

Year 9 Term 2 Homework

Student Name: _____	Grade: _____
Date: _____	Score: _____

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8 Year 9 Term 2 Week 8 Homework

8.1 Probability

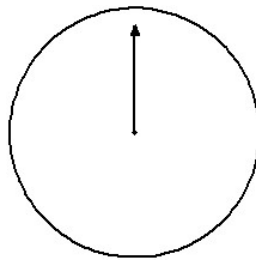
Exercise 8.1.1 Further applications

1. Four students are about to play cards and draw one card to decide who deals first. The person with the higher card will deal first. The cards are from highest to lowest, Ace, King, Queen, Jack, 10, ... 2. If numbers are equal, then they compare suits with hearts highest, then diamond, clubs and finally spades.

Linda draws a Jack of clubs then replaces her card in the pack. Emma draws a 6 of hearts then replaces it. Sandy draws a 10 of diamonds then replaces it. Carlo is the last to draw. What is his chance of winning?

2. Design a spinner, with coloured sectors with the following probabilities:

$$P(\text{blue}) = \frac{1}{3}, P(\text{red}) = \frac{1}{4}, P(\text{green}) = \frac{1}{4}, P(\text{yellow}) = \frac{1}{6}$$



3. A boy holds his maths textbook and his friend tosses an ordinary die into the book, and it falls with an edge in the centre and two faces up. What is the probability that:

(a) the two faces up are 3 and 5?

(b) one of the two faces up is a 4?

(c) the sum of the two faces is 6?

(d) the sum of the two faces is 7?

8.2 Surds

8.2.1 Rational and irrational numbers

1. A rational number is a number that can be written in the form of $\frac{a}{b}$, where **a** and **b** are integers and $b \neq 0$.
2. An irrational number is a number that **can not** be written in the form of $\frac{a}{b}$.

8.2.2 Surds

- A surd is a root of a rational number that is itself irrational. ($\sqrt{2}$)
- \sqrt{x} is the positive square root of x for $x > 0$
- $\sqrt{x} = 0$ if $x = 0$
- \sqrt{x} is undefined if $x < 0$

Exercise 8.2.1 State whether each of these numbers is rational or irrational:

1. $\sqrt{15}$ _____
2. $\sqrt{25}$ _____
3. $\sqrt{90}$ _____
4. $\sqrt[3]{8}$ _____
5. $\sqrt[3]{88}$ _____
6. 0.7 _____
7. $\frac{22}{7}$ _____
8. $4 \times \pi$ _____
9. $0.\dot{2}\dot{7}$ _____
10. $\frac{\pi}{4}$ _____

Exercise 8.2.2 Between which two consecutive integers does each of these surds lie?

1. $\sqrt{5}$ _____
2. $\sqrt{18}$ _____
3. $\sqrt{124}$ _____

Exercise 8.2.3 Express each of these irrational numbers as a decimal, correct to 1 decimal place.

1. $\sqrt{8}$ _____

2. $\sqrt[3]{12}$ _____

3. $3\sqrt{29}$ _____

4. $3\sqrt{2} + 2\sqrt{7}$ _____

5. $\frac{2+\sqrt{10}}{2}$ _____

6. $\frac{\sqrt{3}+\sqrt{12}}{5}$ _____

7. $\frac{14-3\sqrt{3}}{2\sqrt{5}}$ _____

8. $\frac{2+\sqrt{5}}{2-\sqrt{5}}$ _____

8.2.3 Simplifying surds

- Express \sqrt{n} in the form $\sqrt{p} \times \sqrt{q}$ where $n = p \times q$ and p is the largest square number which divides into n.
- Write the answer in the form $a\sqrt{q}$, where $a = \sqrt{p}$
- For example: $\sqrt{18} = \sqrt{9 \times 2} = \sqrt{3^2 \times 2} = 3\sqrt{2}$

Exercise 8.2.4 Express each of these in simplest surd form.

1. $\sqrt{24}$ _____

2. $\sqrt{45}$ _____

3. $\sqrt{150}$ _____

4. $\sqrt{200}$ _____

5. $\sqrt{128}$ _____

6. $5\sqrt{75}$ _____

7. $8\sqrt{88}$ _____

8. $3\sqrt{63}$ _____

8.3 Miscellaneous exercises

Exercise 8.3.1

1. A train leaves Town A for Town B at 12 noon, and another train leaves Town B for Town A forty minutes later. Both trains follow the same route and travel at the same uniform speed, taking $3\frac{1}{2}$ hours to complete the journey. At what time will they pass?

2. On a market day in a village, seven pineapples are worth the total value on nine bananas and eight mangos, whereas five pineapples are worth total value of six bananas and six mangos. On the same day, one pineapple is worth the same as:

- (a) two mangos
- (b) 1 bananas and 2 mangos
- (c) 3 bananas and 1 mango
- (d) 1 banana and 1 mango
- (e) 4 bananas

3. Town A and Town B were 672 km apart. Tony left Town A at an average speed of 72 km/h. He maintained this speed for 4 hours before increasing it by 24 km/h for the rest of the journey to Town B. Find his average speed for the whole journey.

4. Anna and Bonnie have a bicycle race. Anna cycles at a speed of 54 km/h. Bonnie cycles at a speed of 45 km/h. If Anna lets Bonnie start 40 min before her, how long will she take to catch up with Bonnie?

8.4 Maths challenge**Exercise 8.4.1**

1. $\sqrt{2}\sqrt{2\sqrt{2}}$ equals:

(A) $3\sqrt{2}$

(B) $2\sqrt[4]{2}$

(C) 2

(D) $\sqrt[3]{2}$

(E) $\sqrt{6}$

2. In a box are nine identical marbles. Four of these marbles are red and five are not. Adam is blindfolded and selects two marbles. The probabilities that Adam selects at least one red marble is:

(A) $\frac{4}{9}$

(B) $\frac{56}{91}$

(C) $\frac{11}{18}$

(D) $\frac{2}{3}$

(E) $\frac{13}{18}$

3. Human twins are of two types - identical and fraternal. Identical twins must always be of the same sex while the sexes of fraternal twins are unrelated. Boys and girls are equally likely. Assuming that one third of all human twins are identical, the probability that twins are both girls is:

(A) $\frac{1}{6}$

(B) $\frac{1}{4}$

(C) $\frac{1}{3}$

(D) $\frac{1}{2}$

(E) $\frac{2}{13}$

4. Two dice are thrown at random. The probability that the two numbers obtained are the two digits of a perfect square is:

(A) $\frac{1}{9}$

(B) $\frac{2}{9}$

(C) $\frac{7}{36}$

(D) $\frac{1}{4}$

(E) $\frac{1}{3}$
