

- 5 a £431.20    b £450    c  $\approx 4.36\%$   
 6 a  $14.85 \text{ s} < t < 14.95 \text{ s}$     b  $6.66 \text{ m s}^{-1} < s < 6.77 \text{ m s}^{-1}$   
 7  $267.5 \text{ cm}^2 < A < 355.5 \text{ cm}^2$   
 8 a  $\approx 175 \text{ cm}$     b  $\approx 2.87 \text{ cm}$ ,  $\approx 1.61\%$   
 9 a i 2 m    ii 2.24 m    iii 2.236 m  
 b i 1    ii 3    iii 4    c 2.24 m and 2.236 m  
 10 a  $\approx 4.51\%$     b  $\approx 1.32\%$     c  $\approx 0.0507\%$   
 d  $\approx 0.0402\%$     e  $\approx 8.49 \times 10^{-6}\%$   
 11 a  $\approx 38.5 \text{ cm}^2$     b  $37.4 < A < 39.6 \text{ cm}^2$     c  $\approx 2.92\%$

**EXERCISE 2A**

- 1 a \$232    b \$13 920    c \$1920  
 2 a £282.60    b £10 173.60    c £673.60  
 3 a \$1036.80    b \$2610    c €1903.28  
 5 a Balance Bank    b Cash Credit Union  
 c If Becky is able to afford the larger repayments, she should choose Cash Credit Union as she will pay less interest.  
 6 b \$27 509.01  
 c i \$200    ii \$186.21  
 The balance of the loan is less in month 6 which means the interest paid will also be less.  
 d i \$4.02    ii \$6497.40 (\$6498 using technology)  
 e The monthly repayment was rounded up, so every month the payments have reduced the balance by a little extra.  
 7 a \$148.64    b \$729.28  
 8 a £490.61    b £15 598.73  
 9 a \$8500    b i \$518.58    ii \$1871.60    iii \$5492.57  
 10 a 6.30% p.a.    b \$395.65  
 11 a i \$789.19    ii \$512.92    iii \$395.92  
 b The 3 year loan charges the least interest of \$3410.84 as more is paid off each month and therefore less interest is charged.  
 12 a €386.90    b €5214    c €10 169.13  
 d Ally pays more interest in the first  $2\frac{1}{2}$  years than in the second  $2\frac{1}{2}$  years.  
 13 a \$1827.33    b \$188 559.20    c \$162 745.03  
 d i \$3165.28    ii \$159 196.40    iii \$29 362.80

**EXERCISE 2B**

- 1 a 25 years 4 months    b \$3693.84  
 2 a €3163.24    b €413 500.41  
 3 a 12 years 7 months    b 3 years 1 month longer  
 4 a £5614.06  
 b No, he can only afford to spend £5614.06 per month. Otherwise his money will run out before he turns 84.  
 5 a \$1 094 748.09  
 b i \$8600.27    ii 11 years 11 months  
 6 a £11 512.29    b £394 007.62    c £1312.64  
 7 a  $\$4500 \times 12 \times 20 = \$1 080 000$   
 b Maggie will earn interest on the money in the annuity account as she makes her regular withdrawals.  
 c \$618 117.53  
 8 The money will last forever.  
 9 a 7.19%    b i 2 years 10 months    ii €679.24  
 10 a \$5121.03    b \$322 605.07    c \$6708.44

**REVIEW SET 2A**

- 1 a \$455.43    b \$27 325.80    c \$4325.80  
 2 a €157.24    b €1086.93

- 3 a \$2884.74  
 b Total repayments =  $\$2884.74 \times 12 \times 25 = \$865 422$   
 Total interest charged =  $\$865 422 - \$410 000 = \$455 422$   
 4 a 8 years 7 months    b \$2996.23  
 5 a €7861.43    b 14 years 3 months    c €727 698.90  
 6 a \$799 813.28    b \$314 877.35

**REVIEW SET 2B**

- 1 a \$279.08    b \$1395.84  
 2 a \$17 500    b \$1260.97    c \$2675.52    d \$9347.67  
 3 a i 11 742.52 pesos    ii 8286.45 pesos  
 b The 4 year loan charges the least interest of 63 640.96 pesos as more is paid off each month and therefore less interest is charged.  
 4 a An annuity fund is an investment where an individual makes a lump-sum deposit, and then makes regular *withdrawals* from the account. We have previously considered compound interest investments that make regular *deposits* into an account.  
 b Diane is technically correct, but she will be able to withdraw more than £2000 per month since the money in the fund will earn interest.  
 c £3167.02  
 5 a €2467.29    b €448.52  
 6 a 4.90% p.a.    b 6 years 7 months

**EXERCISE 3A**

- 1 a, d, and e are functions, since in each case, no two different ordered pairs have the same  $x$ -coordinate.  
 2 a Is a function, since for any value of  $x$  there is at most one value of  $y$ .  
 b Is a function, since for any value of  $x$  there is at most one value of  $y$ .  
 c Is not a function. If  $x^2 + y^2 = 9$ , then  $y = \pm\sqrt{9 - x^2}$ . So, for example, for  $x = 2$ ,  $y = \pm\sqrt{5}$ .  
 3 a function    b function    c function  
 d not a function    e not a function    f function  
 g function    h not a function  
 4 Not a function as a 2 year old child could pay \$0 or \$20.  
 5 No, because a vertical line (the  $y$ -axis) would cut the relation more than once.  
 6 No. A vertical line is not a function. It will not pass the "vertical line" test.  
 7 a  $y^2 = x$  is a relation but not a function.  
 $y = x^2$  is a function (and a relation).  
 $y^2 = x$  has a horizontal axis of symmetry (the  $x$ -axis).  
 $y = x^2$  has a vertical axis of symmetry (the  $y$ -axis).  
 Both  $y^2 = x$  and  $y = x^2$  have vertex  $(0, 0)$ .  
 $y^2 = x$  is a rotation of  $y = x^2$  clockwise through  $90^\circ$  about the origin *or*  $y^2 = x$  is a reflection of  $y = x^2$  in the line  $y = x$ .  
 b i The part of  $y^2 = x$  in the first quadrant.  
 ii  $y = \sqrt{x}$  is a function as any vertical line cuts the graph at most once.  
 8 a Both curves are functions since any vertical line will cut each curve at most once.  
 b  $y = \sqrt[3]{x}$

**EXERCISE 3B**

- 1 a 2    b 8    c -1    d -13    e 1  
 2 a 2    b 2    c -16    d -68    e  $\frac{17}{4}$