

GENERAL MATHEMATICS EXERCISES FOR YEAR 8 AND 9 STUDENTS

BY

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Tolentino Tuition, Year 8/9 Mathematics

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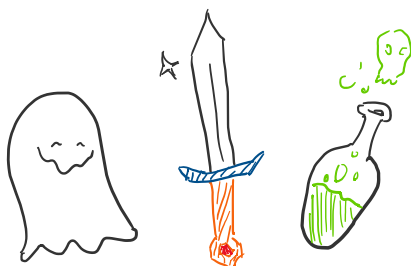
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EXERCISE 1

Assessing:

Natural numbers, integers, index notation, order of operations, primes and composites, square numbers and square roots

1. Which numbers fall into the set of 'natural numbers' ($\mathbb{N}$)?
2. A historic site is running three shows. 'The ghost tour' runs for 45 minutes, 'sword-fighting' is 1 hour long and 'potion-making' takes half an hour longer than 'sword-fighting'. If all three shows start together, and run continuously throughout the day, how many minutes will pass before all three shows start together again?



3. Please evaluate
 - A. $(2 + 3) - 60 \div 15$
 - B. $\frac{-17 \times -4 + 3}{5 - (4 \div 2)}$
4. Please simplify the following, without the use of a calculator
 - A. $2^3 \times 3^2 \times 11$
 - B. $(-4)^2 \times (-5)^3$

5. **Challenge:** Can you explain what is meant by a 'prime number'? And can you express 288 as the product of prime factors, in index form?

For example, the index form of


$$2 \times 2 \times 2 = 2^3$$

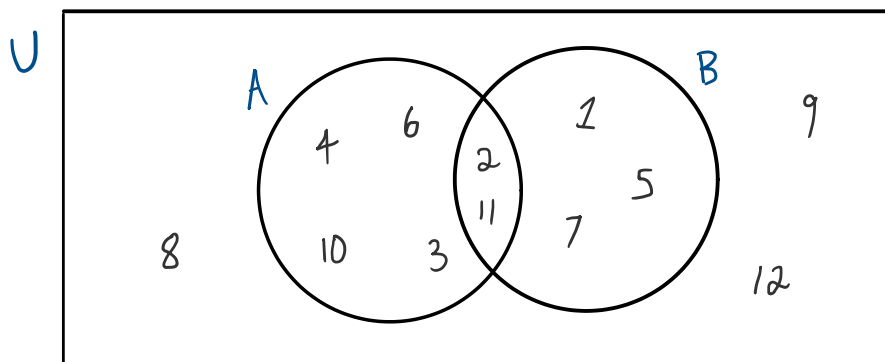
6. Between which two consecutive integers does $\sqrt{71}$ lie?
(Consecutive integers might be 1 & 2, *or* 5 & 6 etc.)

EXERCISE 2

Assessing:

Sets and Venn diagrams

1. Please consider the Venn diagram below:



Please list the elements of,

- i. A
- ii. B
- iii. $A \cap B$
- iv. $A \cup B$
- v. A'
- vi. B'
- vii. U

2. Let $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$.

Please draw a Venn diagram to represent

$$A = \{4, 7, 8, 12\}$$

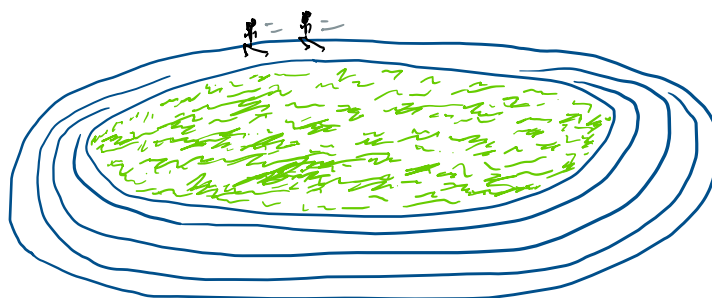
$$B = \{1, 2, 7, 8, 11\}$$

EXERCISE 3

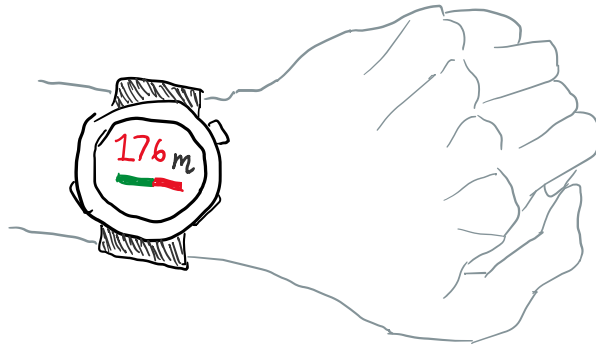
Assessing:

Operations with fractions and decimal numbers, rational numbers, irrational numbers

1. Can you explain the difference between the set of real numbers ($\mathbb{R}$) and the set of natural numbers ($\mathbb{N}$)?
2. Can you explain the difference between a *rational* number and an *irrational* number, giving an example for each?



3. Roland and Svetlana are running laps around a 400 metre track. Roland completes his first and second laps in 53.2 and 51.7 seconds respectively. Svetlana completes her first and second laps in 48.3 and 47.9 seconds respectively.
 - A. What was the difference between Roland and Svetlana's *average* time per lap, for the two laps that they ran, in minutes?
 - B. What fraction of Roland's second lap time was Svetlana's first lap time? Please express your answer in simplest form.



- C. Potentially due to running her first two laps too quickly, Svetlana stops running with 176 metres remaining on her third lap of the track.
- i. What fraction of one lap of the track did Svetlana run? Please express your answer in simplest form.
 - ii. Can you express your answer to (i) as a real number?
 - iii. What percentage of one lap of the track remained for Svetlana to run?

EXERCISE 4

Assessing:

Algebraic notation, terminology, generalisation and substitution; collecting like terms

1. Please simplify the following

A. $8 \times v \times v + 6 \times v \times w - 3 \times w \times w \times w$

B. $(4g)^2$

C. $\frac{15a^2b}{3ab^2}$

2. If $a = -5$, $b = 2$ and $c = -1$, please evaluate

A. $(ab)^2$

B. $a(c)^2$

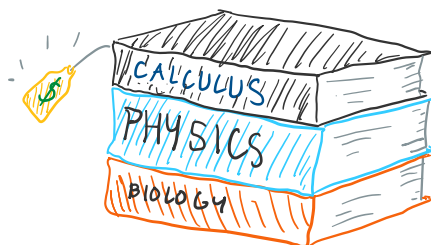
C. $(b - a) + c$

3. Please simplify the following by collecting like terms

A. $3x - 2 + 5x - 3$

B. $2y + 3z + 7y - (10 \div 5)z$

4. Please write $2t^2 - 7uv + 3u^3v^2$ in expanded form



5. Keira is selling a stack of 13 books at her garage sale. p customers bought 2 books each, then Keira added q more books from her bedroom to the stack. Can you write an expression for the number of books that Keira now has in her stack?

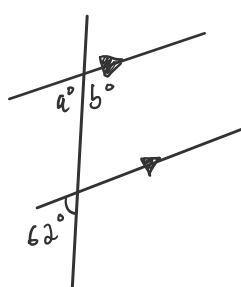
EXERCISE 5

Assessing:

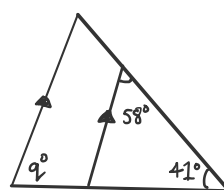
Polygon geometry (see *Haese Mathematics for Australia 8, Chapter 8*)

- Please find the value of each variable, giving reasons for your answers

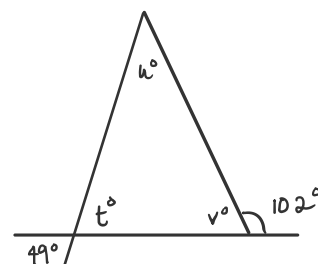
A.



B.



C.



- Please find the values of the variables in the figure below

