



Grade 8

DATA MANAGEMENT AND PROBABILITY: APPLICATIONS

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Play **Train Race** <http://www.bbc.co.uk/education/mathsfile/shockwave/games/train.html> first.
You may also go to www.wiredmath.ca for the link.

1. Find the mean, median, mode and range.
 - a. - 6, 12, 23, - 31, 23, - 9
 - b. 1.5, 8, 3.25, 29, 12
 - c. - 93.7, 3.8, - 5.9, 19.2, 30.5, - 28.5, -5.9

2. Ms Charter's grade 8 class decided to measure and record the length of every students hair. The information recorded is on the chart.

Student Number	Hair Length (cm)
1	12
2	10
3	6
4	0
5	23
6	2
7	1
8	15
9	9
10	8
11	12
12	20
13	12

- a. What are the mean, median, mode and range of hair length?
- b. i. If Ms Charter decided to include her hair length (38 cm) in the tally, what would be the new mean and median?
ii. Is the mean or median more affected? Explain.

3. Bobby's long jump distances are as follows: 142 cm, 157 cm, 149 cm, and 152 cm.
 - a. What is the mean of these distances?
 - b. How far must Bobby jump on his next trial to achieve a mean distance of 154?

The Probability of an event equals the number of favourable outcomes divided by the total number of possible outcomes.

The probability that one of the six faces on a die will turn up

$$\text{a 4 is } P(4) = \frac{1}{6}.$$

The probability of rolling an odd number with the die is

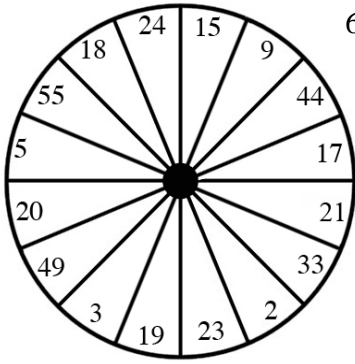
$$P(\text{odd number}) = \frac{3}{6} = \frac{1}{2}.$$

Example,

4. With a single die, what is the probability of rolling each of the following?
 - a. a 5
 - b. an even number
 - c. a number less than 3
 - d. a number greater than 2

Expectations: i) organize categorical, discrete, or continuous primary and secondary data visually; ii) read, interpret, and draw conclusions from primary and secondary data; iii) determine appropriate measure of central tendency needed to compare sets of data; iv) identify the complementary event for a given event, and calculate the theoretical probability that the event will occur. For more activities and resources from the University of Waterloo's Faculty of Mathematics, please visit www.cemc.uwaterloo.ca.

5. In a grade 8 class of 29 students, there are 14 girls. In a draw, what is the probability of drawing a boy's name?



6. Given the spinner on the left.
- What is the probability of landing on a prime number?
 - What is the probability of landing on a multiple of 2?
 - What is the probability of landing on a multiple of 2 or a multiple of 3?
 - What is the probability of landing on a multiple of 2 and a multiple of 3?

Odds compare the chance of an outcome occurring to the chance of the outcome not occurring rather than the total possible outcomes.

Example,

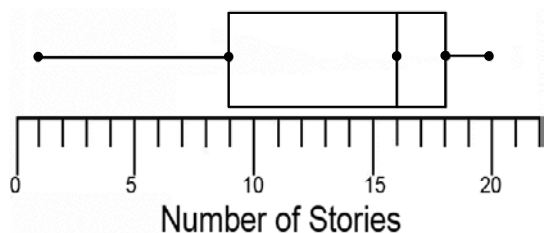
The odds that one of the six faces on a die will turn up a 4 is $\frac{1}{5}$ or 1:5

The odds of rolling an odd number with the die are $\frac{3}{3} = \frac{1}{1}$ or 3:3 = 1:1

7. Use the spinner in question 6.
- What are the odds of landing on a prime number?
 - What are the odds of landing on a multiple of 2?
 - What are the odds of landing on a multiple of 2 or a multiple of 3?
 - What are the odds of landing on a multiple of 2 and a multiple of 3?
- 8.
- What are the odds of drawing a 6 of any suit from a standard deck of 52 playing cards?
 - What are the odds against drawing a diamond?
9. The odds of having one of your tickets drawn at the class raffle are $\frac{3}{46}$, what is the probability that your ticket will not be drawn?

Visit http://en.wikipedia.org/wiki/Box_and_whisker_plot for information on box and whisker plots.

10. The number of stories on 48 apartment buildings is shown on the whisker plot.



- What is the median number of stories?
- About how many buildings surveyed have 16 or more stories?
- About how many have between 9 and 16 stories?

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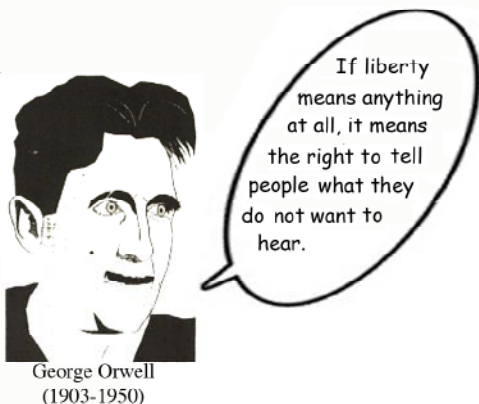
11. Create a box and whisker plot from the following numbers:
4, 3, 14, 45, 12, 9, 12, 15, 7.
- What effect does the outlier have on the shape of the box and whisker plot?
 - What can be done to lessen the effect of the outlier?

An **outlier** is a value that is far from most others in a list of values.

12. An experiment consists of rolling two dice, one red and one blue, and recording the number appearing on the up faces.
- Complete the chart for the experiment. The ordered pair (r, b) indicates that the number on the red die is r and on the blue die is b .

Number on the Blue Die \ Number on the Red Die	1	2	3	4	5	6
1	(1, 1)	(1, 2)				
2						
3						
4						
5						
6						

- Use the chart above to list the following outcomes. State the number of outcomes in each event.
 - The sum of the faces is six.
 - The sum of the faces is eight.
 - The sum of the faces is five.
 - The sum of the faces is nine.
 - A number greater than 4 appears on either or both dice.
13. Results for a math test out of 40 for class A and class B are shown below.
Class A: 32, 29, 15, 35, 29, 40, 30, 30, 22, 38
Class B: 23, 34, 23, 14, 19, 38, 37, 29, 25, 38
- Which class had a higher mean?
 - Create a back to back stem and leaf plot using the data.
 - Which class had more students score 30 or above?



14. George Orwell, author of famous literary works *Animal Farm* and *1984*, is considered one of the most influential authors in history because of the political and moral messages in his works. If you were to write his name on a piece of paper, cut out each letter separately and put them in a hat, determine the odds:
- of drawing the letter W?
 - of drawing the letter E?
 - against drawing a vowel?
 - Express each of the above as a percentage.

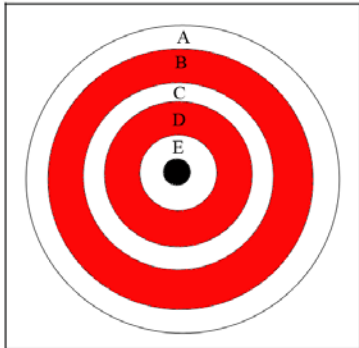
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15. After putting all her pennies into a penny jar, Naji has 35 cents left in her pocket.
- How many different combinations of coins can Naji have in her pocket?
 - What percentage of the combinations contains one or more dimes?

CHALLENGE YOURSELF!

16. Using the numbers from 1 to 10, create a list of 8 numbers whose mean is twice as large as the median.

17. The layout of the target is as follows: A covers $\frac{5}{20}$, B covers $\frac{6}{20}$, C covers $\frac{2}{20}$, D covers $\frac{4}{20}$,



E covers $\frac{2}{20}$, and the “bull’s eye” is the small circle in the centre.

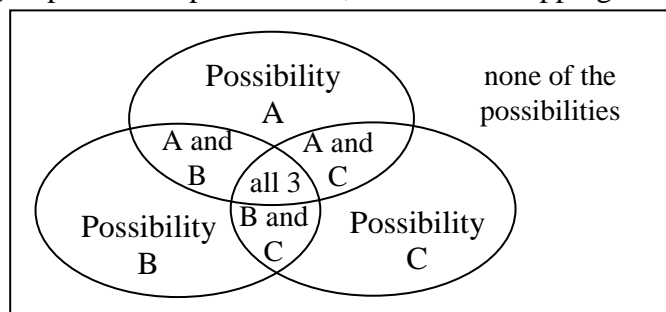
The target covers $\frac{2}{3}$ of the wall on which it stands.

- What is the probability of hitting the bull’s eye?
 - What are the odds of hitting the bull’s eye?
 - What are the odds against hitting a white ring on the target?
18. a. What 5 consecutive numbers have an average of 19?
b. Nine consecutive integers have a sum of 99. What is the value of the highest integer?

EXTENSIONS

19. A baseball team has won 50% of the 60 games it has played. Find the number of games the team must win in succession to increase its winning percentage to 60%.
20. Emiko is in a class of 32 students. 12 of those students are in the band, 16 are on the basketball team, and 15 are in the school international club. 5 students are in the band and on the team, 8 students are in the band and the club, and 9 students are on the team and the club. Only 3 students belong to all 3. Use a Venn diagram to determine the probability that Emiko is not part of any of these.

A Venn diagram uses circles to group different possibilities, and the overlapping areas represent things in common between two circles.



Go to http://en.wikipedia.org/wiki/Venn_diagram for more information on Venn Diagrams.

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