**Student activity sheet**  
**Gambling in Australia – quick quiz**

Read the following statements, then circle **T** if you think the statement is true or **F** if you think it is false.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>On average people in North America spend more on legalised gambling each year than do Australians.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>Australian gamblers lose more than $15 billion per year.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>3</td>
<td>More than 75% of the money lost in gambling in NSW is lost on poker machine.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>4</td>
<td>The Government of NSW was the first Australian government to profit from lotteries.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>5</td>
<td>In Australia less than 5% of money raised by state governments comes from lotteries and gambling taxes.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>6</td>
<td>Adults are just as likely as high school students to develop gambling problems.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>7</td>
<td>In Australia gambling on horses is the most popular gambling activity for problem gamblers.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>A higher percentage of teenagers than adults have serious gambling problems.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>9</td>
<td>More male than female high school students gamble regularly.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>10</td>
<td>Levels of gambling in Australia haven’t changed much in the last 20 years.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>11</td>
<td>Less than 2% of Australian adults have a problem with gambling.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>12</td>
<td>One in ten problem gamblers in Australia considers suicide.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>13</td>
<td>History shows people started gambling after 1200 AD.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>14</td>
<td>The chance of winning Powerball is less than 1 in 54 million.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>15</td>
<td>If you play the pokies and you reinvest all your winnings you will eventually lose all your original investment.</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>16</td>
<td>You are more likely to win at lotto if you use your ‘lucky numbers’.</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>
1. False. Australians spend at least twice as much on average on legalised gambling as people in North American and Europe. (Page 12, Summary from the ‘Australian Gambling Industries Inquiry report by the Productivity Commission in Dec 1999.)

2. True. Judged on losses per capita, Australians are the world’s leading gamblers. At $15 billion per year, Australia’s gambling losses exceed its household savings. (Page 1, Gambling in Australia: thrills, spills and social ills)

3. True. At 10 to 12%, poker machines offer one of the lowest house margins of the popular forms of gambling, yet they account for more that 75% of the amounts gambled and lost in NSW (Page 6, Gambling in Australia, thrills, spills and social ills)

4. False. Tasmania was the first to state to decide to profit from lotteries rather than prohibit. (Page 9, Gambling in Australia: thrills, spills and social ills)

5. False. Today, about 12% of the government revenue raised by state governments comes from lotteries and other gambling taxes. (Page 9, Gambling in Australia: thrills, spills and social ills)

6. False. High school students are 2½ times more likely to become problem gamblers than are adults. (Shaffer et al, 1995a)

7. False. Problem Gamblers spend 42.3% of their gambling money on gaming machines (pokies) compared to 33.1% on horses. (Page 22, Summary from the Australian gambling industries inquiry report by the Productivity Commission in December 1999)

8. True. The percentage of teenagers who gamble that are problem gamblers is higher than the percentage of adults who gamble that are problem gamblers. (Page 129, Facing the odds, Harvard Medical School’s division of addictions)

9. True. Teenage males gamble more than teenage females. (Shaffer, 1997)

10. False. Gambling is a big and rapidly growing business in Australia. (Page 2, Commissioner’s key findings, The Australian gambling industries inquiry report by the Productivity Commission in Dec. 1999)

11. False. There are 290 000 adult problem gamblers, representing 2.1% of Australian adults. Commissioner’s key findings, The Australian gambling industries inquiry report by the Productivity Commission in December 1999)

12. True. One in ten [problem gamblers] said they had contemplated suicide due to gambling. (Commissioner’s key findings, The Australian gambling industries inquiry report by the Productivity Commission in December 1999)

13. False. There is a lot of evidence that people have been gambling for thousands of years.

14. True. The chance of winning Powerball is 1 in 54 979155.

15. True. Poker machines don’t return the full amount invested. Usually only 90% is returned. You can expect the machine to return 90% of your investment. When that’s invested again the machine will return 90% of the 90% of the original investment. This table shows the proportion of the original amount left after winnings are reinvested.

<table>
<thead>
<tr>
<th>After 1st investment</th>
<th>After 2nd investment</th>
<th>After 3rd investment</th>
<th>After 4th investment</th>
<th>After 10th investment</th>
<th>After 20th investment</th>
<th>After 30th investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9</td>
<td>(.9)^2 = .81</td>
<td>(.9)^3 = .729</td>
<td>(.9)^4 = .656</td>
<td>(.9)^5 = .35</td>
<td>(.9)^6 = .12</td>
<td>(.9)^7 = .04</td>
</tr>
</tbody>
</table>

16. False. Every set of the same quantity of numbers has an equally small probability of winning.
Student activity sheets
Chance events

• If you get 3 heads in a row when you toss a coin you’re more likely to get a tail than a head on the 4th coin toss.

• Kate is going for a driving test. There are two possible outcomes. Either she will pass or she will fail. The probability she will pass is ½.

• When I toss a coin there are two possibilities. I can get a head or a tail. The probability I will get a head is ½.

• A couple has 3 daughters. If they have another baby it is likely to be a boy because 4-girl families are uncommon.

• Eighteen horses numbered 1 to 18 are going to run in the Melbourne Cup. The probability that the horse numbered 7 will win is 1/18.

• There are 26 letters in the English alphabet. If I select a letter at random from the page of an English novel the probability that it will be an e is 1/26.

• In roulette 18 numbers are red, 18 are black and 1 is green. In the last 5 spins of the roulette wheel the ball stopped on a red number. On the next spin the ball is more likely to stop on a black number than a red number.

• In a form of lotto, players choose 4 numbers from the numbers 1 to 20. The set of numbers 10, 11, 12 and 13 is less likely to win than a set of 4 numbers than aren’t in order.

• There are 5 different pictures on a poker machine wheel. There are 6 crowns, 4 hearts, 3 clubs, 2 kings and 1 ace. The probability that the wheel will stop on an ace is 1/5.

• When I toss 2 coins I can get 2 heads, 2 tails or a head and a tail. The probability that I will get 2 heads is 1/3.

• On a normal 6-sided die, half the numbers are even and half are odd. When I roll this die the probability that I will get an odd number is ½.

• Kylie doesn’t know the answer to a 4-answer multiple choice question. She is going to guess A, B, C or D. The probability that she will guess incorrectly is ¾.

• Traffic lights can be red, green or orange. The probability that a traffic light will be red as you approach it is 1/3.
Student activity sheets
Gambling: calculating the risk website evaluation

An evaluation is the process of finding out the value or worth of something.

You can try to determine the value of almost anything – but values are subjective (that means different things have different values to different people). For example, the music you may like because it is loud and has a throbbing beat may be the music your grandparents don’t like for the same reasons you like it!

One way of evaluating things is to ask questions of different people – for example, by means of a questionnaire. We have given you some sample questions on the next page. Depending on who you intend to interview here are some other questions you could ask (you also might like to add some of your own):

- age (you could give age ranges, eg, 10-19, 20-29, 30-39, 40-49, etc)
- sex (male/female)
- educational background (year 7/8, year 9/10, year 11/12, technical college, university)
- where people live
- whether people work or not (maybe full time/part time)
- what kind of work people do

In developing the questionnaire and evaluating the data it is important to consider what you wish to find out but also the context of what the developers of the website hoped to achieve.

The aims of the site were to:

- Give the public (including students) the skills and information to help them decide whether they wished to gamble as part of their leisure time
- Make people aware of the legal age to gamble
- Tell people where to find help if they have a gambling problem
- Make a fun and educational game that shows the social impacts of gambling
- Explain mathematical probability as it applies to gambling
Here are some more sample questions which you could use to evaluate whether the Gambling: calculating the risk website works well to achieve its aims. But remember – it might also be worth asking some personal background questions suggested on the previous page first.

How did you first become aware of the Gambling: calculating the risk website?

<table>
<thead>
<tr>
<th>Search engine</th>
<th>Links from other sites</th>
<th>Teacher</th>
<th>Friend</th>
<th>Visiting an exhibition about gambling</th>
<th>From a card promoting the website</th>
<th>Browsing</th>
<th>Other</th>
</tr>
</thead>
</table>

(A question like this one could help you to find out whether the website reaches as many people as it could, or whether there might have been better ways of publicising it and reaching a wider audience.)

How many times did you visit the Gambling: calculating the risk website?

<table>
<thead>
<tr>
<th>Once</th>
<th>Between 2-4 times</th>
<th>Between 5-10 times</th>
<th>11-20 times</th>
<th>More than 20 times</th>
</tr>
</thead>
</table>

Will you to revisit Gambling: calculating the risk website?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

What was the main purpose of your visit to Gambling: calculating the risk website?

<table>
<thead>
<tr>
<th>Browse</th>
<th>Homework</th>
<th>Class work</th>
<th>To learn something of personal interest</th>
<th>To play</th>
<th>Investigate for a class project</th>
<th>Other</th>
</tr>
</thead>
</table>

What did you like (or not) about Gambling: calculating the risk website?

<table>
<thead>
<tr>
<th>Look and feel</th>
<th>Navigation: ease of getting around</th>
<th>Navigational: speed and reliability</th>
<th>Content</th>
<th>Interactivity: game play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very dissatisfied</td>
<td>Dissatisfied</td>
<td>Neither satisfied or dissatisfied</td>
<td>Satisfied</td>
<td>Very satisfied</td>
</tr>
</tbody>
</table>
Would you recommend this site to a friend, family member or colleague?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

For those aged 18 years or over: Do you think in the future you will gamble more, the same, or less after visiting this site? Tick one.

- More
- Less
- The same

For those aged under 18 years: Do you this website will have any influence on how you may approach gambling when you may legally do so?

- Yes – has helped me to be more informed
- No – I don’t think I would ever have been much interested in gambling anyway
- No – it hasn’t made any difference to me

Comments:........................................................................................................................................
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Collate results

After you have gathered all the information, you need to collate the results of your class. That means to gather them all together and find out how the results varied between (depending on your questions), the age, sex and background of the people you asked.

So you might end up filling in the questionnaire on the blackboard, putting down the numbers of each category (male/female, age, etc) who answered the questions in a particular way.

You would get an idea of whether the website was successful in achieving its aims, and whether it was more or less successful for different types of people.

Discuss possible improvements

You might then be able to discuss in class how the website might have been changed to reach more people more successfully. Or been easier to use. Or to better teach the maths of probability.

What else could you find out with your evaluation?

* * * * *
Student activity sheet
Expectation

Applying relative frequency to predict future experimental outcomes

How many time can you expect to win?
When you play a game a few times you can be lucky and win or unlucky and not win at all. However, the more you play a game, the closer the number of times you win comes to the theoretical number of times you can expect to win.

Theoretical number of times you will win = number of games X probability of winning

Example
John is playing a dice game. Every time he plays the game it costs John $2. The probability that his number will win is 1/5. Each time he wins he will receive $6. When he loses he receives nothing. At the start of the game John had $20 and he used the money to play the game 10 times. How much can he expect to have at the end of the 10 games?

Solution

Theoretical number of wins = number of games X probability of winning
= 10 X 1/5
= 2

Theoretically, John will win 2 of the 10 games. For the two winning games he will receive 2 X $6 or $12. As it cost him $20 to play, John can expect to lose $8.

This means that if John plays the game a lot, on average he will lose $8 every time he plays 10 games. Of course, sometimes he will win and other times he will lose more than $8, but in the long run he can expect to lose $8 for every $20 he spends to play.

* * * * * * *
1. Gwen bought 8 scratch lottery tickets. Each ticket cost $2 and had 3 sections to scratch. Under each scratch section is a symbol of an island or a car. The island and car symbols are equally likely to be under each section. For each ticket that has the same picture in all 3 sections Gwen will receive $7.

The diagram shows the 8 possible lottery tickets:

<table>
<thead>
<tr>
<th>Island</th>
<th>Island</th>
<th>Island</th>
<th>Car</th>
<th>Car</th>
<th>Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Island</td>
<td>Island</td>
<td>Island</td>
<td>Car</td>
<td>Car</td>
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<tr>
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<td>Car</td>
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<td>Car</td>
</tr>
</tbody>
</table>

a) What is the probability of getting 3 symbols that are the same in this scratch lottery?
b) Theoretically, how many of Gwen’s tickets will win a prize?
c) How much will Gwen receive from her theoretical winning tickets?
d) Theoretically, how much can Gwen expect to win or lose with the 8 tickets she bought?

2 Faiz is paying $3 to play a dice game. When a pair of dice are rolled the dealer pays Faiz $5 if either or both dice show a 1 or a 2. The probability of either a 1 or a 2 showing is 5/9. Faiz is going to play the game 18 times.

a) How much will it cost Faiz to play 18 games?
b) Theoretically, how many games will Faiz win?
c) Theoretically, how much can Faiz expect to win or lose when he plays the game 18 times?

3 A roulette wheel contains 18 red numbers, 18 black numbers and 1 green number. Kim is betting that the ball will land on a red number. Each bet costs him $10 and he receives $20 every time the ball stops on a red number. If the ball stops on a black or green number he receives nothing. If he makes the same bet 50 times how much can he expect to win or lose?

Answers
1a 1/4 1b 2 1c $14 1d Lose $6
2a $54 2b 10 2c Lose $4 3 He can expect to lose $13.51

* * * * * * * *
Student activity sheet
Probability and odds

Probabilities are always expressed as fractions, decimals or percentages. Usually probabilities are expressed as fractions. In any form

\[
\text{Probability} = \frac{\text{number of favourable outcomes}}{\text{Total number of equally likely outcomes}}
\]

Odds are expressed as a ratio.

\[
\text{Odds} = \frac{\text{number of ways it won't happen}}{\text{the number of ways it can happen}}
\]

Example
The probability of rolling a 3 on a die = \(\frac{\text{the number of ways to get a 3}}{\text{The total number of equally likely outcomes}}\)
= \(\frac{1}{6}\)

The odds of getting a 3 on a die = \(\frac{\text{number of ways of not getting a 3}}{\text{number of ways of getting a 3}}\)
= 5 : 1

Practice questions

1a What is the probability of getting a number bigger than 4 when you roll a die?
1b What are the odds of getting a number bigger than 4 when you roll a die?

2a Darren is going to spin the arrow. What are the odds that the arrow will stop on blue?
2b Darren is going to spin the arrow. What is the probability that the arrow will stop on red?

3a In a bag there are 11 coloured disks, 6 black and 5 white. One disk is selected at random. What is the probability it will be white?
3b In a bag there are 11 coloured disks, 6 black and 5 white. One disk is selected at random. What are the odds it will be black?

4 The odds that Big Black will win his next race are 7 : 2. What is the probability that he will win his next race?

5 The probability that a roulette wheel will stop on a red number is 18/37. What are the odds that a roulette ball will stop on a red number?

6 Which event is the more likely to happen? An even with a probability of 2/5 OR an event with odds of 2 : 1.

Answers
1a 2/6 = 1/3 1b 4 : 2 = 2 : 1 2a 3 : 1 2b ¼ 3a 5/11 3b 5 : 6
4 2/9 5 19 : 18 6 The event with a probability of 2/5

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Supported by G-Line (NSW)
A telephone helpline for people with gambling problems - 1800 633 635
www.powerhousemuseum.com/gambling