook?

10. What is the probability that it is a novel?

☐ $\frac{1}{18}$

☐ $\frac{1}{12}$

☐ $\frac{5}{36}$

☐ $\frac{7}{18}$

11. What is the probability that it is a self-help book or a biography?

12. A bag contains 150 tickets. Sixty of these are coloured red and the rest are coloured green. A ticket is selected at random from the bag. What is the probability that it is green?

Questions 13 – 15 refer to the following:

A kitchen drawer contains 16 knives, 12 forks and 22 spoons.

An implement is drawn at random from the drawer.



13. What is the probability that it is a knife?

☐ $\frac{6}{25}$

☐ $\frac{8}{25}$

☐ $\frac{11}{25}$

☐ $\frac{14}{25}$

14. What is the probability that it is either a knife or fork?

15. What is the probability that it is not a fork?

☐ $\frac{6}{25}$

☐ $\frac{14}{25}$

☐ $\frac{17}{25}$

☐ $\frac{19}{25}$

Voting in an electorate produced the results below.

Name	Party	Percentage of Vote
Paul	Nationals	60
Cassandra	Labor	28
Tracey	Greens	10
Others	Various	2



One voter from this electorate was chosen at random to be interviewed.

16. What is the probability that they did not vote for Paul?

☐ 0.4

☐ 0.6

☐ 0.88

☐ 0.9

17. What is the probability that they voted for the Cassandra or Tracey?

18. What is the probability that they did not vote for either Nationals or Greens?

☐ $\frac{3}{10}$

☐ $\frac{7}{10}$

☐ $\frac{22}{25}$

☐ $\frac{9}{10}$

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Questions 1 - 3 refer to the following :

Eight coloured balls are placed in a container.

Three are yellow, two are green and the rest are blue.

One ball is selected at random.

1. Complete the sample space for this experiment.

Y, Y, Y, G, G,

2. What is the probability of drawing a blue ball?

3. Which coloured balls are equally likely to be drawn?

☐

Blue and green

☐

Blue and yellow

☐

Green and yellow

☐

No two are equally likely

4. Which of these events could be described as being certain to happen?

☐

Drawing a heart from a normal pack of 52 cards.

☐

Drawing a red card from a normal pack of 52 cards.

☐

Rolling a number less than 7 on a normal die.

☐

Rolling a 7 on a normal die.

5. In the crowd at a cricket match, 65% are supporting Australia.
One member of the crowd is chosen at random.

What is the probability that they are not supporting Australia?

6. There are some cans of soft drink in the Keith's Esky.
Five are orange, six are lemon and nine are cola.
Keith picks out one can at random from the Esky.
What is the probability that it is a can of lemon?



☐ $\frac{1}{4}$

☐ $\frac{3}{10}$

☐ $\frac{2}{5}$

☐ $\frac{9}{20}$

Questions 7 - 8 refer to the following:

There are 28 students in a class.
Fourteen have brown eyes, seven have blue eyes, six have hazel eyes and the remainder have green eyes.
One of the students is chosen at random.



7. What is the likelihood that the student has green eyes?

☐ Unlikely

☐ Even chance

☐ Likely

☐ Very likely

8. What is the probability that the student has blue eyes?

☐ 0.01

☐ 0.07

☐ 0.14

☐ 0.25

9. What is the probability that the student has either brown or green eyes?

Questions 10 - 12 refer to the following:

In a choir there are 15 sopranos, 18 altos, 25 tenors and 12 baritones.

One of them is chosen at random to be the spokesperson for the choir.



10. What is the probability that the person is a baritone?

☐ $\frac{6}{35}$

☐ $\frac{3}{14}$

☐ $\frac{9}{35}$

☐ $\frac{5}{14}$

11. What is the probability that the person is either an alto or a tenor?

12. What is the probability that the person is not a soprano?

☐ $\frac{9}{14}$

☐ $\frac{26}{35}$

☐ $\frac{11}{14}$

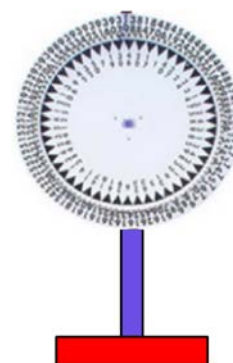
☐ $\frac{29}{35}$

Questions 13 and 14 refer to the following:

A chocolate wheel used at a school fete is numbered from 1 to 100.

People at the fete bought tickets numbered from 1 to 100.

The ticket which matches the number on the wheel, wins the prize.



13. Harry buys all the tickets that end in a zero.
What is the probability that he will win? (Answer as a fraction in simplest form.)

14. Justine buys all the tickets which are a multiple of 6, which Harry has not already bought.
What is the probability that she will win? (Answer as a decimal.)

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Questions 15 and 16 refer to the following:

Kerrie has 80 photos on her phone.

She wants to choose one to put into a frame.

There are 25 selfies of her alone, 15 selfies taken with her friend Lucille, 32 selfies taken with larger groups of friends, and the remainder are photos of groups of friends without Kerrie in them.

Because she can't decide she chooses one photo at random.

15. What is the probability that the photo will not have Kerrie in it?

☐ $\frac{1}{16}$

☐ $\frac{1}{10}$

☐ $\frac{3}{16}$

☐ $\frac{5}{16}$

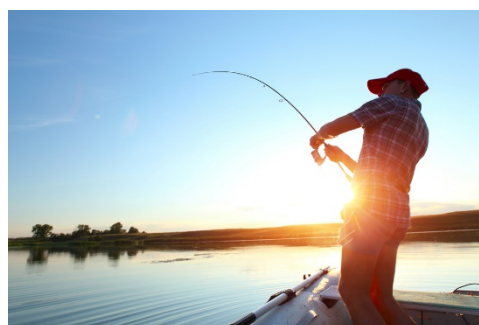
16. What is the probability that it will have more than one person in it?

Questions 17 and 18 refer to the following:

Omar keeps a record of the number of fish of different species that he has caught in the lake near where he lives.

The results are shown in the table below.

Species	Number caught
Tailor	6
Bream	4
Blackfish	12
Flathead	16
Mullet	22



17. Based on Omar's records, what is the probability that when he catches a fish it will be a Bream or a Tailor?

18. What is the probability that when he catches a fish it will be a something other than a Bream or Blackfish?

☐ $\frac{1}{6}$

☐ $\frac{13}{30}$

☐ $\frac{8}{15}$

☐ $\frac{11}{15}$

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ANSWERS

No.	WORKING	ANSWER
1.	No in SS = $19+17+13+11 = 60$	4 th answer
2.	$P(\text{Red}) = \frac{17}{60}$	3 rd answer
3.	$P(\text{Yellow}) = \frac{11}{60}$	$\frac{11}{60}$
4.	There are 13 white, 11 black and 8 grey = 32 altogether.	32
5.	$P(\text{Grey}) = \frac{8}{32} \left(= \frac{1}{4} \right)$	1 st answer
6.	Earns points for white. $P(\text{White}) = \frac{13}{32}$	3 rd answer
7.	While not impossible, it is very unlikely on a given day.	2 nd answer
8.	Even chance means probability of $\frac{1}{2}$ which would be the coin.	2 nd answer
9.	There are 36 books altogether. 12 are textbooks. $P(\text{Textbook}) = \frac{12}{36} \left(= \frac{1}{3} \right)$	$\frac{12}{36} \left(= \frac{1}{3} \right)$
10.	$P(\text{Novel}) = \frac{14}{36} = \frac{7}{18}$	4 th answer
11.	$P(\text{SH or Bio}) = \frac{5+3}{36} = \frac{8}{36} = \frac{2}{9}$	$\frac{8}{36} \left(= \frac{2}{9} \right)$
12.	60 red so $150-60=90$ are green $P(\text{Green}) = \frac{90}{150} \left(= \frac{3}{5} \right)$	$\frac{90}{150} \left(= \frac{3}{5} \right)$
13.	Total implements = $16 + 12 + 22$ $P(\text{Knife}) = \frac{16}{50} \left(= \frac{8}{25} \right)$	2 nd answer

14.	$P(\text{Knife or fork}) = \frac{16 + 12}{50} = \frac{28}{50} = \frac{14}{25}$	$\frac{14}{25}$
15.	$P(\text{not a fork}) = \frac{16 + 22}{50} = \frac{38}{50} = \frac{19}{25}$	4 th answer
16.	60% voted for Paul, so $100 - 60 = 40\%$ did not $P(\text{not for Paul}) = 40\% = 0.4$	1 st answer
17.	Number for Cassandra or Tracey = $28\% + 10\% = 38\%$ $P(\text{Cas or Tracey}) = 38\% = \frac{38}{100} = \frac{19}{50}$	$\frac{38}{100} = \frac{19}{50}$
18.	Not for Nationals or Greens leaves Labor and Others which is 28% and 2%, so 30% altogether. $30\% = \frac{3}{10}$	1 st answer

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ANSWERS

No.	WORKING	ANSWER
1.	5 out of the 8 are yellow or green, so the remaining 3 are blue.	B, B, B
2.	$P(\text{Blue}) = \frac{3}{8}$	$\frac{3}{8}$
3.	3 are yellow and 3 are blue, so they are equally likely	2 nd answer
4.	As all numbers on a normal die are less than 7, this is certain.	3 rd answer
5.	65% are supporting Australia so 35% are not. $35\% = \frac{35}{100} = \frac{7}{20}$	$\frac{35}{100} = \frac{7}{20}$
6.	5+6+9 = 20 cans in the esky. 6 are lemon, so $P(\text{Lemon}) = \frac{6}{20} = \frac{3}{10}$	2 nd answer
7.	There is only one left with green eyes, so it is unlikely.	1 st answer
8.	$P(\text{Blue}) = \frac{7}{28} = \frac{1}{4} = 0.25$	4 th answer
9.	$P(\text{brown or green}) = \frac{14 + 1}{28} = \frac{15}{28}$	$\frac{15}{28}$
10.	There are 15+18+25+12 = 70 altogether $P(\text{Baritone}) = \frac{12}{70} = \frac{6}{35}$	1 st answer
11.	$P(\text{Alto or tenor}) = \frac{18 + 25}{70} = \frac{43}{70}$	$\frac{43}{70}$
12.	$P(\text{not a soprano}) = \frac{70 - 15}{70} = \frac{55}{70} = \frac{11}{14}$	3 rd answer
13.	Tickets ending in zero are: 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100 $P(\text{Harry wins}) = \frac{10}{100} = \frac{1}{10}$	$\frac{1}{10}$

14.	Tickets which are multiples of 6 are: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90 and 96, so there are 16. Of these Harry has already bought 30, 60 and 90, so 13 are left. $P(\text{Justine wins}) = \frac{13}{100} = 0.13$	0.13														
15.	Number of photos with Kerrie = 25+15+32 = 72 This leaves 8 without Kerrie. $P(\text{Kerrie not in photo}) = \frac{8}{80} = \frac{1}{10}$	2 nd answer														
16.	These are all the photos except the selfies just of Kerrie. Number = 80 – 25 = 55 $P(\text{More than one in photo}) = \frac{55}{80} = \frac{11}{16}$	$\frac{11}{16}$														
17.	<table border="1"><thead><tr><th>Species</th><th>Number caught</th></tr></thead><tbody><tr><td>Tailor</td><td>6</td></tr><tr><td>Bream</td><td>4</td></tr><tr><td>Blackfish</td><td>12</td></tr><tr><td>Flathead</td><td>16</td></tr><tr><td>Mullet</td><td>22</td></tr><tr><td>Total</td><td>60</td></tr></tbody></table> $P(\text{Bream or Tailor}) = \frac{4 + 6}{60} = \frac{10}{60} = \frac{1}{6}$	Species	Number caught	Tailor	6	Bream	4	Blackfish	12	Flathead	16	Mullet	22	Total	60	$\frac{1}{6}$
Species	Number caught															
Tailor	6															
Bream	4															
Blackfish	12															
Flathead	16															
Mullet	22															
Total	60															
18.	Bream and blackfish total 16, so rest total 60 – 16 = 44 $P(\text{Not Bream or Blackfish}) = \frac{44}{60} = \frac{11}{15}$	4 th answer														