Further Practice: Depreciation

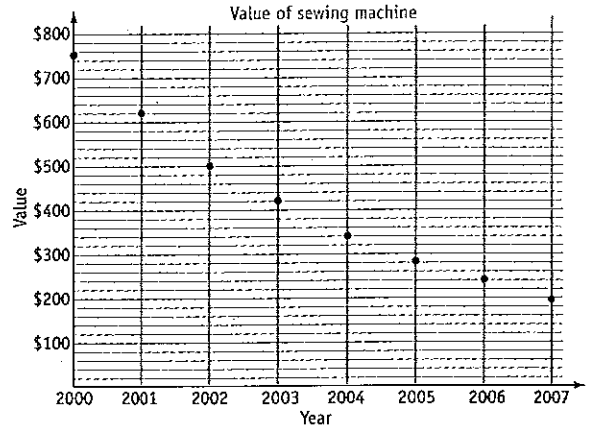
Remember: all questions match the numbered examples on pages 38–48.

1 A truck was bought for \$78 000 six years ago. The table gives the value of the truck at the end of each of those six years.

Year	Value	Year	Value
1	\$73 320	4	\$63 327
2	\$69 654	5	\$60 541
3	\$66 311	6	\$58 119

a What is the value at the end of four years?
b By how much has the value of the truck decreased at the end of five years?
c What percentage of its original value did the truck lose in the first year?

2 The graph shows the value of a sewing machine at the 30th of June each year.



a What was the value at 30/6/2005?
b How much was the loss in value in the financial year from 1/7/2003 to 30/6/2004?
c What percentage of its original value is the sewing machine worth at 30/6/2007?
d What percentage of its original value did the machine lose in the first two years?

3 Gareth is using the rule $S = 25(t^2 - 16t + 80)$ to give the value, \$$S$, of his pump at the end of t years.
a What is the purchase price of the pump?
b By how much had the pump depreciated at the end of three years?
c What percentage of the original value was the salvage value at the end of eight years?
d Find S when $t = 9$.
e Gareth claims that the rule will only work for 8 years. Use the answer to part **d** in explaining why Gareth is correct.

4 Rochelle estimates that her scooter, originally valued at \$7200, is decreasing in value by \$800 every year.
a What will be the value after one year?
b What will be the value after two years?
c Sketch a graph of the value of the scooter over time.
d After how many years will the scooter be worthless?

5 A tool was purchased for \$3700. Find its value after six years if \$360 depreciation is allowed every year.

6 A forklift was purchased for \$6400 and is being depreciated by \$360 per year.
a What is the value after eight years?
b After how many years will the value of the forklift fall to \$1000?

7 A six-year-old machine is currently valued at \$4625. If it has been depreciated by \$675 per year, find its purchase price.

8 A van, originally purchased for \$24 500, is being depreciated by the straight-line method. Find the amount of depreciation allowed per year if the salvage value of the machine is \$15 700 after eight years.

9 A chainsaw, originally valued at \$1080, is being depreciated by \$90 per year.
a What is the salvage value of the chainsaw after six years?
b What percentage of the original value is the value after six years?
c What percentage of the original value has been lost after nine years?

10 A truck is being depreciated at the rate of 8% per year. The purchase price of the truck was \$110 000.
a Find the amount of depreciation allowed in the first year.
b What is the value of the truck at the end of the first year?
c Find the amount of depreciation allowed in the second year.

11 A car is being depreciated using the declining-balance method, at 12% p.a. If its purchase price was $42 000, find its value to the nearest one hundred dollars, after seven years.

12 A cement mixer was bought for $1400 three years ago. If it is being depreciated at 8% p.a., how much has it depreciated in value over that time?

13 A machine was bought for $76 000. It is being depreciated using the declining-balance method by 12.5% p.a.

a Find the salvage value, to the nearest dollar, at the end of five years.

b Find the salvage value, to the nearest dollar, at the end of six years.

c Find the amount of depreciation allowed in the 6th year.

14 Find the amount of depreciation allowed for the fourth year if a bus is being depreciated, using the declining-balance method, at 9% per year and the purchase price was $56 000.

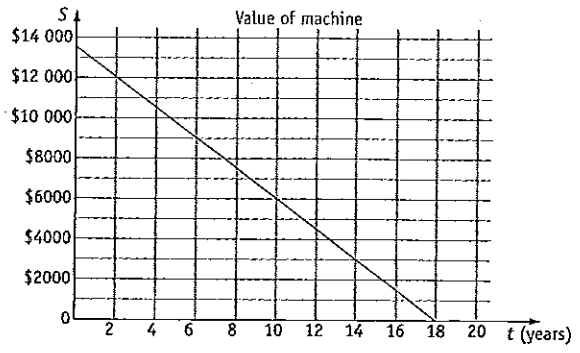
15 The current value of a set of tools is $3600. Find the purchase price of the tools if they have been depreciated at 8% p.a. and they are six years old.

16 A machine, bought for $43 000 three years ago, is currently valued at $26 400. Find the rate of depreciation allowed if the machine has been depreciated using the declining-balance method.

17 An asset is being depreciated using the declining-balance method. The rate of depreciation is 12.5% p.a. If the purchase price was $29 000 and the current value is $9965, find the age of the asset.

18 A car was bought for $26 000 and is depreciating by $1300 per year. Sketch a graph of the salvage value of the car over time.

19 The graph shows the value of a machine over time.



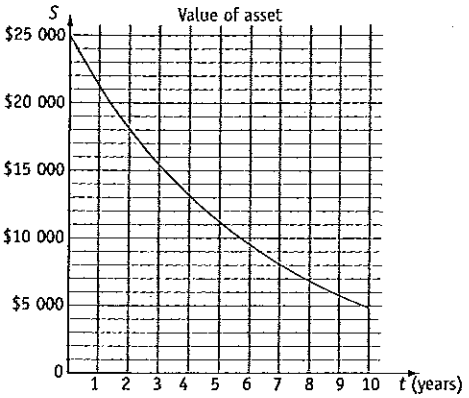
a What is the value after 12 years?

b By how much is the machine depreciating each year?

c When is the value $9000?

d After how many years is the machine halved in value?

20 The graph shows the value of an asset, which is depreciated using the declining-balance method, over the first ten years.



a What is the value after three years?

b When is the value of the asset $8000?

c By what percentage is the value decreasing each period?

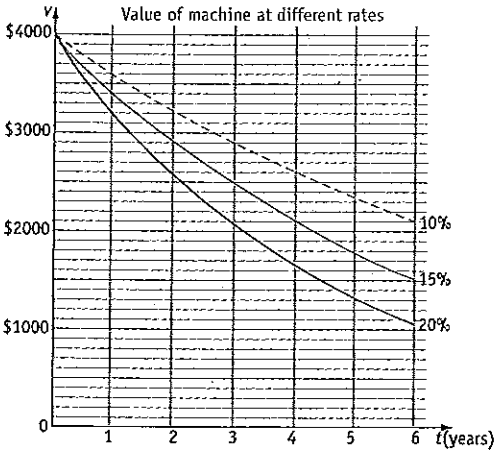
21 A tractor is being depreciated so that its salvage value, S, at time n years is given by $S = \$75\,000(0.92)^n$.

a Draw up a table of values with whole number values of n from 0 to 12 and complete to give the value of S to the nearest $100.

b Plot the points on a grid.

c Use the graph to find the approximate time when the tractor will be worth $34 000.

22 The graph shows the value of a machine over time, if it is depreciated at different rates.



a What was the purchase price?

b What is the value of the machine after four years if it is depreciated at 20%?

c If the machine is depreciated at 10%, after how many years will it halve in value?

d If it is depreciated at 15%, how much did the machine lose in value in the 2nd year?

e What is the difference in salvage value after six years if the machine is depreciated at 15% or 20%?

23 A van is bought for $32 500.

a If it is depreciated by the straight-line method with depreciation of $2700 allowed per year, what will it be worth in five years?

b If it is depreciated using the declining-balance method at 9% p.a., what will it be worth in five years? (Give the answer to the nearest one hundred dollars.)

c By which method of depreciation will the salvage value of the car be higher after six years? Justify your answer.

24 A machine is purchased for $35 000. If depreciated using the straight-line method, the amount of depreciation allowed each year would be $2750. If depreciated using the declining-balance method, the depreciation rate is 5% per year.

a Find the difference in the salvage values after three years using the two methods.

b Under which method will the depreciation be greater after five years?

25 An asset, the original value of which was $61 000, is depreciating using the straight-line method. The amount of depreciation allowed per year is $5940. Draw up a table to show the salvage value of the asset over the first six years.

26 A machine bought for $80 000 is being depreciated using the declining-balance method. The rate of depreciation is 10% per year. Draw up a table to show the value of the machine for the first five years.

27 Lisa is drawing up a table giving the value of her business assets over the last year. All of the assets are depreciated using the declining-balance method.

Item	Beg. value	Depr.	Final value
Washers	$23 500	$3525	$19 975
Driers	$16 800		
Van		$1240	

a The driers are depreciating at 12.5% p.a. Find the depreciation allowed during the year and the final value of the driers.

b At what rate are the washers depreciating?

c The van is being depreciated at 8% p.a. What was its final value?

d What is the total depreciation?

e What is the final value of all the assets?

28 A small business has assets totalling $19 260 at the beginning of the financial year and has not bought or sold any during the year. For taxation purposes the assets are depreciated using the declining-balance method at 25% p.a.

a Find the amount of depreciation allowed as a tax deduction.

b Find the value of the assets at the beginning of the next financial year.

29 A contractor depreciates his equipment using the declining-balance method. He has drawn up the following table so that he can calculate the total depreciation.

Item	Beg. value	Depr. rate	Depr. amount	Final value
Van	$12 700	15%		
Trailer	$3 025	7.5%		
Compressor	$3 760	10%		
Ladders	$2 400	12.5%		
Cleaners	$5 112	8%		
Tools	$9 378	10%		
Computer	$4 287	18%		

a Complete the table, giving each answer correct to the nearest dollar.

b What is the total amount of depreciation that can be claimed this year?

c How much depreciation can be claimed on the tools next year?

30 Some assets of a business are depreciated by the straight-line method and some by the declining-balance method.

Item	Type	Amount/ rate	Initial value
Furniture	Straight-line	$1250	$17 560
Van	Declining-balance	15%	$14 320
Computers	Declining-balance	20%	$10 980
Library	Straight-line	$3240	$25 270

a What is the total amount of depreciation that can be claimed?

b If the business is paying tax at the rate of 20 cents in the dollar, how much tax will be saved by claiming the depreciation?

31 Nadia bought a sewing machine for her upholstery business for $11 780, fifty days before the end of the financial year. If the machine is depreciated using the straight-line method, with the amount of depreciation being 12% of the purchase price, find the amount of depreciation that can be claimed in the financial year.

Go to p 284 for **Quick Answers**
or to pp 305–7 for **Worked Solutions**

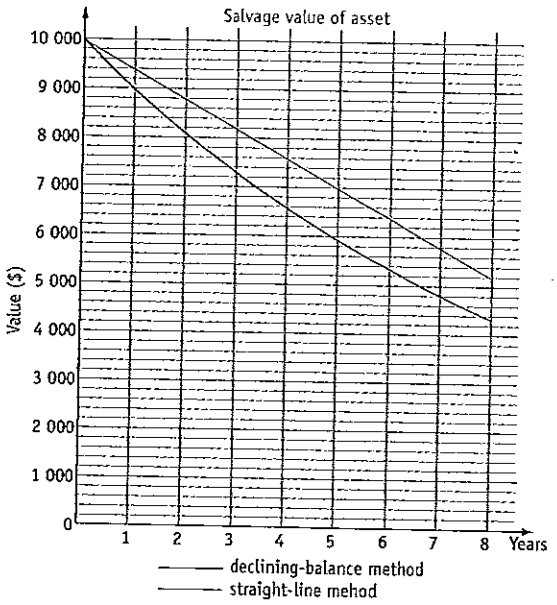
Challenge: Depreciation

1 A generator was purchased for $2700 and is being depreciated by the straight-line method. The amount of depreciation per year is 9% of the original price. Find the value of the generator after five years. *Hint 1*

2 A tractor was purchased for $70 000 twelve years ago. Its current value is $29 300. Find the rate of depreciation, given that it is being depreciated by the declining-balance method. *Hint 2*

3 A pump and irrigator package was bought for $24 000. If the equipment is depreciated by 8% p.a., find the amount of depreciation allowed in the second year. *Hint 3*

4 The graph shows the salvage value of an asset if it is depreciated by the straight-line method and by the declining-balance method.



a How much is the depreciation per year under the straight-line method?

b At what percentage is the asset depreciating under the declining-balance method? *Hint 4*

c After how many years will the value be the same under both methods? *Hint 5*

5 The table shows the items that can be depreciated for taxation purposes by a small business.

Item	Beg. value	Method	Rate/amount
Mower	$13 590	Declining-balance	12%
4-wheel bike	$8 700	Declining-balance	15%
Fertiliser spreader	$2 657	Straight-line	$234
Pump	$6 200	Declining-balance	18%

Find the amount of depreciation that can be claimed as a tax deduction. *Hint 6*

6 A four-year-old machine is valued at $7830. It has been depreciated by 15% per year using the declining-balance method. Find the purchase price. *Hint 7*

7 To approximate the value of her rotary hoe, Monica is using the rule $v = 19(t^2 - 27t + 180)$ where v is the value at time t years.

a What was the original value of the rotary hoe? *Hint 8*

b Monica says that the rule only works for the first twelve years. Explain why Monica is correct. *Hint 9*

Go to p 284 for **Quick Answers**
or to p 308 for **Worked Solutions**

Hint 1: A fixed amount is subtracted each period, not a percentage. You will first need to find this fixed amount.
Hint 2: The rate could be found by solving an equation but it could also be found using a calculator and trial and error.
Hint 3: Find a percentage of an amount, twice.
Hint 4: How much does it depreciate (with the declining-balance method) in the first year? What is this as a percentage of the original value?
Hint 5: Continue the graphs, using the information found in parts a and b.
Hint 6: Find the amount of depreciation for each item and then the total depreciation.
Hint 7: Substitute the given values into the formula and solve an equation.
Hint 8: What is the value when $t = 0$?
Hint 9: What is the value when $t = 12$?

Solutions

Ch 3: Depreciation Further Practice p49

1

Year	Value	Year	Value
1	\$73 320	4	\$63 327
2	\$69 654	5	\$60 541
3	\$66 311	6	\$58 119

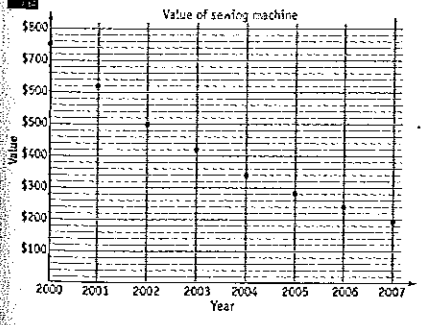
a Value at end of 4 years = \$63 327

b Value at end of 5 years = \$60 541
Loss in value = \$78 000 – \$60 541
= \$17 459

c Value at end of 1 year = \$73 320
Loss in value = \$78 000 – \$73 320
= \$4680

$$\%\ \text{loss} = \frac{\$4680}{\$78\,000} \times 100\%$$
$$= 6\%$$

2 a The value at 30/6/05 is \$280.



b Value at 30/6/03 = \$420
Value at 30/6/04 = \$340
Loss in value = \$420 – \$340
= \$80
The loss in value in the year was \$80.

c Original value = \$750
Value at 30/6/07 = \$195

$$\%\ \text{of original value} = \frac{\$195}{\$750} \times 100\%$$
$$= 26\%$$

The sewing machine is worth 26% of its original value at 30th June 2007.

d Loss in value = \$750 – \$500
= \$250

$$\%\ \text{loss in value} = \frac{\$250}{\$750} \times 100\%$$
$$= 33.33333\ldots\%$$

The sewing machine lost $33\frac{1}{3}\%$ of its value in the first two years.

3 a $S = 25(t^2 - 16t + 80)$
When $t = 0$,
$S = 25(0^2 - 16 \times 0 + 80)$
$= 2000$
The purchase price of the pump was \$2000.

b When $t = 3$,
$S = 25(3^2 - 16 \times 3 + 80)$
$= 1025$
It is worth \$1025 after 3 years.
Depreciation = \$2000 – \$1025
= \$975
The pump has depreciated by \$975 in the first three years.

c When $t = 8$,
$S = 25(8^2 - 16 \times 8 + 80)$
$= 400$
The value of the pump after 8 years is \$400.

$$\%\ \text{of original value} = \frac{\$400}{\$2000} \times 100\%$$
$$= 20\%$$

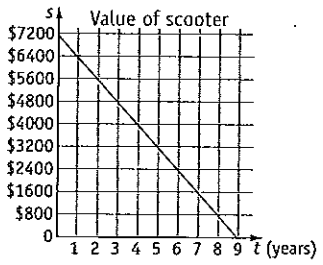
d When $t = 9$,
$S = 25(9^2 - 16 \times 9 + 80)$
$= 425$

e The value when $t = 9$ is higher than the value when $t = 8$. The value of the pump is not likely to increase so the rule no longer works.

4 a The value after 1 year = \$7200 – \$800
= \$6400

b After another year,
value = \$6400 – \$800
= \$5600

c



d The scooter is worthless after 9 years.

5 $V_0 = \$3700$, $D = \$360$, $n = 6$
$S = V_0 - Dn$
$= \$3700 - \$360 \times 6$
$= \$1540$
The value after six years is \$1540.

6 a $V_0 = \$6400$, $D = \$360$, $n = 8$
$S = V_0 - Dn$
$= \$6400 - \$360 \times 8$
$= \$3520$
After eight years the value will be \$3520.

b $S = \$1000$, $V_0 = \$6400$, $D = \$360$
$S = V_0 - Dn$
$\$1000 = \$6400 - \$360 \times n$
$\$360n = \$6400 - \$1000$
$\$360n = \$5400$
$n = 15$
After fifteen years the value of the forklift will fall to \$1000.

7 $S = \$4625$, $D = \$675$, $n = 6$
$S = V_0 - Dn$
$\$4625 = V_0 - \$675 \times 6$
$\$4625 = V_0 - \$4050$
$V_0 = \$4625 + \$4050$
$= \$8675$
The purchase price was \$8675.

8 $S = \$15\,700$, $V_0 = \$24\,500$, $n = 8$
$S = V_0 - Dn$
$\$15\,700 = \$24\,500 - D \times 8$
$8D = \$24\,500 - \$15\,700$
$= \$8800$
$D = \$1100$
The amount of depreciation allowed per year is \$1100.

9 a $V_0 = \$1080$, $D = \$90$, $n = 6$
$S = V_0 - Dn$
$= \$1080 - \$90 \times 6$
$= \$540$
After six years, the salvage value is \$540.

b $$\%\ \text{of original value} = \frac{\$540}{\$1080} \times 100\%$$
$$= 50\%$$
After six years the chainsaw is worth 50% of its original value.

c After 9 years the chainsaw has depreciated by $9 \times \$90 = \$810$

$$\%\ \text{loss} = \frac{\$810}{\$1080} \times 100\%$$
$$= 75\%$$
After nine years, 75% of the original value has been lost.

10 **a** Depreciation in 1st year
= 8% of \$110 000
= \$8800

b Value at end of 1 year
= \$110 000 − \$8800
= \$101 200

c Depreciation in 2nd year
= 8% of \$101 200
= \$8096

11 $V_0 = \$42\,000,\ r = 0.12,\ n = 7$
$S = V_0(1 - r)^n$
$= \$42\,000(1 - 0.12)^7$
$= \$17\,164.375\,05\ldots$
$= \$17\,200$ (nearest hundred dollars)
After 7 years the car is worth approximately \$17 200.

12 $V_0 = \$1400,\ r = 0.08,\ n = 3$
$S = V_0(1 - r)^n$
$= \$1400(1 - 0.08)^3$
$= \$1090.1632$
$= \$1090$ (nearest dollar)
Depreciation = \$1400 − \$1090
= \$310
The cement mixer has depreciated by \$310, to the nearest dollar, in that time.

13 **a** $V_0 = \$76\,000,\ r = 0.125,\ n = 5$
$S = V_0(1 - r)^n$
$= \$76\,000(1 - 0.125)^5$
$= \$38\,981.0791\ldots$
$= \$38\,981$ (nearest dollar)

b $V_0 = \$76\,000,\ r = 0.125,\ n = 6$
$S = V_0(1 - r)^n$
$= \$76\,000(1 - 0.125)^6$
$= \$34\,108.444\,21\ldots$
$= \$34\,108$ (nearest dollar)

c Depreciation = \$38 981 − \$34 108
= \$4873

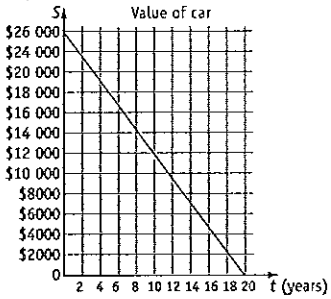
14 Value at end of 3rd year:
$V_0 = \$56\,000,\ r = 0.09,\ n = 3$
$S = V_0(1 - r)^n$
$= \$56\,000(1 - 0.09)^3$
$= \$42\,199.976$
$= \$42\,200$ (nearest dollar)
Depreciation = 9% of \$42 200
= \$3798
The amount of depreciation allowed during the fourth year is \$3798.

15 $S = \$3600,\ r = 0.08,\ n = 6$
$S = V_0(1 - r)^n$
$\$3600 = V_0(1 - 0.08)^6$
$\$3600 = V_0 \times 0.606\,355\,001\ldots$
$V_0 = \$3600 \div 0.606\,355\,001\ldots$
$= \$5937.116\,033\ldots$
$= \$5937$ (nearest dollar)
The purchase price of the tools was \$5937.

16 $S = \$26\,400,\ V_0 = \$43\,000,\ n = 3$
$S = V_0(1 - r)^n$
$\$26\,400 = \$43\,000(1 - r)^3$
$(1 - r)^3 = \dfrac{\$26\,400}{\$43\,000}$
$= 0.613\,953\,488\ldots$
$1 - r = \sqrt[3]{0.613\,953\,488\ldots}$
$= 0.849\,920\,863\ldots$
$= 0.85$ (2 d.p.)
$r = 1 - 0.85$
$= 0.15$
The machine has depreciated at 15% p.a.

17 $S = \$9965,\ V_0 = \$29\,000,\ r = 0.125$
$S = V_0(1 - r)^n$
$\$9965 = \$29\,000(1 - 0.125)^n$
$\$9965 = \$29\,000(0.875)^n$
[A few values are given to illustrate the method. Any values of n could have been used in the process.]
Try $n = 5$,
$\$29\,000(0.875)^5 = \$14\,874.359\,13\ldots$
Try $n = 10$,
$\$29\,000(0.875)^{10} = \$7629.191\,709\ldots$
Try $n = 7$,
$\$29\,000(0.875)^7 = \$11\,388.181\,21\ldots$
Try $n = 8$,
$\$29\,000(0.875)^8 = \$9964.658\,558\ldots$
The machine is 8 years old.

18 $V_0 = \$26\,000,\ D = \$1300$



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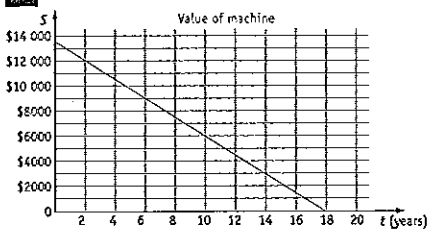


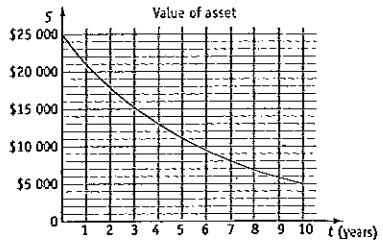
a When $t = 12$, $S = 4500$
After 12 years, the value of the machine is \$4500.

b It depreciates by \$13 500 in 18 years.
Depreciation per year = \$13 500 ÷ 18
= \$750
It is depreciating by \$750 per year.

c When $S = 9000$, $t = 6$
The value is \$9000 after six years.

d The machine halved in value after nine years.

20



a After 3 years the value is about \$15 000.

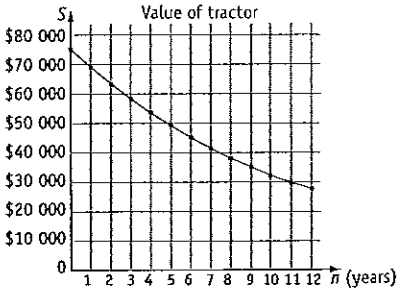
b The value of the asset is \$8000 after seven years.

c When $t = 0$, $v = \$25\,000$
When $t = 1$, $v = \$21\,250$
Depreciation = \$25 000 − \$21 250
= \$3750
$\%\ \text{depreciation} = \dfrac{\$3750}{\$25\,000} \times 100\%$
$= 15\%$
It is decreasing in value by 15% per year.

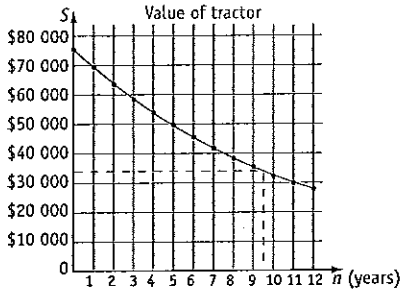
21 **a** $S = \$75\,000(0.92)^n$

n	S
0	\$75 000
1	\$69 000
2	\$63 500
3	\$58 400
4	\$53 700
5	\$49 400
6	\$45 500
7	\$41 800
8	\$38 500
9	\$35 400
10	\$32 600
11	\$30 000
12	\$27 600

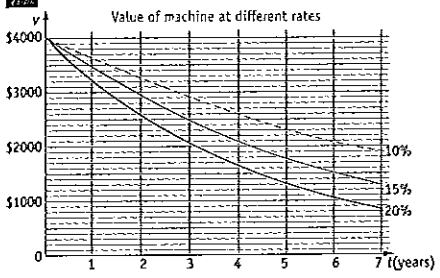
b



c The tractor would be worth $34 000 after nine and a half years.



22 a The purchase price was $4000.



b After four years depreciation at 20% the machine is worth $1650.

c At 10% depreciation, the machine halves in value after about 7 years.

d At 15% depreciation the machine lost about $500 in the second year.

e After six years there is about $450 difference in salvage value if depreciated at 15% or 20%.

23 a $V_0 = \$32\,500$, $D = \$2700$, $n = 5$

$S = V_0 - Dn$

$= \$32\,500 - \$2700 \times 5$

$= \$19\,000$

If depreciated by the straight-line method the van will be worth $19 000 after 5 years.

b $V_0 = \$32\,500$, $r = 0.09$, $n = 5$

$S = V_0(1-r)^n$

$= \$32\,500(1-0.09)^5$

$= \$20\,281.044\,72\ldots$

$= \$20\,300$ (nearest $100)

c After a further year under the straight-line method of depreciation, the van will lose a further $2700 in value.

Salvage value $= \$19\,000 - \$2700$

$= \$16\,300$

Under the declining-balance method, the car will lose a further 9% of its value.

Depreciation $= 0.09 \times \$20\,300$

$= \$1827$

Salvage value $= \$20\,300 - \$1827$

$= \$18\,473$

The car will be worth more after six years using the declining-balance method.

24 a Straight-line method:

$V_0 = \$35\,000$, $D = \$2750$, $n = 3$

$S = V_0 - Dn$

$= \$35\,000 - \$2750 \times 3$

$= \$26\,750$

Declining-balance method:

$V_0 = \$35\,000$, $r = 0.05$, $n = 3$

$S = V_0(1-r)^n$

$= \$35\,000(1-0.05)^3$

$= \$30\,008.125$

$= \$30\,008$ (nearest dollar)

Difference $= \$30\,008 - \$26\,750$

$= \$3258$

The difference in depreciation is $3258, to the nearest dollar.

b $V_0 = \$35\,000$, $D = \$2750$, $n = 5$

$S = V_0 - Dn$

$= \$35\,000 - \$2750 \times 5$

$= \$21\,250$

$V_0 = \$35\,000$, $r = 0.05$, $n = 5$

$S = V_0(1-r)^n$

$= \$35\,000(1-0.05)^5$

$= \$27\,082.332\,81\ldots$

$= \$27\,082$ (nearest dollar)

The machine has less value under the straight-line method, so the depreciation will be greater with this method.

25 $V_0 = \$61\,000$, $D = \$5940$

Year	Beginning value	Depreciation	Final value
1	$61 000	$5940	$55 060
2	$55 060	$5940	$49 120
3	$49 120	$5940	$43 180
4	$43 180	$5940	$37 240
5	$37 240	$5940	$31 300
6	$31 300	$5940	$25 360

26 $V_0 = \$80\,000$, $r = 0.1$

Year	Beginning value	Depreciation	Final value
1	$80 000	$8000	$72 000
2	$72 000	$7200	$64 800
3	$64 800	$6480	$58 320
4	$58 320	$5832	$52 488
5	$52 488	$5249	$47 239

27

Item	Beg. value	Depr.	Final value
Washers	$23 500	$3525	$19 975
Driers	$16 800		
Van		$1240	

a Driers:

Depreciation $= 0.125 \times \$16\,800$

$= \$2100$

Final value $= \$16\,800 - \$2100$

$= \$14\,700$

b Washers:

$$\text{Depreciation rate} = \frac{\$3525}{\$23\,500} \times 100\%$$

$= 15\%$

c Van: 8% is $1240

1% is $155

100% is $15 500

Beginning value = $15 500

Final value $= \$15\,500 - \$1240$

$= \$14\,260$

d Total depreciation

$= \$3525 + \$2100 + \$1240$

$= \$6865$

e Value of assets

$= \$19\,975 + \$14\,700 + \$14\,260$

$= \$48\,935$

28 a Depreciation = 25% of $19 260

$= \$4815$

The amount of depreciation is $4815.

b Salvage value $= \$19\,260 - \$4815$

$= \$14\,445$

The assets are worth $14 445 at the beginning of the next financial year.

29 a

Item	Beg. value	Depr. rate	Depr. amount	Final value
Van	$12 700	15.0%	$1905	$10 795
Trailer	$3 025	7.5%	$227	$2 798
Compressor	$3 760	10.0%	$376	$3 384
Ladders	$2 400	12.5%	$300	$2 100
Cleaners	$5 112	8.0%	$409	$4 703
Tools	$9 378	10.0%	$938	$8 440
Computer	$4 287	18.0%	$772	$3 515

b Depreciation

$= \$1905 + \$227 + \$376 + \$300$

$+ \$409 + \$938 + \$772$

$= \$4927$

c Depreciation = 10% of $8440

$= \$844$

30

Item	Type	Amount/ rate	Initial value
Furniture	Straight-line	$1250	$17 560
Van	Declining-balance	15%	$14 320
Computers	Declining-balance	20%	$10 980
Library	Straight-line	$3240	$25 270

a Depreciation on van

= 15% of $14 320

$= \$2148$

Depreciation on computers

= 20% of $10 980

$= \$2196$

Total depreciation

$= \$1250 + \$2148 + \$2196 + \$3240$

$= \$8834$

b Tax savings $= 0.2 \times \$8834$

$= \$1766.80$

An amount of $1766.80 tax will be saved.

31 $$\text{Depreciation} = \frac{50}{365} \times 0.12 \times \$11\,780$$

$= \$193.643\,8356$

$= \$194$ (nearest dollar)

Nadia can claim $194 as a tax deduction.

Challenge p52

1 Depreciation = 9% of \$2700
$= 0.09 \times \$2700$
$= \$243$
$V_0 = \$2700$, $D = \$243$, $n = 5$
$S = V_0 - Dn$
$= \$2700 - 5 \times \$243$
$= \$1485$

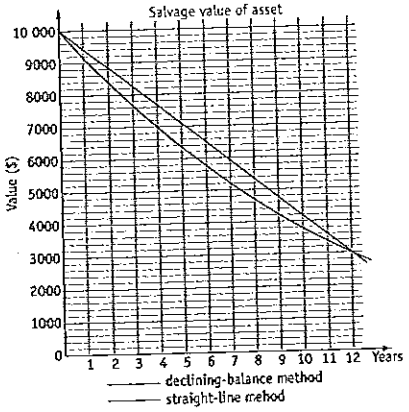
2 $V_0 = \$70\,000$, $S = \$29\,300$, $n = 12$
$S = V_0(1-r)^n$
$\$29\,300 = \$70\,000(1-r)^{12}$
$(1-r)^{12} = 0.418\,571\,428\ldots$
$r = 0.07$
[Using estimation and refinement.]
The rate of depreciation is 7%.

3 $V_0 = \$24\,000$
Depreciation in 1st year = 8% of \$24 000
$= 0.08 \times \$24\,000$
$= \$1920$
Value at beginning of second year
$= \$24\,000 - \$1920$
$= \$22\,080$
Depreciation in 2nd year
$= 0.08 \times \$22\,080$
$= \$1766.40$

4 **a** \$600

b Depreciation in first year = \$1000
Rate of depreciation $= \dfrac{\$1000}{\$10\,000} \times 100\%$
$= 10\%$

c After 12 years.



5 Mower: depreciation = 12% of \$13 590
$= 0.12 \times \$13\,590$
$= \$1630.80$
4-wheel bike: depr. = 15% of \$8700
$= 0.15 \times \$8700$
$= \$1305$
Fertiliser spreader: depreciation = \$234
Pump: depreciation = 18% of \$6200
$= 0.18 \times \$6200$
$= \$1116$
Total depreciation
$= \$1630.80 + \$1305 + \$234 + \$1116$
$= \$4285.80$

6 $S = \$7830$, $r = 0.15$, $n = 4$
$S = V_0(1-r)^n$
$\$7830 = V_0(1 - 0.15)^4$
$= V_0(0.85)^4$
$V_0 = \$7830 \div (0.85)^4$
$= \$14\,999.8204\ldots$
$= \$15\,000$ (nearest dollar)

7 **a** $v = 19(t^2 - 27t + 180)$
When $t = 0$,
$v = 19(0^2 - 27 \times 0 + 180)$
$= 3420$
The original value was \$3420

b When $t = 12$,
$v = 19(12^2 - 27 \times 12 + 180)$
$= 0$
The value of the rotary hoe is \$0 after twelve years. It cannot be valued at less than \$0 so this model for depreciation can work for at most 12 years.