
Engage | Inspire | Achieve

EM1
Calculations, percentages and rates

## Goals

Goals for this week:

- ascertain the reasonableness of answers to arithmetic calculations
- use leading digit approximation to obtain estimates of calculations
- use a calculator for multi-step calculations
- check results of calculations for accuracy


## Theoretical Components

## STEP 1

## Resources:

PDF file: Week 3 Notes and Exercises
YouTube videos: Linked in the PDF file
This Week:
We will be looking at:

- Estimate length, weight, time, and other metrics
- Estimate the value of maths sums
- Round numbers to 10's, 100's, 1000's etc


## Practical Components

## STEP 2

Read through Week 3 Notes and Exercises for instructions on what to do.

There are 5 Exercises in this booklet. Read any worked examples before you begin.

If you haven't completed the work from last week, you need to complete it and hand it in.

Remember to regularly check Google Classroom for messages.

## Portfolio Task

## STEP 3

Complete the task at the end of the brief and submit your weekly work. () learning brief

Make sure you have joined the Google Classroom. If you have not, see your teacher.


## ESSENTIAL MATHEMATICS 1

## WEEK 3 - ESTIMATION

## How are we ever going to use this?

- Mentally estimating the amount we have to pay and the change we should receive.
- Estimating the total value of shopping to make sure we have sufficient funds to pay for it.
- Trades people use multiples frequently when they calculate material quantities.


## ESTIMATION

We use estimation when we don't want to, don't need to, or can't get the exact answer. It has recently been proven in a research paper that grown adults use MORE ESTIMATION in everyday life, than they do EXACT answers.

Estimation is something you need to practise to get good at. Things we estimate often include cost, distance, temperature, length, weight, height and time.

Example: Tic tacs cost $\$ 1.95$ each pack. How much would it approximately cost to buy 5 packs.

Solution: $\$ 1.95$ is close to $\$ 2.00$, so $5 \times 2=10$. So 5 packs of tic tacs will approximately cost $\$ 10.00$

## Exercise 1

## Money

Imagine you go to the shops and buy the following items:
Box of cereal, 2 L carton of milk and a loaf of bread.
How much do you think it will cost?

## Distance

How far do you think it is if you were to walk from the college to Hawker Shops and back?

How far do you think it is between Hawker College and your home?

## Temperature

How much hotter or colder than yesterday is it today?

## Length

How long do you think the whiteboard wall is in the Math Hub?

How long is the Gym in Hawker College?

## Mass

How heavy do you think a Chromebook computer is?

How heavy do you think your bag is?

## Height

How tall do you think your math teacher is? (Which teacher have you estimated?)

How much taller or shorter are you compared to your teacher?

## Time

How long do you think it would take you to walk from the Maths staffroom over to the school gym?

How long do you think it would take you to fly to Brisbane from Canberra?

## Others

How many students do you think are studying Essential Mathematics this semester?

How big in area is the Maths Open Area?

How many cars do you think is in the school's car park?

## Exercise 2

| a. The mass of this <br> pumpkin in <br> kilograms... | b. The mass of this giant <br> onion... | C. The height of this giant <br> carrot statue... |
| :--- | :--- | :--- |
| Explain how you |  |  |
| estimated this. |  |  |

## ESTIMATION OF WRITTEN MATH PROBLEMS AND ROUNDING

Often a good way of estimating when doing problems in maths is to ROUND the numbers. Rounding can be done to round decimals off a calculator, you might ROUND UP to OVER-ESTIMATE, or ROUND DOWN to UNDER-ESTIMATE.

Intro video on rounding:
https://www.youtube.com/watch?v=Y7FekoVid54\&list=PL4E3C90726B1F37F0
Copy down the examples given in the video.
Example 1:

Example 2:

## Example 3:



Rounding is used to make numbers easier to work with.

## 268 Mark your place

268 Look next door
2685 or greater. add one more
268 Numbers in front 27 stay the same
268 Numbers behind.
270 zeros their name


## Exercise 3

Play these games, a minimum of 5-10 minutes. You may choose the value to which you are rounding.

## https://www.softschools.com/math/practice/rounding numbers.jsp

Write down five examples correctly rounded.
Example: Rounding to the nearest $100 \rightarrow 3,489 \approx 3,500$
1.
2.
3.
4.
5.

## Exercise 4

1. Round the following numbers correctly to the nearest 10.
a. 91
b. 205
c. 324
d. 149
e. 43
2. Round the following numbers correctly to the nearest 100.
a. 82
b. 216
c. 342
d. 157
e. 34
3. Round the following numbers correctly to the nearest whole number.
a. 9.4
b. 28.6
c. 35.5
d. 18.2
e. 4.9

## Exercise 5

Estimate the value of these calculations, don't work out the exact answer. Indicate as you go if you think the EXACT answer will be MORE or LESS than the answer you have estimated.

1. Subtraction

Example: 168-97
Firstly, round and change the question to $170-100$, then we get the rounded answer of 70 . The actual answer is greater than 70 (just!)
a. $91-47$
b. $104-56$
c. $1,194-583$
d. $23,770-14,789$
e. $45,239-203$
f. $632-192$

## 2. Addition

Example: $168+97$
Firstly, round and change the question to $170+100$, then we get the rounded answer of 270 . The actual answer is less than 270 .
a. $98+49$
b. $105+68$
c. $2,105+901$
d. $4,287+4,265$
e. $4,321+3,421-232$
f. $2,301+6,482-1,543$
3. Multiplication

Example: $224 \times 3$
Firstly, round and change the question to $200 \times 3$, then we get the rounded answer of 600 . The actual answer is greater than 600.
a. $198 \times 5$
b. $987 \times 43$
C. $87 \times 39$
d. $29 \times 5,699$
e. $99,987 \times 99$
f. $16 \times 6,152+126$
g. $35 \times 547-3,681$

## 4. Division

Example: $285 \div 2$
Firstly, round and change the question to $300 \div 2$, then we get the rounded answer of 150 . The actual answer is less than 150.
a. $198 \div 5$
b. $98 \div 51$
c. $81 \div 39$
d. $29,840 \div 3$
e. $99,987 \div 99$
f. $90,245 \div 105 \times 12$
g. $96,251 \div 32,658 \times 35+523$
h. $86,150 \div 42,945 \times 42-634$

## Week 3 Portfolio Task

## Sports estimation

This table shows the percent of annual hospital visits due to sports injuries by males aged 15-19.

| Percent of Male Sports-Related Injuries in the US |  |  |  |
| :--- | :---: | :--- | :---: |
| Sport | Percent | Sport | Percent |
| Basketball | 25.9 | Boxing, Wrestling | 4.4 |
| Football | 21.3 | Exercise | 4.8 |
| Baseball/softball | 4.1 | Bicycling | 8.1 |
| Soccer | 4.6 | Skateboarding | 3.6 |

Write your answers to the following questions in the table, explaining for every question HOW you did it and the rounding you used.

1. Estimate the total percentage of hospital visits due to injuries in baseball/softball, exercising, skateboarding and boxing.
2. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
estimation to estimate how many more
seconds Charlotte dribbled the ball than
3. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
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4. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
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seconds Charlotte dribbled the ball than
5. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
estimation to estimate how many more
seconds Charlotte dribbled the ball than
6. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
estimation to estimate how many more
seconds Charlotte dribbled the ball than
7. Charlotte dribbled a basketball for 43
seconds before Oscar got the ball away.
Then Oscar dribbled the ball for 11.525
seconds before Len got the ball. Use
estimation to estimate how many more
seconds Charlotte dribbled the ball than Oscar.
8. Are there any injuries not accounted for in the above table? How do you know? What percentage if there are some unaccounted for?
9. Are there any injuries not accounted for in
the above table? How do you know? What
percentage if there are some unaccounted
10. About how many more visits were due to football injuries than soccer injuries?
11. What combination of sports accounts for about $50 \%$ of all injuries to the hospital?

MARKING RUBRIC

| CRITERIA | EXPECTATIONS | POSS | MULT | GIVEN | TOTAL |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Practical | Student completes practical work, including exercises of the brief to an acceptable standard set by the teacher. | 2 | 3 |  | /6 |
| Portfolio Task | Student completes the portfolio task of the week to an acceptable standard set by the teacher. | 2 | 2 |  | 14 |
| Reasoning and Communications | Student responses are accurate and appropriate in presentation of mathematical ideas, with clear and logical working out shown. | 4 | - |  | 14 |
| Concepts and Techniques | Student submitted work selects and applies appropriate mathematical modelling and problem solving techniques to solve practical problems, and demonstrates proficiency in the use of mathematical facts, techniques and formulae | 4 | - |  | 14 |
|  | Submission Guidelines |  |  |  |  |
| Timeliness | Student submits the exercises and portfolio tasks by the set deadline. See scoring guidelines for specific details. | 2 | - |  | /2 |
|  |  | FINAL |  |  | /20 |

## Student Reflection:

How did you go with this week's work?

What was interesting?

What did you find easy?

What do you need to work on?

