

Present all necessary working in a neat and logical manner.

- Evaluate the following:
 - $6 + 4 \div -2$
 - $-8 - (4 - 2 \times -1) - 3$
 - -0.3×-0.2
- Simplify the following expressions.
 - $2\frac{7}{10} + 1\frac{4}{30} - 1\frac{3}{4}$
 - $1\frac{1}{5} \times 2\frac{7}{8}$
 - $\frac{7}{10} \div \frac{3}{5}$
- Evaluate the following:
 - $34.65 - 2.006$
 - $1.4 \div 0.5$
 - $(0.6)^2 + 0.4 \times 0.025$
- Convert the following to a percentages:
 - 0.003
 - $1\frac{2}{9}$
- Convert the following to fractions in their simplest form:
 - 0.05%
 - 15.5%
- If 15% of a class of 40 girls were absent, how many girls were absent?
 - On a monorail journey that lasts one hour Joshua sleeps for 12% of the time. How long does he sleep? (Answer to the nearest second.)
- Harry invested \$1200 for 3 years earning 9.6% simple interest per annum. Calculate:
 - The simple interest earned.
 - His total savings at the end of 3 years.
- The students below gained the following marks in a Maths paper which was marked out of a total of 48. Express each mark as a percentage.
 - Eli: 42
 - Sean: 30.
- Decrease 340 ml by 15%.
 - Hanson buys a computer game for \$84 then sells it to Arjun for \$105. Calculate his percentage profit on the cost price.
- Find 100% given that:
 - 16% = \$128
 - 124% = 806 km
- An amount x is decreased by 12%. This amount is then increased by 6% to obtain \$400. Find x .

12. Guang pays 40% deposit on the purchase of a Harley Davidson Motor Cycle with a cost price of \$10 000. His monthly repayments for five years are \$140. Calculate the simple interest rate p.a. charged on the loan.

13. Evaluate

(a) ~~$\frac{3}{4} + \frac{2}{3} + \frac{1}{2}$
 $\frac{3}{8} + \frac{1}{3} - \frac{1}{4}$~~

(b) $\frac{1}{a} + \frac{1}{b}$ given $a = \frac{3}{4}$ and $b = \frac{2}{3}$.

(c) $2 - (1 - (2 - (1 - (2 - (1 - (2))))))$

14. If each edge of a cube is increased by 60%, find the percentage increase in surface area.

15. A motor car manufacturer makes m cars per week. If the production is increased by $n\%$ write down an expression that gives the number N of cars made each week.

2B - RATIONALS AND PERCENTAGES

1. (a) $6 + 4 \div -2 = 6 + -2$
 $= 4$ ✓

(b) $-8 - (4 - 2 \times -1) - 3 = -8 - (4 + 2) - 3$
 $= -8 - 6 - 3$
 $= -14 - 3$ ✓
 $= -17$

(c) $-0.3 \times -0.2 = 0.06$ ✓

2. (a) $2 \frac{7}{10} + 1 \frac{4}{30} - 1 \frac{3}{4} = 2 \frac{42 + 8 - 45}{60}$ ✓
 $= 2 \frac{5}{60}$
 $= 2 \frac{1}{12}$ ✓

(b) $1 \frac{1}{5} \times 2 \frac{7}{8} = \overset{3}{\cancel{5}} \times \frac{23}{\cancel{8} 4}$
 $= \frac{69}{20}$ ✓
 $= 3 \frac{9}{20}$

(c) $\frac{7}{10} \div \frac{3}{5} = \frac{7}{\cancel{10} 2} \times \frac{\cancel{5} 1}{3}$
 $= \frac{7}{6}$ ✓
 $= 1 \frac{1}{6}$

3. (a) $34.65 - 2.006 = 32.644$

34.650
2.006
<hr style="width: 100%; border: 0.5px solid black;"/> 32.644

(b) $1.4 \div 0.5 = 14 \div 5$
 $= 2 \frac{4}{5}$ ✓

(c) $(0.6)^2 + 0.4 \times 0.025 = 0.36 + 0.01$
 $= 0.37$ ✓

$$4. (a) 0.003 = 0.3\% \quad \checkmark$$

$$(b) 1\frac{2}{9} = 1.222\dots$$

$$= 122.2\% \quad \checkmark$$

$$\text{OR } \frac{11}{9} \times \frac{100}{1}\% = \frac{1100}{9}\%$$

$$5. (a) 0.05\% = \frac{0.05}{100}$$

$$= \frac{5}{10000}$$

$$= \frac{1}{2000} \quad \checkmark$$

$$(b) 15.5\% = \frac{15.5}{100}$$

$$= \frac{31}{200} \quad \checkmark$$

$$6. \text{ Girls absent} = 15\% \times 40$$

$$= \frac{3}{20} \times 40$$

$$= 6 \quad \checkmark$$

6(b)
later

432 seconds
OR 7 min 12 seconds

6
so 6 girls were absent from class. ✓

$$7. (i) I = PRN$$

$$\text{Interest} = \$1200 \times \frac{9.6}{100} \times 3 \quad \checkmark$$

$$= \$36 \times 9.6$$

$$= \$345.60 \quad \checkmark$$

$$(ii) \text{ Total savings} = \$1200 + \$345.60$$

$$= \$1545.60 \quad \checkmark$$

$$8. (a) \text{ Eli's mark} = \frac{42}{48} \times \frac{100}{1}\%$$

$$= \frac{7}{8} \times \frac{100}{1}\%$$

$$= 87\frac{1}{2}\% \quad \checkmark$$

$$(b) \text{ Sean's mark} = \frac{30}{48} \times \frac{100}{1}\%$$

$$= \frac{5}{8} \times \frac{100}{1}\%$$

$$= 62\frac{1}{2}\% \quad \checkmark$$

$$9. (a) \quad 340 \text{ ml} \times 85\% = 340 \text{ ml} \times \frac{17}{20}$$

$$= 17 \times 17 \text{ ml}$$

$$= 289 \text{ ml.} \quad \checkmark$$

$$(b) \quad \text{Profit} = \$105 - \$84$$

$$= \$21 \quad \checkmark$$

$$\text{Percentage Profit} = \frac{21}{84} \times \frac{100}{1} \%$$

$$= 25\% \quad \checkmark$$

$$10. (a) \quad 16\% \text{ of amount} = \$128$$

$$4\% \text{ of amount} = \$32$$

$$100\% \text{ of amount} = \$32 \times 25$$

$$= \$800 \quad \checkmark$$

$$(b) \quad 124\% \text{ of distance} = 806 \text{ km}$$

$$2\% \text{ of distance} = \frac{806 \text{ km}}{62}$$

$$= 13 \text{ km}$$

$$100\% \text{ of distance} = 13 \times 50$$

$$= 650 \text{ km}$$

$$11. \quad 106\% \times 88\% \times x = \$400 \quad \checkmark$$

$$x = \frac{\$400}{1.06 \times 0.88}$$

$$x = \$428.82 \quad (\text{nearest c}). \quad \checkmark$$

NASTY NUMBERS!!

$$6. (b) \quad \text{length of sleep} = 12\% \times 60 \times 60$$

$$= \frac{12}{100} \times 3600$$

$$= 12 \times 36$$

$$= 432 \text{ seconds} \quad \checkmark$$

$$12. \text{ Deposit} = 40\% \times \$10000 \\ = \$4000$$

$$\text{Repayments} = 5 \times 12 \times \$140 \\ = \$8400$$

$$\therefore \text{Loan} = \$6000 \quad \checkmark$$

$$I = PRN$$

$$2400 = 6000 \times R \times 5$$

$$R = \frac{2400}{5 \times 6000} \quad \checkmark$$

$$R = \frac{2}{25} \quad \checkmark$$

so the simple interest rate on the loan is 8% p.a.

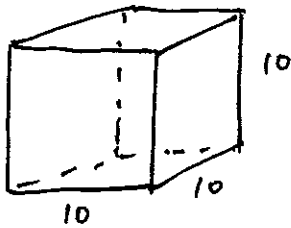
$$13. (a) \quad \frac{\frac{3}{4} + \frac{2}{3} + \frac{1}{2}}{\frac{3}{8} + \frac{1}{3} - \frac{1}{4}} = \frac{\frac{9+8+6}{12}}{\frac{9+8-6}{24}} \\ = \frac{23}{12} \times \frac{24}{11}^2 \\ = \frac{46}{11} \\ = 4 \frac{2}{11}$$

$$(b) \quad \frac{1}{a} + \frac{1}{b} = \frac{1}{\frac{3}{4}} + \frac{1}{\frac{2}{3}} \\ = \frac{4}{3} + \frac{3}{2} \quad \checkmark \\ = \frac{8+9}{6} \quad \checkmark \\ = 2 \frac{5}{6}$$

$$(c) \quad 2 - (1 - (2 - (1 - (2 - (1 - (2)))))) = 2 - (1 - (2 - (1 - (2 - (-1))))) \\ = 2 - (1 - (2 - (1 - 3))) \\ = 2 - (1 - (2 + 2)) \\ = 2 - (-3) \\ = 5 \quad \checkmark$$

6

14. Let the side length of the cube be 10 units



$$\text{Surface area} = 6 \times 100 \text{ units}^2$$

$$\begin{aligned} \text{New side length} &= 160\% \times 10 \\ &= 16 \text{ units} \end{aligned} \quad \checkmark$$

$$\begin{aligned} \text{New surface area} &= 6 \times 16 \times 16 \\ &= 6 \times 256 \text{ units}^2 \end{aligned} \quad \checkmark$$

$$\begin{aligned} \text{Increase in S.A.} &= 6 \times 256 - 6 \times 100 \\ &= 6 \times 156 \text{ units}^2 \end{aligned}$$

$$\begin{aligned} \text{Percentage increase} &= \frac{6 \times 156}{6 \times 100} \times 100\% \\ \text{in surface area} &= 156\% \end{aligned} \quad \checkmark$$

3

15. $N = m \left(1 + \frac{n}{100}\right)$

TOTAL

Mad.

36