

RATIO

1

(a) Mohsin has 600 pear trees and 720 apple trees on his farm.

(i) Write the ratio pear trees : apple trees in its simplest form.

..... : [1]

(ii) Each apple tree produces 16 boxes of apples each year.
One box contains 18 kg of apples.

Calculate the total mass of apples produced by the 720 trees in one year.
Give your answer in standard form.

..... kg [3]

(b) (i) One week, the total mass of pears picked was 18 540 kg.
For this week, the ratio mass of apples : mass of pears = 13 : 9.

Find the mass of apples picked that week.

..... kg [2]

(ii) The apples cost Mohsin \$0.85 per kilogram to produce.
He sells them at a profit of 60%.

Work out the selling price per kilogram of the apples.

\$ [2]

- (c) Mohsin exports some of his pears to a shop in Belgium.
The shop buys the pears at \$1.50 per kilogram.
The shop sells the pears for 2.30 euros per kilogram.
The exchange rate is $\$1 = 0.92$ euros.

Calculate the percentage profit per kilogram made by the shop.

..... % [5]

- (d) Mohsin's earnings increase exponentially at a rate of 8.7% each year.
During 2018 he earned \$195 600.

During 2027, how much **more** does he earn than during 2018?

\$ [3]

MARKING SCHEME:

(a)(i)	5 : 6	1	
(a)(ii)	$2.0736[0] \times 10^5$ final answer	3	B2 for 207360 oe or M1 for $16 \times 18 \times 720$
(b)(i)	26780	2	M1 for $18540 \div 9$ soi
(b)(ii)	1.36	2	M1 for 0.85×1.6 oe or B1 for 0.51 or 51
(c)	66.7 or 66.66 to 66.67	5	<p>M4 for $\frac{(2.3 - 1.5 \times 0.92)}{1.5 \times 0.92} [\times 100]$ oe or $\frac{2.3 \times 100}{1.5 \times 0.92}$ oe</p> <p>OR</p> <p>Working in euros B2 for [€]1.38 or M1 for $1.5[0] \times 0.92$ M2dep on B2 or M1 for $\frac{2.3 - \text{their } 1.38}{\text{their } 1.38} [\times 100]$ oe or $\frac{2.3 - \text{their } 1.38}{\text{their } 1.38} \times 100$ oe or M1 for $2.3 - \text{their } 1.38$ or $\frac{2.3}{\text{their } 1.38}$</p> <p>OR</p> <p>Working in dollars B2 for [\$]2.50 or M1 for or $2.3[0] \div 0.92$ M2dep on B2 or M1 for $\frac{\text{their } 2.5 - 1.5}{1.5} [\times 100]$ oe or $\frac{\text{their } 2.5}{1.5} \times 100$ or M1 for $\text{their } 2.5 - 1.5$ or $\frac{\text{their } 2.5}{1.5}$</p>

2

(a) In a cycling club, the number of members are in the ratio males : females = 8 : 3.
The club has 342 females.

(i) Find the total number of members.

..... [2]

(ii) Find the percentage of the total number of members that are female.

..... % [1]

(b) The price of a bicycle is \$1020.
Club members receive a 15% discount on this price.

Find how much a club member pays for this bicycle.

\$ [2]

(c) In 2019, the membership fee of the cycling club is \$79.50 .
This is 6% more than last year.

Find the **increase** in the cost of the membership.

\$ [3]

- (d) Asif cycles a distance of 105 km.
On the first part of his journey he cycles 60 km in 2 hours 24 minutes.
On the second part of his journey he cycles 45 km at 20 km/h.

Find his average speed for the whole journey.

..... km/h [4]

- (e) Bryan invested \$480 in an account 4 years ago.
The account pays compound interest at a rate of 2.1% per year.
Today, he uses some of the money in this account to buy a bicycle costing \$430.

Calculate how much money remains in his account.

\$ [3]

- (f) The formula $s = \frac{1}{2}at^2$ is used to calculate the distance, s , travelled by a bicycle.

When $a = 3$ and $t = 10$, each correct to the nearest integer, calculate the lower bound of the distance, s .

..... [2]

MARKING SCHEME:

(a)(i)	1254	2	M1 for $342 \div 3$
(a)(ii)	27.3 or 27.27...	1	
(b)	867	2	M1 for $1020 \times \frac{15}{100}$ oe or $1020 \times \left(1 - \frac{15}{100}\right)$ oe
(c)	4.5[0]	3	M2 for $\frac{79.5[0]}{100+6} [\times 6]$ oe or $\frac{79.5[0]}{100+6} \times 100$ oe or M1 for 79.5[0] associated with 106[%]
(d)	22.6 or 22.58... nfw	4	M1 for $\frac{45}{20}$ or better and M2 for $\frac{60+45}{\text{their 2h 24 min} + \text{their } \frac{45}{20}}$ or M1 for $\text{their } \frac{45}{20} + \text{their 2h 24min}$
(e)	91.6[0] to 91.61	3	M2 for $480 \times \left(1 + \frac{2.1}{100}\right)^4 - 430$ oe OR M1 for $480 \times \left(1 + \frac{2.1}{100}\right)^4$ oe A1 for 522, 521.6[0] to 521.61
(f)	112.8125	2	B1 for 2.5 or 9.5 seen