8 Rate

This photocopier can print 50 copies per minute.

I can type about 80 words in 1 minute.

How many copies can the printer print in 5 minutes?

SINGAPORE STUDENT LEARNING SPACE

Do you know what rate is?

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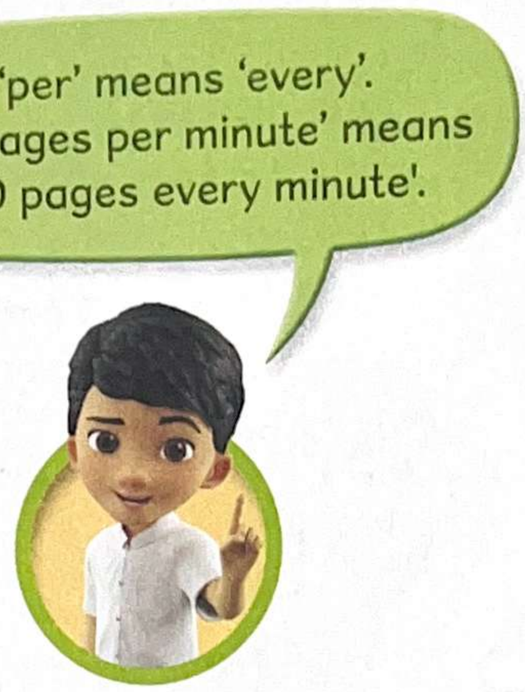
Rate

A printer prints 50 pages every minute.
The printer prints at a **rate** of 50 pages per minute.



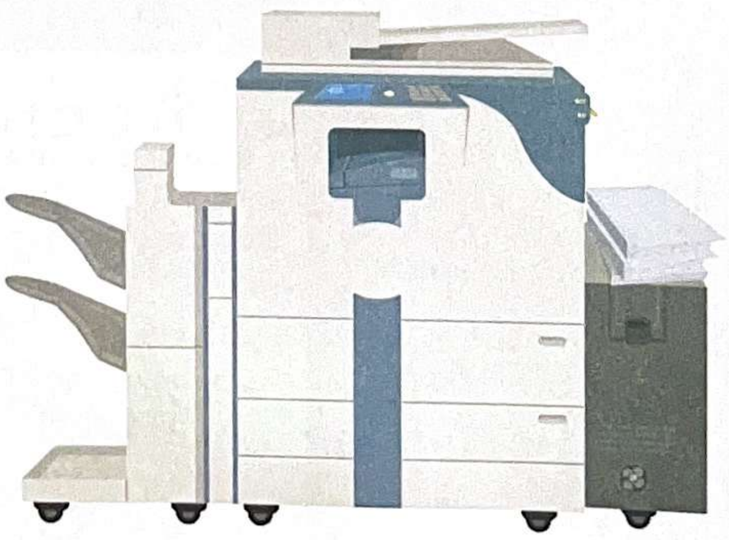
A photocopier takes 5 minutes to print 300 pages.
How many pages does it print per minute?

5 min	300 pages
1 min	? pages

(÷5 between the rows; ÷5 between the columns)

$300 \div 5 = 60$

The photocopier prints **60** pages per minute.



Since we divide 5 min by 5 to get 1 min, we also divide 300 pages by 5 to find the number of pages printed in 1 min.

A robot walks 20 m for 4
How far does it walk in 1

20 m

20 m
? m

(÷4 between the rows)

$20 \text{ m} \div 4 = 5 \text{ m}$

It walks **5 m** in 1 minute.

Mark is paid $75 for work
What is the rate of his pa

$75
$?

(÷5 between the rows)

$\$75 \div 5 = \$15$

The rate of his pay is **$15** p

A robot walks 20 m for 4 minutes.
How far does it walk in 1 minute?

20 m

÷4	20 m	4 min
	? m	1 min

÷4

20 m ÷ 4 = 5 m

It walks **5 m** in 1 minute.

Mark is paid $75 for working 5 hours.
What is the rate of his pay per hour?

÷5	$75	5 h
	$?	1 h

÷5

$75 ÷ 5 = $15

The rate of his pay is **$15** per hour.

12 ℓ of water was collected from a dripping tap in 6 hours.
How much water was collected per hour?

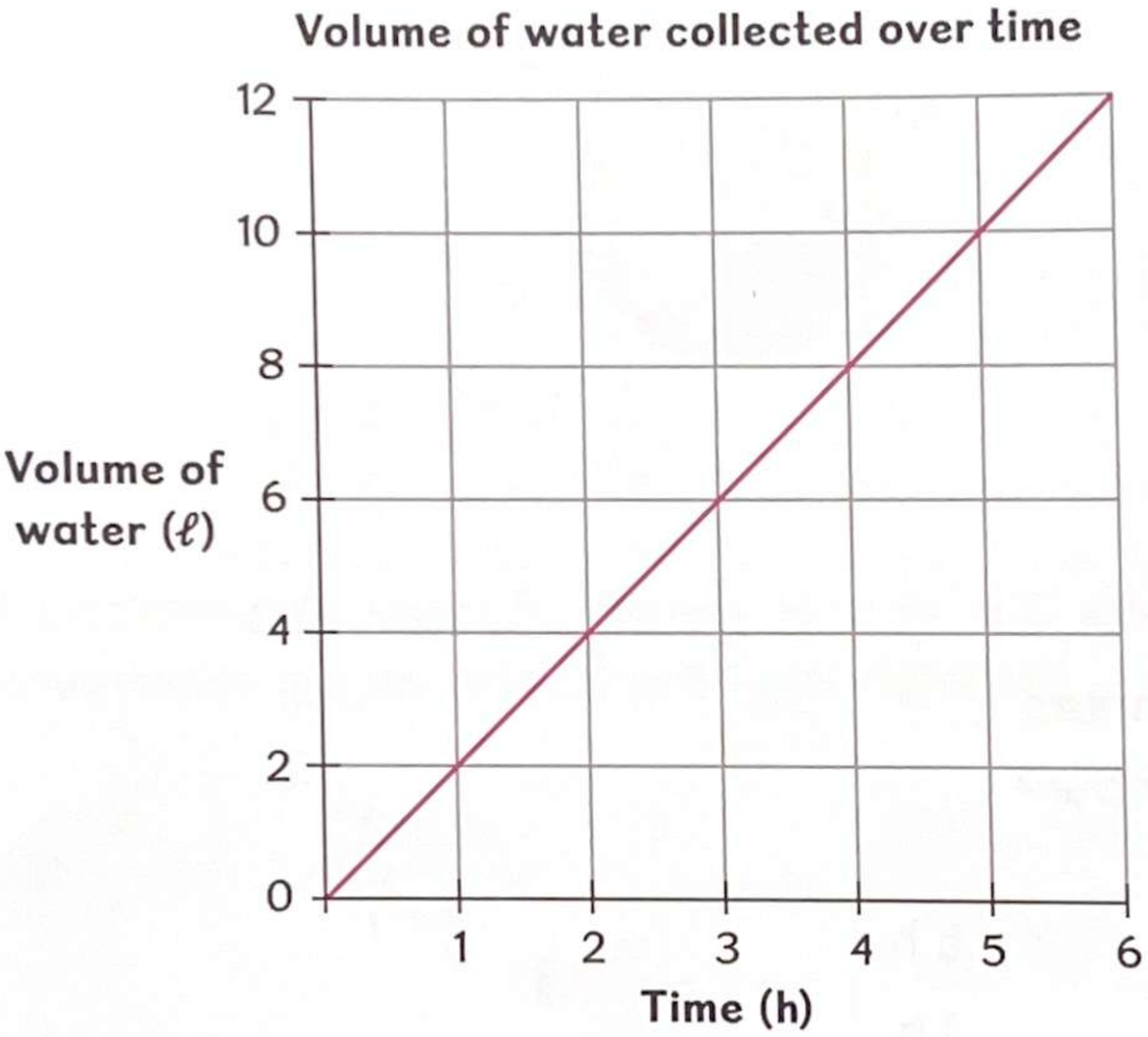
÷6	12 ℓ	6 h
	? ℓ	1 h

÷6

12 ℓ ÷ 6 = 2 ℓ

2 ℓ of water was collected per hour.

The line graph represents the rate of water collected from a dripping tap.



Let's Try! 1

Solve the word problems.

(a) A printer prints 36 pages in 4 minutes.
At this rate, how many pages does it print per minute?

(b) A machine packs 9600 bottles into boxes every 5 hours.
At this rate, how many bottles does it pack into boxes per hour?

(c) A motorcyclist travelled 140 km in 4 hours.
He travelled the same distance every hour.
How far did he travel in 1 hour?

Go to PB 5B Practice 1

Miriam is paid $11 an hour for working at a restaurant.
How much is she paid for working 10 hours?

$11	1 h
$?	10 h

×10 ×10

Since we multiply 1 h by 10 to get 10 h, we also multiply $11 by 10 to find the amount paid for working 10 h.

$11 × 10 = $110

Miriam is paid **$110** for working 10 hours.

A wheel can make 42 revolutions in 3 minutes.
At this rate, how many revolutions can it make in 7 minutes?

42 revolutions	3 min
14 revolutions	1 min
? revolutions	7 min

÷3 ×7 ÷3 ×7

42 ÷ 3 = 14

The wheel can make 14 revolutions in 1 minute.

14 × 7 = 98

The wheel can make **98** revolutions in 7 minutes.

First, we need to find the number of revolutions per minute. Then, we find the number of revolutions in 7 minutes.

In 2 hours, Susan cycles 58 km.
At this rate, how far can she cycle in 6 hours?

×3	2 h	58 km
	6 h	? km

×3

58 km × 3 = 174 km

She can cycle **174 km** in 6 hours.

A construction worker lays 8 m² of tiles every 30 minutes.
At this rate, what is the floor area he can lay with tiles in 2 hours?

×2	8 m²	30 min
	16 m²	60 min
×2	? m²	120 min

×2

×2

16 m² × 2 = 32 m²

He can lay a floor area of **32 m²** with tiles in 2 hours.

Let's Try! 2

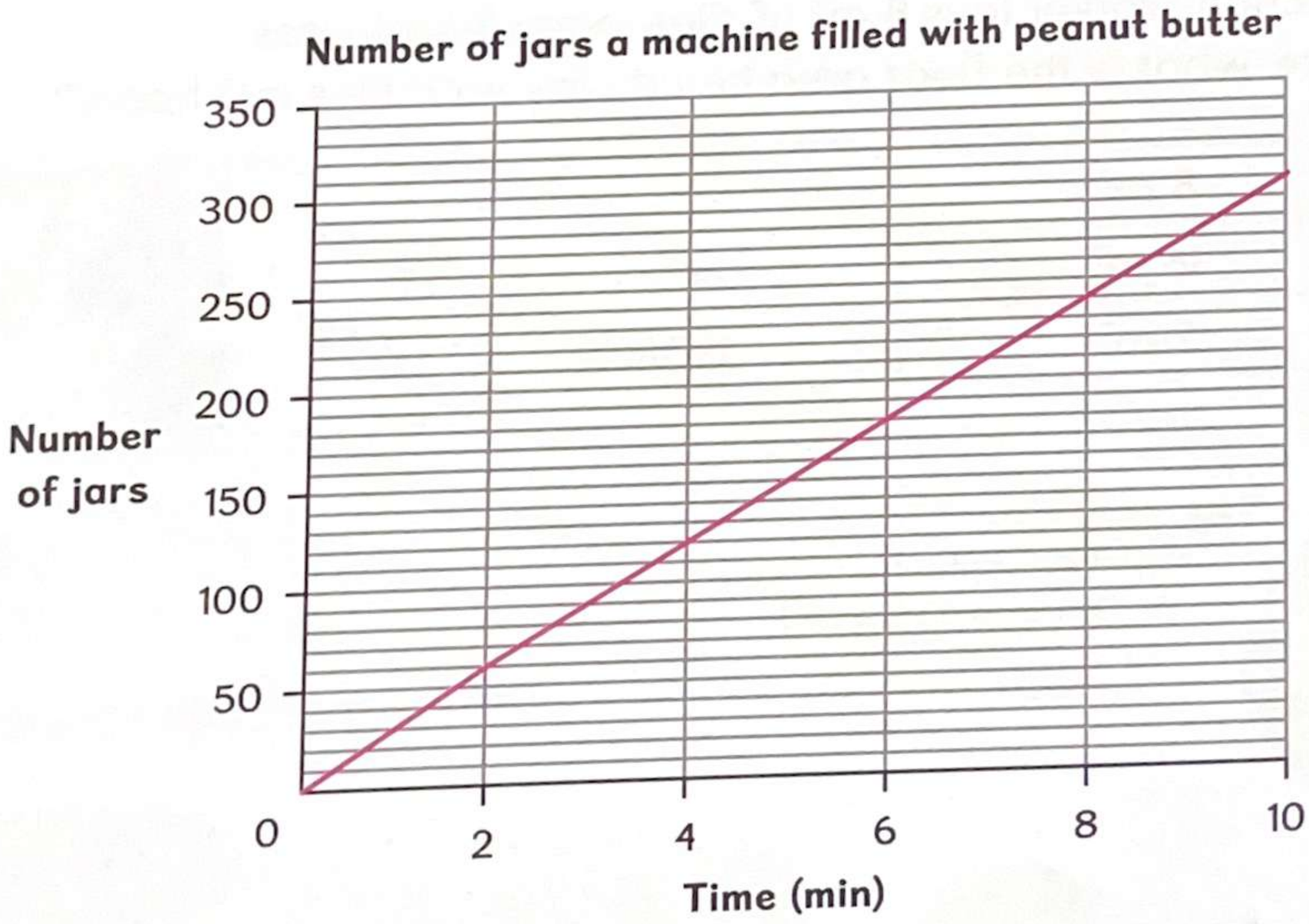
Solve the word problems.

(a) A shopkeeper sells cloth at $9 per metre.
Shanti buys 15 m of cloth.
How much does she pay for the cloth?

(b) A car travels 450 km in 5 hours. At this rate, how far can it travel in 8 hours?

(c) A vacuum cleaner cleans a floor area of 10 m^2 every 4 min.
What is the floor area it cleans in 30 min?

(d) The line graph shows the number of jars a machine filled with peanut butter over 10 minutes.



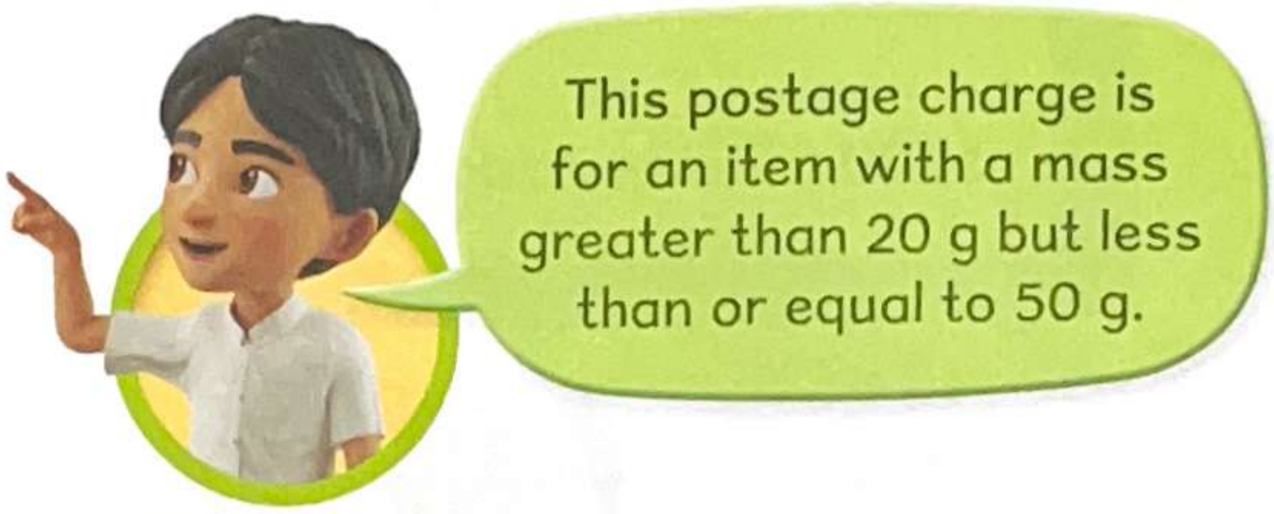
(i) How many jars of peanut butter did the machine fill in 1 minute?

(ii) At this rate, how many jars of peanut butter can the machine fill in 1 hour?

Word Problems

The table below shows the amounts a certain country charges for sending mails.

Mass up to	Charges
20 g	$2.55
50 g	$2.65
100 g	$2.85
250 g	$3.15
400 g	$5

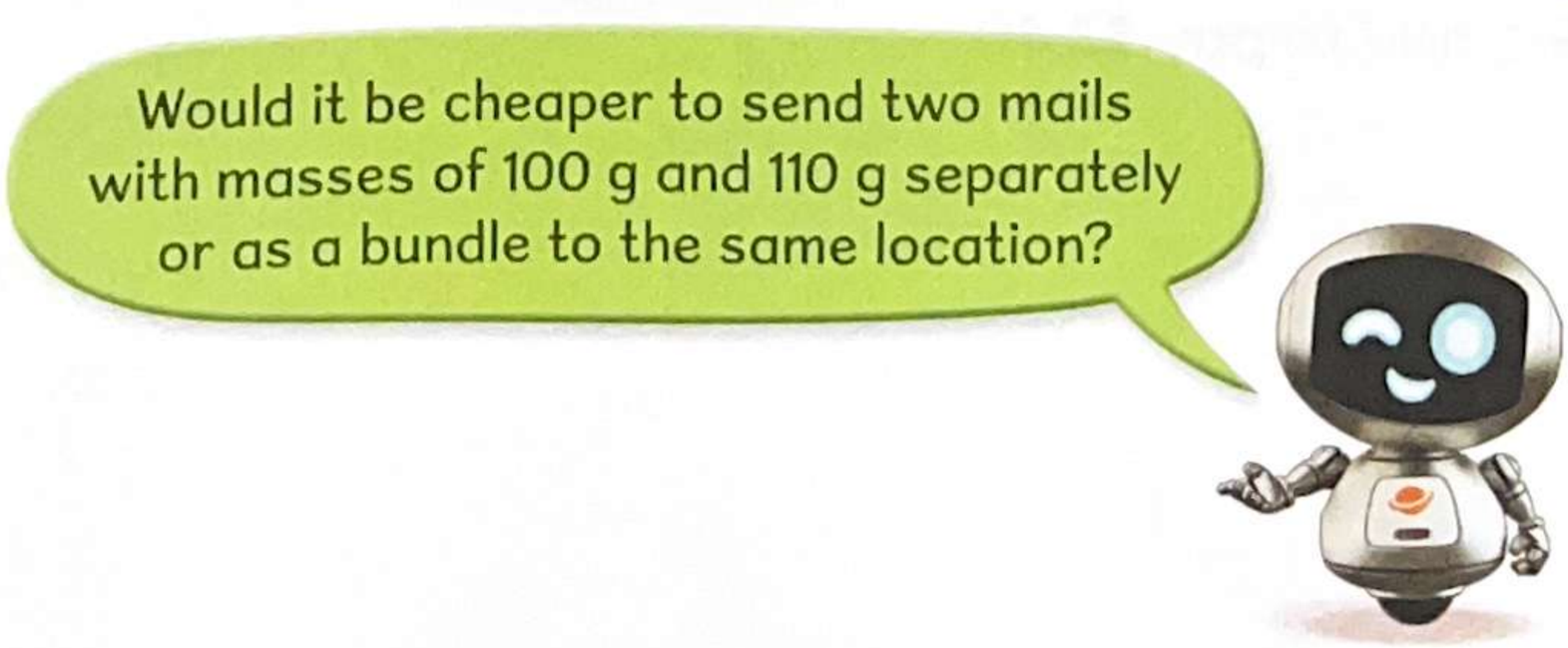


(a) Devi wants to send a mail with a mass of 400 g.
How much does she have to pay for the postage?

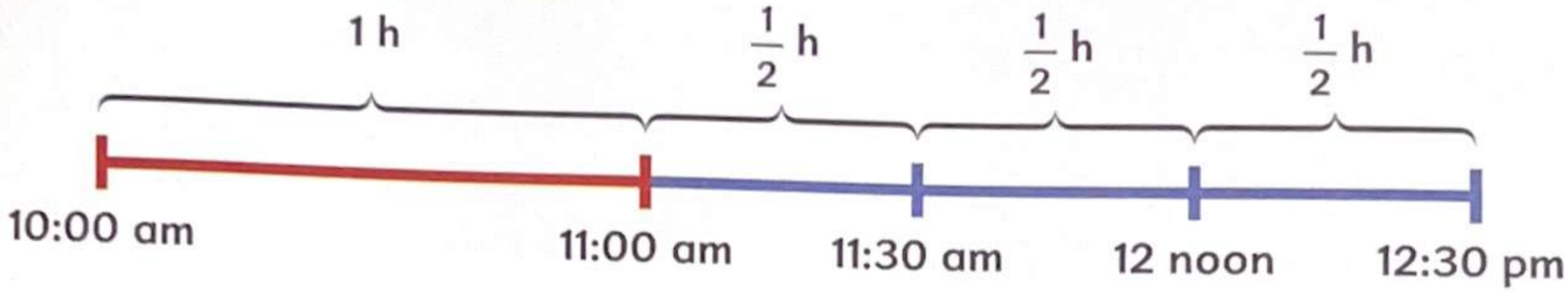
Devi has to pay **$5**.

(b) Andy wants to send a mail that has a mass of 80 g.
How much does he have to pay for the postage?

Andy has to pay **$2.85**.



(b) Mrs Leng parked her car at the car park from 10:00 am to 12:30 pm.
How much did she have to pay?



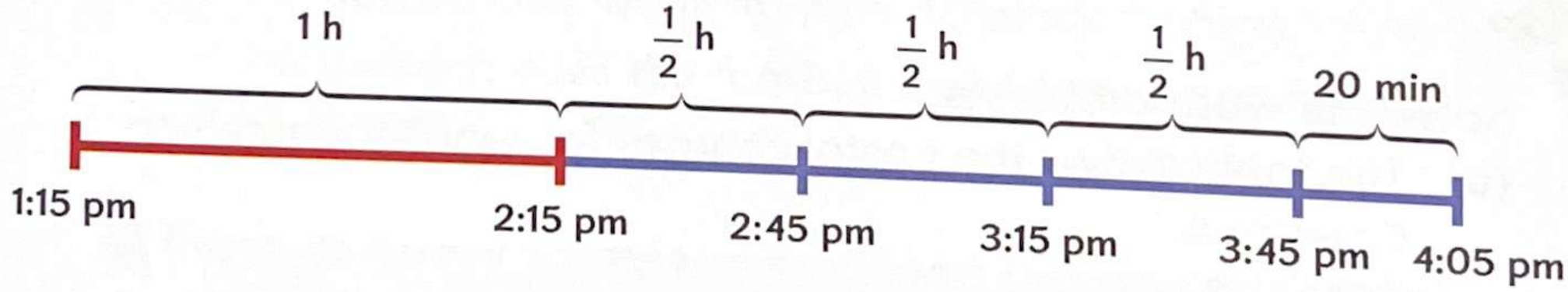
Charges from 10:00 am to 11:00 am = \$2.20

Charges from 11:00 am to 12:30 pm = \$1.20 × 3
= \$3.60

Total charges = \$2.20 + \$3.60
= \$5.80

Mrs Leng had to pay **\$5.80**.

(c) Dan parked his car at the car park from 1:15 pm to 4:05 pm.
How much did he have to pay?



Charges from 1:15 pm to 2:15 pm = \$2.20

Charges from 2:15 pm to 4:05 pm = \$1.20 × 4
= \$4.80

Total charges = \$2.20 + \$4.80
= \$7

Dan had to pay **\$7**.

The table below shows the water charges in cubic metres.

Volume of water	First 40 m^3	more than 40 m^3
Water charges	\$1.43 per m^3	\$1.81 per m^3

(a) Company A uses 35 m^3 of water.
How much is Company A charged for the water consumption?

$35 \times \$1.43 = \$50.05$

Company A is charged **\$50.05**.

(b) Company B uses 46 m^3 of water.
How much is Company B charged for the water consumption?

$46\ m^3 - 40\ m^3 = 6\ m^3$

$\$1.43 \times 40 = \$57.20$

$\$1.81 \times 6 = \$10.86$

$\$57.20 + \$10.86 = \$68.06$

Company B is charged **\$68.06**.

Let's Try! 4

Solve the word problems.

(a) The table shows the postal charges for sending parcels to Country A.

Mass up to	Charges
2 kg	\$25
4 kg	\$32
6 kg	\$46
8 kg	\$55

(i) Henry needs to send a parcel with a mass of 2 kg 800 g to Country A. How much does Henry need to pay?

(ii) Mdm Chan needs to send two different parcels separately to Country A. The masses of the parcels are 3 kg and 5 kg 500 g. How much does she need to pay for the two parcels altogether?