STRAND 1.2NUMBERS

SUB-STRANDS: *NUMBERS AND OPERATIONS*

KNOW STATEMENT: *APPROXIMATION AND SCIENTIFIC NOTATION.*

A. DECIMAL PLACES AND SIGNIFICANT FIGURES

LEARNING OUTCOMES:

1. Identify the number
    a. Significant figures
    b. Decimal place

2. Round any numbers to
    a. Specific number of decimal place.
    b. Specific number of significant figures
    c. A given place value

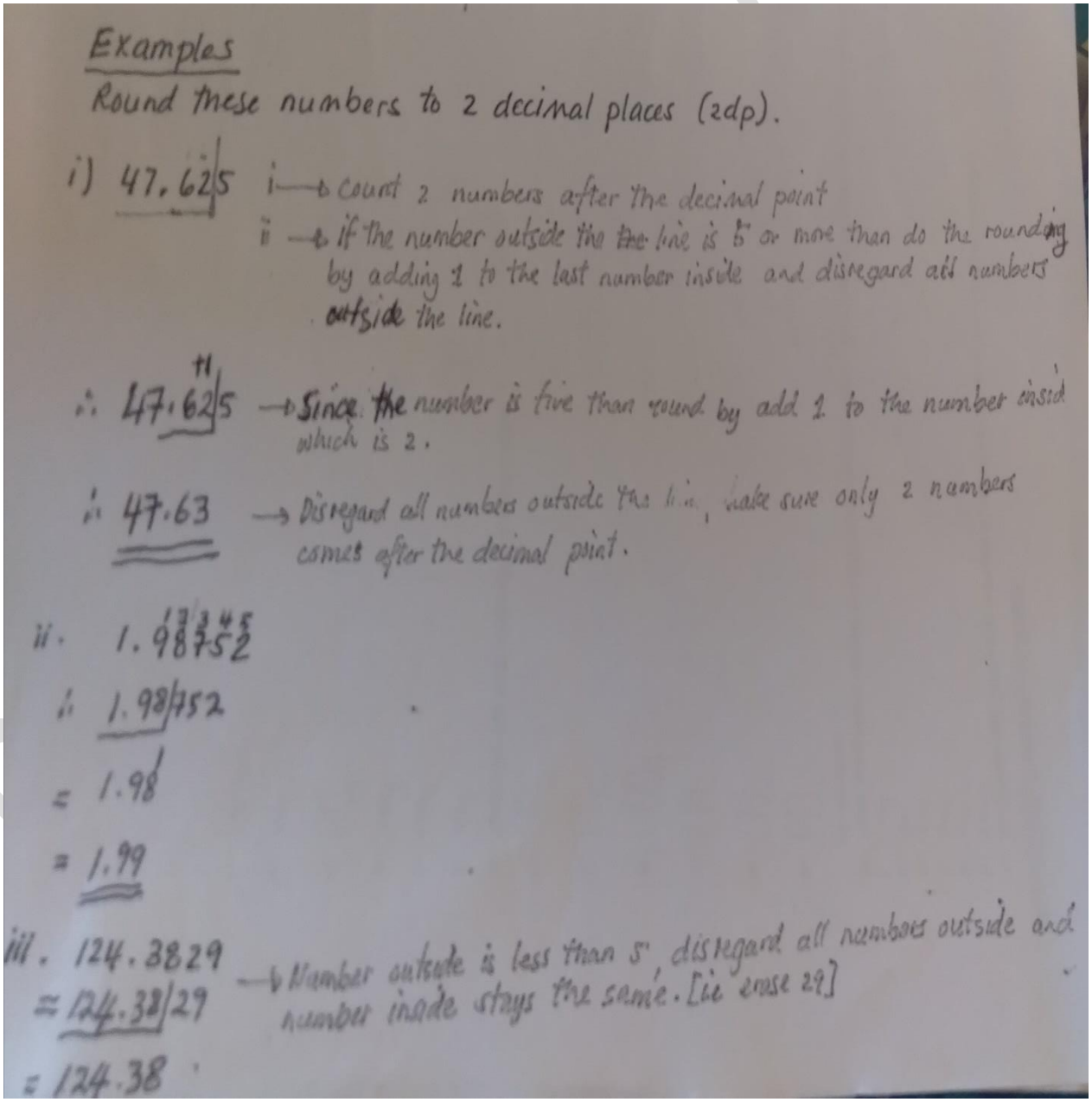
ROUNDING:

An approximating of a number to a less accurate number.

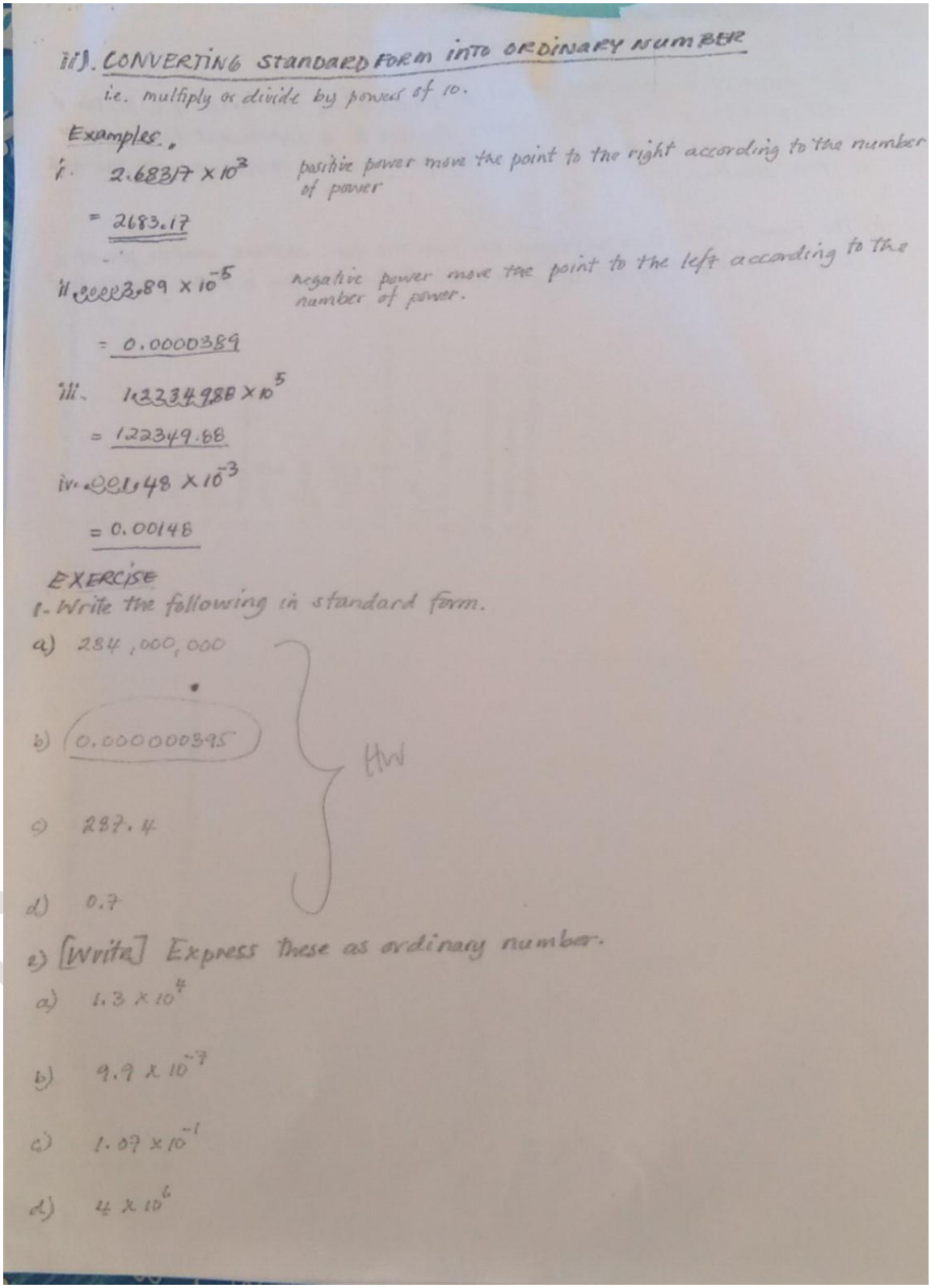
The adjustment of an exact number to one with fewer significant figures.

1. ROUNDING DECIMAL PLACE: WHEN ROUNDING A NUMBER TO A PARTICULAR NUMBER OF DECIMALS PLACE, COUNT THE FIGURE AFTER THE DECIMAL POINT.

EXAMPLES:



CONVERTING STANDARD FORM INTO ORDINARY NUMBER. (**Multiply or divide by power of 10)**



iii). CONVERTING STANDARD FORM INTO ORDINARY NUMBER

i.e. multiply or divide by powers of 10.

Examples.

i. 2.68317×10^{2} positive power move the point to the right according to the number of power

$= 2683.17$

ii. 3.89×10^{-5} negative power move the point to the left according to the number of power.

$= 0.0000389$

iii. 1.2334988×10^{5}

$= 122349.88$

iv. 2.148×10^{-3}

$= 0.00148$

EXERCISE

1. Write the following in standard form.

a) 284,000,000

b) 0.000000395

c) 287.4

d) 0.7

HW

2) [Write] Express these as ordinary number.

a) 1.3×10^{4}

b) 9.9×10^{-7}

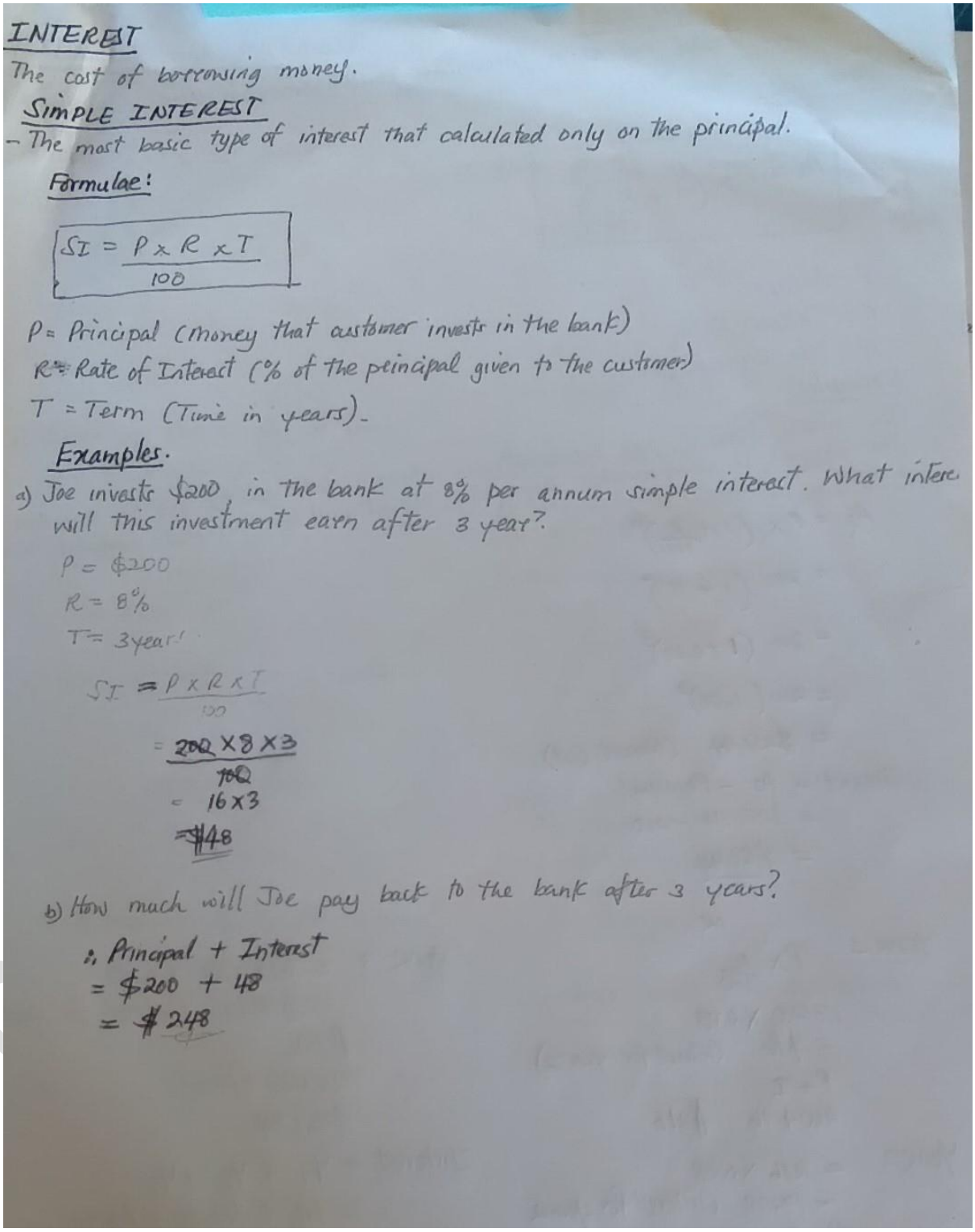
c) 1.07×10^{-1}

d) 4×10^{6}

3. WORD PROBLEMS.

i. The mass of an electron at rest is 9.109×10^{-31} Kg. The mass of a proton at rest is 1.673×10^{-27} kg, both figures correct to 4 significant figures. How many times greater is the mass of the proton, when compared with the mass of the electron.

ii. The Planet Pluto is 5,950,000,000 km from the sun. Neptune another planet is 4.498×10^{9} km from the sun. How much further the sun is Pluto than Neptune?



INTEREST

The cost of borrowing money.

SIMPLE INTEREST

- The most basic type of interest that calculated only on the principal.

Formulae:

$$SI = \frac{P \times R \times T}{100}$$

P = Principal (money that customer invests in the bank)
R = Rate of Interest (% of the peincipal given to the customer)
T = Term (Time in years).

Examples.

a) Joe invests $200 in the bank at 8% per annum simple interest. What interest will this investment earn after 3 year?

P = $200
R = 8%
T = 3years

$$SI = \frac{P \times R \times T}{100}$$

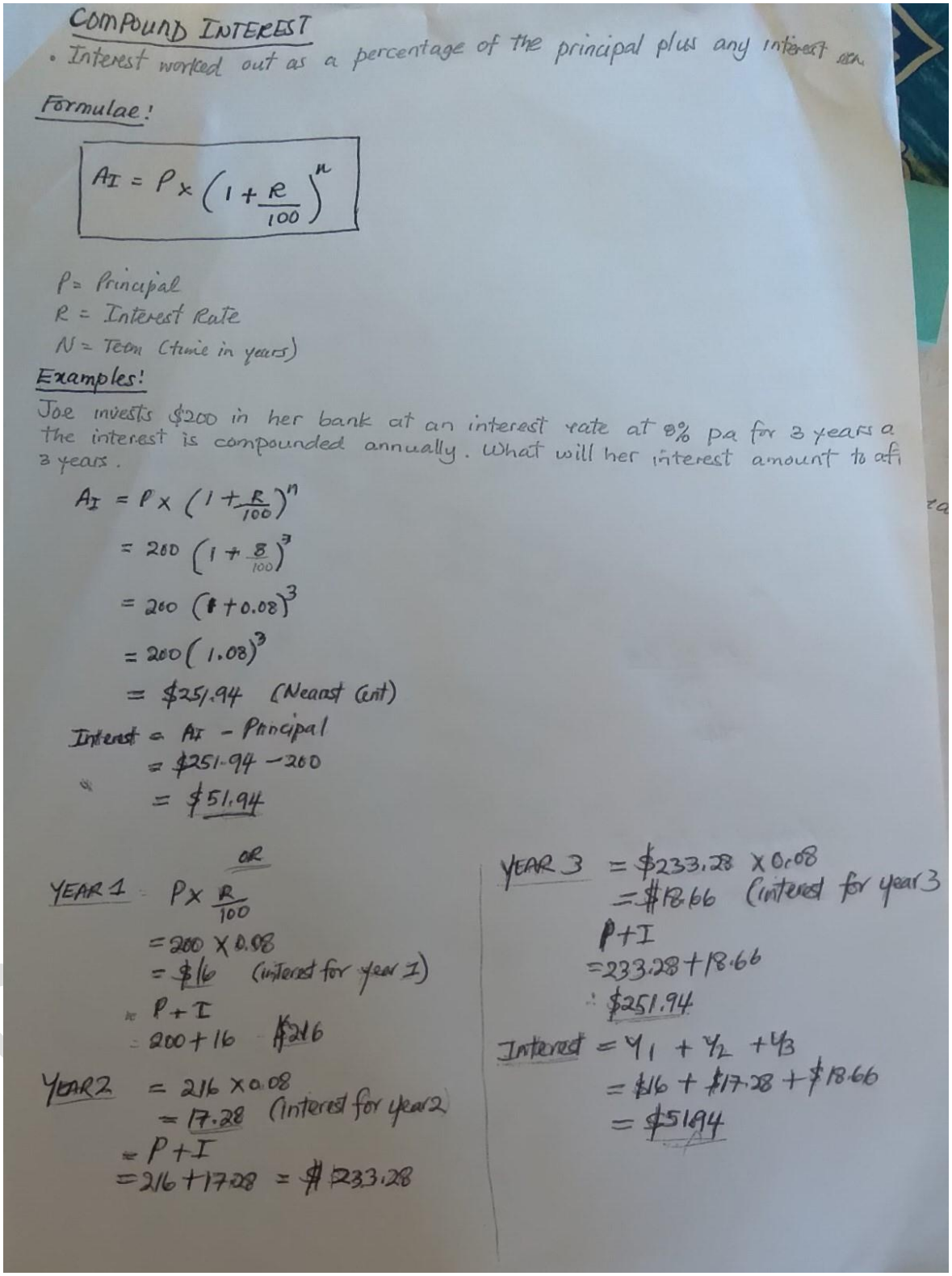
$$= \frac{200 \times 8 \times 3}{100}$$

$$= 16 \times 3$$

$$= \$48$$

b) How much will Joe pay back to the bank after 3 years?

∴ Principal + Interest
= $200 + 48
= $248



COMPOUND INTEREST

- Interest worked out as a percentage of the principal plus any interest ear

Formulae!

$$A_I = P \times \left(1 + \frac{R}{100}\right)^n$$

P = Principal
R = Interest Rate
N = Term (time in years)

Examples!

Joe invests $200 in her bank at an interest rate at 8% pa for 3 years a the interest is compounded annually. What will her interest amount to aft 3 years.

$A_I = P \times \left(1 + \frac{R}{100}\right)^n$

$= 200\left(1 + \frac{8}{100}\right)^3$

$= 200\,(1 + 0.08)^3$

$= 200(1.08)^3$

$= \$251.94$ (Nearest cent)

Interest = A_I − Principal
= $251.94 − 200
= $51.94

OR

YEAR 1 $P \times \frac{R}{100}$
$= 200 \times 0.08$
$= \$16$ (interest for year 1)
P + I
200 + 16 $216

YEAR 2 $= 216 \times 0.08$
$= 17.28$ (interest for year 2)
P + I
$= 216 + 17.28 = \$233.28$

YEAR 3 $= \$233.28 \times 0.08$
$= \$18.66$ (interest for year 3
P + I
$= 233.28 + 18.66$
$\therefore \$251.94$

Interest $= Y_1 + Y_2 + Y_3$
$= \$16 + \$17.28 + \$18.66$
$= \$51.94$

EXERCISE ON INTEREST

1. **Calculate the simple interest earned on these investment.**

a. $2000 at 10% for 8 years

b. $600 at $12\frac{1}{4}$% for 4 years

c. $770 at 14% for 3 months

d. $8000 at 16.2 for 4 years

e. $273.60 at $12\frac{1}{2}$ for 2 years

f. $436 at 16% for 6 months

2. Problem Solving

1. Ross deposits $3000 in his saving account at 13% per year.

a. How much interest has he earned after 3 years?

b. How much does he have altogether in the bank?

2. Sione invests $750 at 18% per year.How much interest will she earned after 12 years?

3. Mele invests $3000 at 10% compound interest for 10 years.

a. How much does she have in her account at the end of this time?

b. How much interest did she received after 10 years?

4. Mr and Mr's Development deposits $32000 in a bank which pays 16% interest per year compoundedly quarterly. Find the total amount of money that the couple will received after 3 years.

Ratio

- Comparison of two or more like quantities.

WAYS OF WRITING RATIO

- use the word "to"
- using colon (:)
- writing as fraction.

Example

- A bag contains 30 black and 40 white marbles. Write the ratio of black marble to white marble.

∴ 30 to 40

∴ 30 : 40

∴ $\frac{30}{40}$.

1. **SIMPLIFYING RATIO** (when simplifying ratio do not write unit in it). (Ratio should not include fraction or decimals) Ratio does not have units.

Examples

a) \$ 8p : 4p

2 : 1

b) $1\frac{1}{2} : 2\frac{1}{4}$ (write as improper fraction).

$\frac{2x}{2x}(\frac{3}{2}) : \frac{9}{4}$ (write common denominator (LCM))

$\cancel{4} \times \frac{6}{\cancel{4}} : \frac{9}{\cancel{4}} \times \cancel{4}$ (cancel denominators by multiplying both sides by 4)

6 : 9 (Simplify by 3)

2 : 3

c) 1.5 : 2.25 (change to whole # by multiplying both number by 100)

×100 ×100

150 : 225 (Simplify)

6 : 9

2 : 3

d) 16mm : 4cm (change to same unit change larger unit to smaller unit).

16mm : 40 mm change 4cm = 40 mm

×10

16 : 40 (simplify by 4)

4 : 10 Simplify by 2

2 : 5

CALCULATIONS WITH RATIOS

Example:

Solution A

a) If $10:3 = a:15$. Find a

$\frac{10}{3} = \frac{a}{15}$ [Use equivalent ratio] → Write as fractions

$10(15) = a(3)$ → solve for a

$\frac{150}{3} = \frac{3a}{3}$

$a = 50$

Solution B

a) $10:3 = a:15$

$\times 5 \quad \times 5$

$10 \times 5 = 50$

$a = 50$

b) A super market ordered hams and turkeys for christmas sales in the ratio 3:5. If 60 turkeys arrived in one order how many hams arrived in the same order?

Solution → let x of hams in order

Hams : Turkey

$3:5 = x:60$

$\times 12 \quad \times 12$

$x = 3 \times 12$

$x = 36$

OR

$3:5 = x:60$

$\frac{3}{5} = \frac{x}{60}$

$3(60) = x(5)$

$\frac{180}{5} = \frac{5x}{5}$

$x = 36$

3) SHARING QUANTITY IN A GIVEN RATIO

Examples.

a) Divide 16 oranges between two people in the ratio 3:5.

$3:5 = 16$

$3+5 = 8 \quad (\frac{16}{8} = (2))$

$3(2) : 5(2)$

$6:10$

OR

$3:5 = 16$

$3+5 = 8$

$\frac{3}{8} \times \frac{16}{1} = 6$ oranges

$\frac{5}{8} \times \frac{16}{1} = 10$ oranges $\therefore 6:10$

b) Divide \$36 in the ratio 2:3:5

$2:3:5 = 36$

$2+3+5 = 36$

$10 = 36$

$\frac{2}{10} \times \frac{36}{1} = \$7.20$

$\frac{3}{10} \times \frac{36}{1} = \$10.80$

$\frac{5}{10} \times \frac{36}{1} = \$18.00$

7.20 : 10.80 : 18.00

EXERCISE:

1. Simplify each of the following ratio.
   a. 8:16

   b. $\frac{1}{2}:\frac{1}{3}$

   c. 0.4kg to 20g

   d. 0.5 : 4

   e. 20 mins to 1hrs

   f. $4\frac{1}{5}:\frac{3}{10}$

2. Find the unknown in each of the following.
   a. 5: 3 = a: 12

   b. 5: 9 = 20: c

   c. $\frac{3}{d}=\frac{12}{16}$

3.

a. Divide 40 in the ratio 3:5

b. Divide 90 in ratio 1:4:5

c. Divide $32.40 in the ratio 5:7

4. Mr.Allen and Ms.Ahokava bought truct for $8000.Mr Allen paid $5000.They then hired the truck out for $300.

a. How much did Ms. 'Ahokava pay her share of the truck?

b. What should be Ms. Ahokava share of the $300?

5. a. Mr.Big invested $50000 to a $70000 company in partnership with Mr. Siope who paid the balance.

a. How much did Mr Siope pay?

b. What is the ratio of the investments Mr. Big to Mr.Siope?

b. A profit of $175000 was shared between the two in the same ratio as their investment.How much did each get?

6. A fruit concentrate is sold in 250ml pack.The instructions are add water to make one litre(1L) of ready to drink fruit juice.

a. What is the ratio of concentrate to water in the made up juice?

b. How many litre of water are required to dilute 2L of concentrate?

c. Find the volume of water in 6L of made up juice?