

PROFIT-LOSS-DISCOUNT

1 A factory produces bird food made with sunflower seed, millet and maize.

(a) The amounts of sunflower seed, millet and maize are in the ratio

sunflower seed : millet : maize = 5 : 3 : 1 .

(i) How much millet is there in 15 kg of bird food?

Answer(a)(i) kg [2]

(ii) In a small bag of bird food there is 60 g of sunflower seed.

What is the mass of bird food in a small bag?

Answer(a)(ii) g [2]

(b) Sunflower seeds cost \$204.50 for 30 kg from Jon's farm or €96.40 for 20 kg from Ann's farm.
The exchange rate is \$1 = €0.718.

Which farm has the cheapest price per kilogram?

You must show clearly all your working.

Answer(b) [4]

(c) Bags are filled with bird food at a rate of 420 grams per second.

How many 20 kg bags can be **completely** filled in 4 hours?

Answer(c) [3]

(d) Brian buys bags of bird food from the factory and sells them in his shop for \$15.30 each. He makes 12.5% profit on each bag.

How much does Brian pay for each bag of bird food?

Answer(d) \$ [3]

(e) Brian orders 600 bags of bird food.

The probability that a bag is damaged is $\frac{1}{50}$.

How many bags would Brian expect to be damaged?

Answer(e) [1]

MARKING SCHEME:

	<p>(a) (i) 5</p> <p>(ii) 108</p> <p>(b) Correct conversion of money $J \times 0.718$ or $A \div 0.718$</p> <p>Correct equalising of weights e.g. $J \times \frac{2[0]}{3[0]}$ or $A \times \frac{3[0]}{2[0]}$ or $J \div 3$ and $A \div 2$ or $J \div 30$ and $A \div 20$</p> <p>97 to 98 or 201[.39...] and Ann <u>48.9[4..]</u> and 48.2[0] and Ann or 68[.16] to 68.[2] and <u>67[.13]</u> and Ann <u>4.88... to 4.9</u> and 4.82 and Ann or 6.8[1..] to 6.82 and <u>6.7[1...]</u> and Ann <div style="text-align: right;">www</div></p> <p>(c) 302 Final answer</p> <p>(d) 13.6[0]</p> <p>(e) 12</p>	<p>2</p> <p>2</p> <p>M1</p> <p>M1</p> <p>A2</p> <p>3</p> <p>3</p> <p>1</p>	<p>M1 for $\frac{3 \times 15}{(5 + 3 + 1)}$</p> <p>M1 for $60 \times \frac{9}{5}$ oe</p> <p>Correct conversion of money soi by 146.83[1] rounded or truncated to 3sf or 134.26[1...] rounded or truncated to 3 sf if done 1st</p> <p>Correct equalising of weights or money Accept other methods that give a pair of comparable values for method and accuracy marks This mark can be implied by values seen correct to 3 sf or better</p> <p>The underlined values imply M1 for the money conversion</p> <p>Or A1 for 97 to 98 or 201[.39...] or a correct pair of values with wrong/no conclusion</p> <p>M1 for $60 \times 60 \times 4$ soi by 14400 or figs 6048 or figs 3024 and M1 for $\div (1000 \times 20)$ soi Answer 302.4 implies M2</p> <p>M2 for $\frac{15.3[0]}{1.125}$ oe or M1 for 15.3[0] associated with 112.5%</p>
--	---	--	---

- 2** (a) Luc is painting the doors in his house.
He uses $\frac{3}{4}$ of a tin of paint for each door.

Work out the least number of tins of paint Luc needs to paint 7 doors.

Answer(a) [3]

- (b) Jan buys tins of paint for \$17.16 each.
He sells the paint at a profit of 25%.

For how much does Jan sell each tin of paint?

Answer(b) \$ [2]

- (c) The cost of \$17.16 for each tin of paint is 4% more than the cost in the previous year.

Work out the cost of each tin of paint in the previous year.

Answer(c) \$ [3]

- (d) In America a tin of paint costs \$17.16 .
In Italy the same tin of paint costs €13.32 .
The exchange rate is \$1 = €0.72 .

Calculate, in dollars, the difference in the cost of the tin of paint.

Answer(d) \$ [2]

(e) Paint is sold in cylindrical tins of height 11 cm.
Each tin holds 750 ml of paint.

(i) Write 750 ml in cm^3 .

Answer(e)(i) cm^3 [1]

(ii) Calculate the radius of the tin.
Give your answer correct to 1 decimal place.

Answer(e)(ii) cm [3]

(iii) A mathematically similar tin has a height of 22 cm.
How many **litres** of paint does this tin hold?

Answer(e)(iii) litres [2]

(f) The mass of a tin of paint is 890 grams, correct to the nearest 10 grams.
Work out the upper bound of the total mass of 10 tins of paint.

Answer(f) g [1]

(g) The probability that a tin of paint is dented is 0.07 .
Out of 3000 tins of paint, how many would you expect to be dented?

Answer(g) [2]

(h) Tins of paint are filled at the rate of 2 m^3 per minute.
How many 750 ml tins of paint can be filled in 1 hour?

Answer(h) [3]

MARKING SCHEME:

(a)	6	3	B2 for $5\frac{1}{4}$ or 5.25 shown in working isw or M1 for $\frac{3}{4} \times 7$ soi by answer 5
(b)	21.45 cao final answer	2	M1 for 17.16×0.25 or 17.16×1.25
(c)	16.5[0] nfwf	3	M2 for $17.16 \div 1.04$ oe or M1 for 17.16 associated with 104[%] oe isw
(d)	1.34 cao final answer	2	M1 for $13.32 \div 0.72$ soi by 18.5[0] or for any correct complete longer method If zero scored, SC1 for 0.96 [euros] seen
(e) (i)	750	1	
(ii)	4.7 cao	3	B2 for 4.658 to 4.66 or M2 for $\sqrt{\text{their (e)(i)} \div 11\pi}$ or M1 for $11\pi r^2 = \text{their (e)(i)}$
(iii)	6	2	M1 for 2^3 or $\frac{1}{2^3}$ oe seen or for $\pi \times (2 \times \text{their (e)(ii)})^2 \times 22$ If zero scored, SC1 for answer 6000
(f)	8950	1	
(g)	210	2	M1 for 0.07×3000
(h)	160 000	3	M2 for $2 \times 60 \times 100^3 \div 750$ oe or M1 for figs 16 as answer or 100^3 seen

3 A film company uses 512 actors in a film.
The actors are in the ratio men : women : children = 7 : 11 : 14.

(a) (i) Show that there are 224 children in the film.

Answer(a)(i)

[2]

(ii) Find the number of men in the film.

Answer(a)(ii) [1]

(b) Every working day, each child is given \$1 to spend.
Each child works for 45 days.

Calculate the total amount that the film company gives the children to spend.
Give your answer correct to the nearest \$100.

Answer(b) \$ [2]

(c) The children have lessons every day in groups of no more than 12.

Calculate the smallest possible number of groups.

Answer(c) [2]

(d) The film costs four million and ninety three thousand dollars to make.

(i) Write this number in figures.

Answer(d)(i) [1]

(ii) Write your answer to **part (d)(i)** in standard form.

Answer(d)(ii) [1]

(e) A DVD copy of the film costs \$2.75 to make.
The selling price is \$8.20 .

Calculate the percentage profit.

Answer(e)% [3]

MARKING SCHEME:

1	(a) (i)	$\frac{512}{7+11+14} \times 14$	M2	or M1 for $\frac{512}{7+11+14}$
	(ii)	112	1	
	(b)	10 100	2	M1 for 224×45 soi by 10080
	(c)	19	2	M1 for $224 \div 12$ soi by 18.66 to 18.67 or 18.7 or $18\frac{2}{3}$
	(d) (i)	4093000	1	
	(ii)	4.093×10^6	1FT	FT <i>their (d)(i)</i>
(e)	198 or 198.1 to 198.2	3	M2 for $\frac{8.2-2.75}{2.75} \times 100$ oe or M1 for $\frac{8.2}{2.75} \times 100$ or $\frac{8.2-2.75}{2.75}$	

4 (a) A jigsaw puzzle has edge pieces and inside pieces.
The ratio edge pieces : inside pieces = 3 : 22.

(i) There are 924 inside pieces.

Calculate the total number of pieces in the puzzle.

..... [2]

(ii) Find the percentage of the total number of pieces that are edge pieces.

.....% [1]

(iii) Anjum and Betty spent a total of 9 hours completing the puzzle.
The ratio Anjum's time : Betty's time = 7 : 5.

Work out how much time Anjum spent on the puzzle.

..... hours [2]

(b) The price of the puzzle was \$15.99 in a sale.
This was 35% less than the original price.

Calculate the original price of the puzzle.

\$. [3]

- (c) Betty takes a photograph of the completed puzzle.
The photograph and the completed puzzle are mathematically similar.

The area of the photograph is 875 cm^2 and the area of the puzzle is 2835 cm^2 .
The length of the photograph is 35 cm.

Work out the length of the puzzle.

..... cm [3]

- (d) (i) The area of another puzzle is 6610 cm^2 .

Change 6610 cm^2 into m^2 .

..... m^2 [1]

- (ii) The cost price of this puzzle is \$12.50 .
The selling price is \$18.50 .

Calculate the percentage profit.

.....% [3]

MARKING SCHEME:

(a) (i)	1050	2	M1 for $924 \div 22$ oe or $924 \div 0.88$ oe If zero scored, SC1 for 126 seen
(ii)	12	1	
(iii)	$5 \frac{1}{4}$ hrs or 5.25 hrs	2	M1 for $9 \div (7 + 5)$ or $540 \div (7 + 5)$ If zero scored, SC1 for answer 3.75h or 3h 45 mins
(b)	24.6[0]	3	M2 for $15.99 \div \left(1 - \frac{35}{100}\right)$ oe or M1 for 65% associated with 15.99
(c)	63	3	M2 for $35 \times \sqrt{\frac{2835}{875}}$ oe or M1 for $\sqrt{\frac{2835}{875}}$ or $\sqrt{\frac{875}{2835}}$ or better or $\frac{\sqrt{2835}}{?} = \frac{\sqrt{875}}{35}$ oe OR M2 for $\sqrt{2835 \times \frac{35}{\text{their}(875 \div 35)}}$ oe or M1 for $\frac{35}{\text{their}(875 \div 35)}$ or $\frac{\text{their}(875 \div 35)}{35}$
(d) (i)	0.661[0]	1	
(ii)	48	3	M2 for $\frac{18.50 - 12.50}{12.50} \times 100$ or M1 for $\frac{18.50 - 12.50}{12.50}$ or $\frac{18.50}{12.50} \times 100$

5

Marianne sells photos.

(a) The selling price of each photo is \$6.

(i) The selling price for each photo is made up of two parts, printing cost and profit.
For each photo, the ratio printing cost : profit = 5 : 3.

Calculate the profit she makes on each photo.

\$ [2]

(ii) Calculate her profit as a percentage of the selling price.

.....% [1]

(iii) Calculate the selling price of a photo in euros (€) when the exchange rate is €1 = \$1.091 .

€ [2]

(b) Marianne sells two sizes of photo.
These photos are mathematically similar rectangles.
The smaller photo has length 15 cm and width 12 cm.
The larger photo has area 352.8 cm².

Calculate the length of the larger photo.

..... cm [3]

(c) In a sale, Marianne buys a new camera for \$483.
This is a reduction of 8% on the original price.

Calculate the original price of the camera.

\$ [3]

MARKING SCHEME:

(a)(i)	2.25 final answer	2	M1 for $\frac{3}{5+3}$ or $\frac{6}{5+3}$ oe
(a)(ii)	37.5	1	FT their $\frac{(a)(i)}{6} \times 100$
(a)(iii)	5.5[0] or 5.499 to 5.500	2	M1 for $6 \div 1.091$
(b)	21	3	M2 for $15 \times \sqrt{\frac{352.8}{15 \times 12}}$ oe or SC2 for answer 16.8 or M1 for $\sqrt{\frac{352.8}{15 \times 12}}$ or $\sqrt{\frac{15 \times 12}{352.8}}$ seen or M1 for a correct implicit statement for the length
(c)	525	3	M2 for $\frac{483}{100-8} [\times 100]$ oe or M1 for 483 associated with 92 [%]

6

(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 <u>Working in euros</u> 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</p> <p>or M1 for $2.3 - \text{their } 1.38$ or $\frac{2.3}{\text{their } 1.38}$</p> <p>OR <u>Working in dollars</u> 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 $\frac{\text{their } 2.5}{1.5} \times 100$</p> <p>or M1 for $\text{their } 2.5 - 1.5$ or $\frac{\text{their } 2.5}{1.5}$</p>

(d)	219 000 or 218814[.3....] rounded to 4 sf or more	3	<p>B2 for 414000 or 414414[.3....] rounded to 4 sf or more</p> <p>or M2 for $195600 \times \left(1 + \frac{8.7}{100}\right)^9$ [- 195600]</p> <p>or M1 for $195600 \times \left(1 + \frac{8.7}{100}\right)^k$ or better ($k > 1$ and an integer)</p>
-----	--	---	--