High School
Mathematics Test 2014

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 cards shown are turned over, mixed and one is chosen at random. What is the probability that it is a 7?

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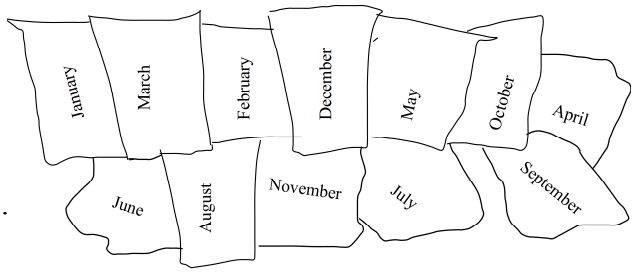
2. Hazel writes the names of the months of the year on slips of paper and places them in a bowl. She draws one slip at random. What is the probability that the name starts with the letter J?



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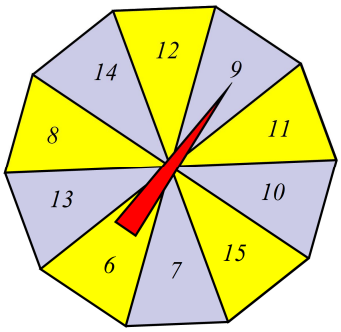
Questions 3 and 4 refer to the following.

A spinner has ten equal sectors numbered 6 to 15 as shown.



3. What is the probability that it lands on a number smaller than 11?

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4. What is the probability that it lands on a number which is a multiple of 3?

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5. Micah has 5 red T shirts, 3 blue T shirts and 4 yellow T shirts in his drawer. He chooses one at random. What is the probability that it is blue?

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6. The table shows the genres of books on Dean's bookshelf.

A book is chosen at random.

What is the probability that it isn't a crime book?

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Book Genre	Frequency
Crime	23
Thriller	17
Comedy	18
Biography	8
Self Help	14

7. If one letter is selected at random from those making up the word EXPECTATIONS.
What is the probability that it is an E or a T?

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Questions 8 and 9 refer to the following:
Freda is planning a holiday but can't decide on which package to choose. She has a choice of four destinations and three types of accommodation as shown in the table below.

Destination	Fiji	Hawaii	Tahiti	New Zealand
Resort	$950	$1 250	$1 050	$1 150
Cabins	$740	$950	$840	$920
Hotel	$645	$865	$790	$820

Freda cannot decide so she chooses one of the packages at random.

8. What is the probability that the package she chooses costs more than $900 or is to Hawaii or both?

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9. What is the probability that the package she chooses is not in a resort and is not to New Zealand?

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10. A container holds marbles of two sizes and two colours.

	Small	Large	Totals
Blue	24	7	31
Green	8	11	19
Totals	32	18	50

One marble is chosen at random.
What is the probability that it is a small blue marble?

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Questions 11 -13 refer to the following:
The table below records the Hornets results in their last 20 basketball matches and the main form of defence used in those games.

Hornets Matches	Zone Defence	Man to Man Defence	Totals
Won the match	6	6	12
Lost the match	5	3	8
Totals	11	9	20

Sally went to watch one of the games chosen at random.

11. What is the probability that a zone defence was played and the Hornets won?

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12. What is the probability that a zone defence was played or the Hornets won or both?

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13. What is the probability that, if it was a game where a zone defence was played, the Hornets won?

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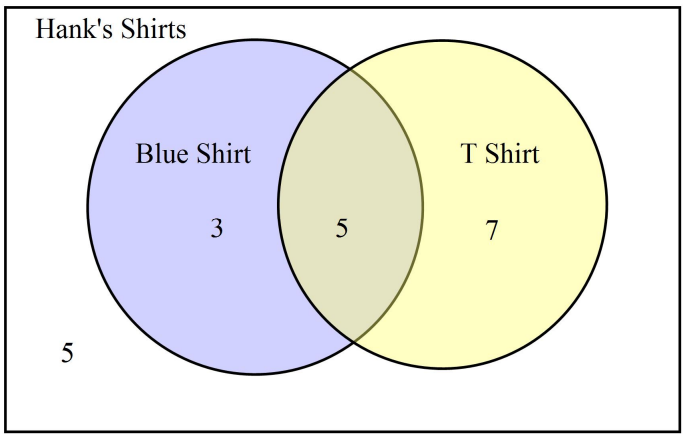
Questions 14 – 15 refer to the following:
The Venn diagram shows the shirts that Hank owns.



14. One of Hank's shirts is chosen at random. What is the probability that it is a blue T shirt?

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15. One of Hank's T shirts is chosen at random. What is the probability that it is not blue?

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High School
Mathematics Test 2014

Year 9

Basic Probability

Calculator Allowed

Name_____

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. Karen hears that it is very likely to rain tomorrow.
Which fraction might represent this probability?

A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{4}{5}$

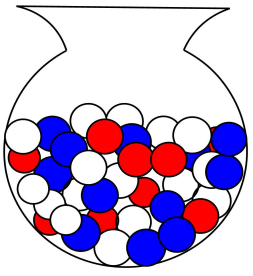
2. Lois has a pile of 40 coloured discs.
Twelve of the discs are red, eight are blue, nine are green, seven are white and four are black.

She chooses one disc at random from the pile.

What is the probability that it is blue?

A. $\frac{1}{10}$ B. $\frac{1}{6}$ C. $\frac{1}{5}$ D. $\frac{1}{4}$

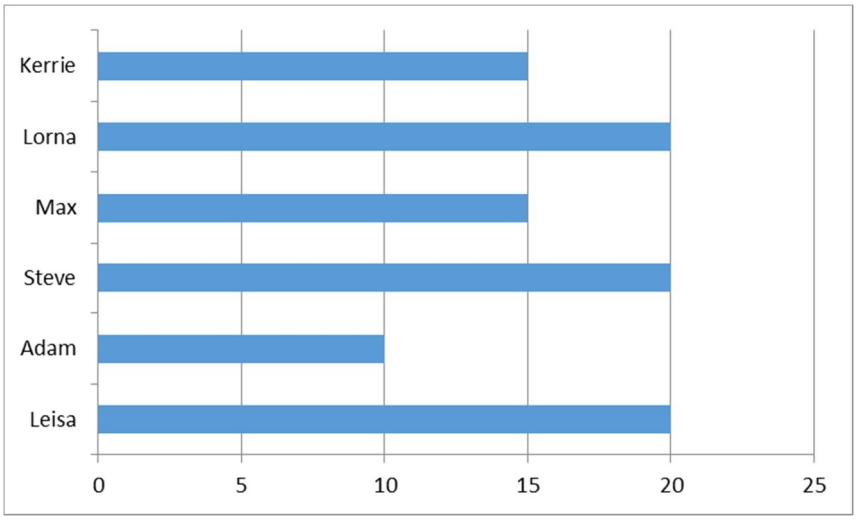
3. A vase holds 60 coloured beads. Fifteen are coloured red, twenty five are coloured white and the rest are blue.
If one is chosen at random, what is the probability that it is blue?



A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{5}{12}$ D. $\frac{2}{3}$

Questions 4 and 5 refer to the following.

Six friends record the number of phone calls that they made over a two day period.



4. One of the friends was chosen at random.
What is the probability that the friend made 15 calls?

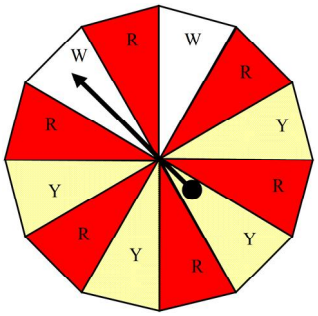
A. $\frac{1}{5}$ B. $\frac{1}{3}$ C. $\frac{2}{5}$ D. $\frac{3}{5}$

5. One of the calls is chosen at random.
What is the probability that it was made by Steve?

A. $\frac{1}{5}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{2}{3}$

Questions 6 and 7 refer to the following:

The spinner shown has red, yellow and white sectors.



6. What is the probability that the arrow will stop on a sector which is not white?

A. $\frac{1}{12}$ B. $\frac{1}{6}$ C. $\frac{5}{6}$ D. $\frac{11}{12}$

7. What is the probability that the arrow will stop on a sector which is white or red?

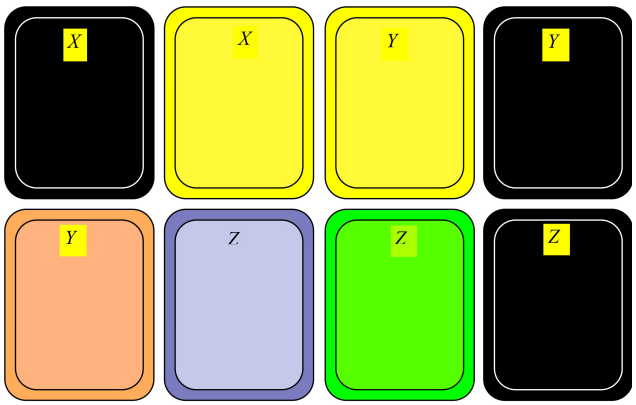
A. $\frac{1}{6}$ B. $\frac{2}{3}$ C. $\frac{3}{4}$ D. $\frac{5}{6}$

8. A store opens at 9 am and closes at 5 pm. Twice during the day the store closes for 15 minutes while the proprietor does the banking and the mail. Jasmine goes to the store at a random time between 9am and 5 pm. What is the probability that the store will not be open?

A. $\frac{1}{16}$ B. $\frac{1}{8}$ C. $\frac{7}{8}$ D. $\frac{15}{16}$

Questions 9 and 10 refer to the following:
Michael has 8 models of phone to choose from. There are three brands, X, Y and Z which can have a coloured case or a black case as illustrated.

He chooses one of the eight phones at random.



9. What is the probability that it is a coloured brand Y phone?

A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{5}{8}$

10. What is the probability that it is either a coloured phone or a brand X phone , but not both?

A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{5}{8}$

Questions 11 and 12 refer to the following:
The table shows the results of a survey on how people of used their laptop and tablet computers.

	Laptop	Tablet	Total
Work	25	10	35
Personal	18	27	45
Total	43	37	80

11. If a person who did the survey was chosen at random, what is the probability that they had a laptop and used it for work?

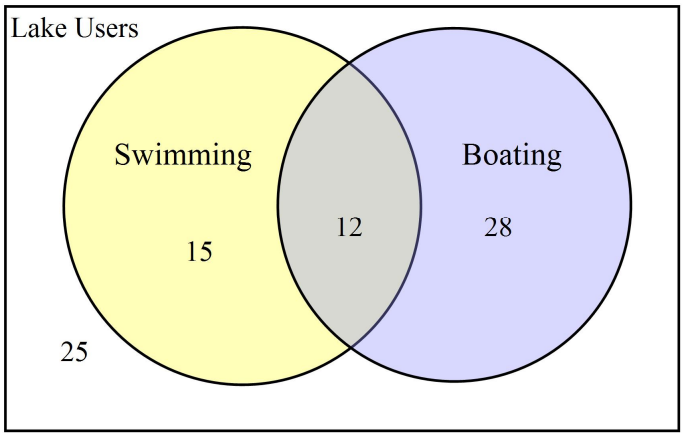
A. $\frac{1}{8}$ B. $\frac{9}{40}$ C. $\frac{5}{16}$ D. $\frac{27}{80}$

12. If a person who used a laptop was chosen at random, what is the probability that they used it for work?

A. $\frac{7}{16}$ B. $\frac{18}{43}$ C. $\frac{37}{80}$ D. $\frac{25}{43}$

Questions 13 – 15 refer to the following:

The Venn diagram illustrates the results of a survey on the recreational uses that occurred at a lake.



A person is chosen at random from the survey group.

13. What is the probability that they participated in both swimming and boating?

A. $\frac{3}{20}$ B. $\frac{3}{16}$ C. $\frac{5}{16}$ D. $\frac{7}{20}$

14. What is the probability that they participated in either swimming or boating but not both?

A. $\frac{3}{16}$ B. $\frac{5}{16}$ C. $\frac{43}{80}$ D. $\frac{11}{16}$

15. What is the probability that they did not participate in swimming?

A. $\frac{3}{16}$ B. $\frac{5}{16}$ C. $\frac{43}{80}$ D. $\frac{53}{80}$

High School
Mathematics Test 2014

Basic Probability

Multiple Choice Answer Sheet

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 ⬭

High School
Mathematics Test 2014

Basic Probability

ANSWERS

<table>
<tr><td colspan="2">Section 1 (1 mark each)</td></tr>
<tr><td></td><td>Working and Answers</td></tr>
<tr><td>1.</td><td>There are 4 sevens out of five cards.
$P(7) = \frac{4}{5}$</td></tr>
<tr><td>2.</td><td>January, June and July start with J.
$P(\text{Start with J}) = \frac{3}{12} = \frac{1}{4}$</td></tr>
<tr><td>3.</td><td>Numbers less than 11 are 6, 7, 8, 9 and 10
$P(\text{Less than 10}) = \frac{5}{10} = \frac{1}{2}$</td></tr>
<tr><td>4.</td><td>Multiples of 3 are 6, 9, 12 and 15
$P(\text{Less than 10}) = \frac{4}{10} = \frac{2}{5}$</td></tr>
<tr><td>5.</td><td>Total = 5+3+4 = 12
$P(\text{Blue}) = \frac{3}{12} = \frac{1}{4}$</td></tr>
<tr><td>6.</td><td>$P(\text{ Crime }) = \frac{23}{80}$
$P(\text{ Not Crime }) = 1 - \frac{23}{80} = \frac{57}{80}$</td></tr>
<tr><td>7.</td><td>2 E’s and 2 T’s out of 12 letters.
$P(\text{ E or T }) = \frac{4}{12} = \frac{1}{3}$</td></tr>
<tr><td>8.</td><td>
<table>
<tr><td>Destination</td><td>Fiji</td><td>Hawaii</td><td>Tahiti</td><td>New Zealand</td></tr>
<tr><td>Resort</td><td>$950</td><td>$1 250</td><td>$1 050</td><td>$1 150</td></tr>
<tr><td>Cabins</td><td>$740</td><td>$950</td><td>$840</td><td>$920</td></tr>
<tr><td>Hotel</td><td>$645</td><td>$865</td><td>$790</td><td>$820</td></tr>
</table>
Those that meet the criteria are marked
$P(\text{Over 900 or Hawaii }) = \frac{7}{12}$</td></tr>
<tr><td>9.</td><td>
<table>
<tr><td>Destination</td><td>Fiji</td><td>Hawaii</td><td>Tahiti</td><td>New Zealand</td></tr>
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<tr><td>Hotel</td><td>$645</td><td>$865</td><td>$790</td><td>$820</td></tr>
</table>
Those that meet the criteria are marked
$P(\text{Not resort and not NZ }) = \frac{6}{12} = \frac{1}{2}$</td></tr>
</table>

10.	24 are small and Blue out of 50 altogether. $P(\text{ Small Blue marble }) = \frac{24}{50} = \frac{12}{25}$
11.	$P(\text{ Zone and won }) = \frac{6}{20} = \frac{3}{10}$
12.	$P(\text{ Zone or won or both }) = \frac{11 + 12 - 6}{20} = \frac{17}{20}$
13.	$P(\text{ Won given Zone }) = \frac{6}{11}$
14.	$P(\text{Blue T shirt }) = \frac{5}{20} = \frac{1}{4}$
15.	$P(\text{ Not Blue given } T \text{ shirt }) = \frac{5}{12}$

Section 2 (1 mark each)		
	Working	**Answers**
1.	Very likely is a probability more than $\frac{1}{2}$, so $\frac{4}{5}$ is only one which meets this criteria.	D
2.	$P(\text{Blue}) = \frac{8}{40} = \frac{1}{5}$	C
3.	Number of Red and White = 15 + 25 =40 Number of Blue = 60 – 40 = 20 $P(\text{Blue}) = \frac{20}{60} = \frac{1}{3}$	B
4.	Kerrie and Max made 15 calls. $P(15 \text{ calls}) = \frac{2}{6} = \frac{1}{3}$	B
5.	Number of calls made altogether = 15 + 20 + 15 + 20 + 10 + 20 =100 $P(\text{Steve}) = \frac{20}{100} = \frac{1}{5}$	A
6.	$\text{P(W)} = \frac{2}{12} = \frac{1}{6}$ $P(\overline{W}) = 1 - \frac{1}{6} = \frac{5}{6}$	C
7.	$\text{P(W or R)} = \frac{1}{6} + \frac{1}{2} = \frac{2}{3}$	B
8.	8 hours between 9am and 5 pm. Closed for 2×15 min = $\frac{1}{2}$ hour. $P(\text{ not open}) = \frac{30}{8 \times 60} = \frac{1}{16}$	A
9.	There are 3 brand Y phones of which 2 are coloured. $P(\text{ Brand Y and coloured }) = \frac{2}{8} = \frac{1}{4}$	B
10.	Two are brand X, but 1 is coloured (ie both) so one brand X. Five are coloured of which one is brand X, so four coloured. $P(\text{Brand X or coloured but not both }) = \frac{5}{8}$	D
11.	25 out of 80 $P(\text{Laptop for work }) = \frac{25}{80} = \frac{5}{16}$	C
12.	43 used laptop and of these 25 were for work. $P(\text{Work given laptop }) = \frac{25}{43}$	D
13.	$P(\text{Both Swimming and Boating }) = \frac{12}{80} = \frac{3}{20}$	A
14.	15 did swimming only and 28 did boating only a total of 43 $P(\text{Either Swimming or Boating not both }) = \frac{43}{80}$	C
15.	27 participated in swimming, so 80 – 27 = 53 did not do swimming. $P(\text{No swimming }) = \frac{53}{80}$	D

High School
Mathematics Test 2014

Basic Probability

Multiple Choice Answer Sheet

Name ___Marking Sheet

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 ●