1 **a**

x-coordinate of B	y-coordinate of B	gradient of AB
2	4	$\frac{4-1}{2-1} = 3$
1.1	1.21	$\frac{1.21-1}{1.1-1} = 2.1$
1.01	1.0201	$\frac{1.0201-1}{1.01-1} = 2.01$
1.001	1.002001	$\frac{1.002001-1}{1.001-1} = 2.001$

b gradient = 2

c

x-coordinate of B	y-coordinate of B	gradient of AB
0	0	$\frac{1-0}{1-0} = 1$
0.9	0.81	$\frac{1-0.81}{1-0.9} = 1.9$
0.99	0.9801	$\frac{1-0.9801}{1-0.99} = 1.99$
0.999	0.998001	$\frac{1-0.998001}{1-0.999} = 1.999$

this table supports the answer to part **b** as the gradient of the chord AB again gets closer to 2 as B gets closer to A

2 possible tables of values are:

a

x-coordinate of B	y-coordinate of B	gradient of AB
3	9	$\frac{9-4}{3-2} = 5$
2.1	4.41	$\frac{4.41-4}{2.1-2} = 4.1$
2.01	4.0401	$\frac{4.0401-4}{2.01-2} = 4.01$
2.001	4.004001	$\frac{4.004001-4}{2.001-2} = 4.001$

$\therefore$ gradient = 4

b

x-coordinate of B	y-coordinate of B	gradient of AB
5	25	$\frac{25-16}{5-4} = 9$
4.1	16.81	$\frac{16.81-16}{4.1-4} = 8.1$
4.01	16.0801	$\frac{16.0801-16}{4.01-4} = 8.01$
4.001	16.008001	$\frac{16.008001-16}{4.001-4} = 8.001$

$\therefore$ gradient = 8

c

x-coordinate of B	y-coordinate of B	gradient of AB
2.5	6.25	$\frac{6.25-2.25}{2.5-1.5} = 4$
1.6	2.56	$\frac{2.56-2.25}{1.6-1.5} = 3.1$
1.51	2.2801	$\frac{2.2801-2.25}{1.51-1.5} = 3.01$
1.501	2.253001	$\frac{2.253001-2.25}{1.501-1.5} = 3.001$

$\therefore$ gradient = 3

d

x-coordinate of B	y-coordinate of B	gradient of AB
–2	4	$\frac{4-9}{-2-(-3)} = -5$
–2.9	8.41	$\frac{8.41-9}{-2.9-(-3)} = -5.9$
–2.99	8.9401	$\frac{8.9401-9}{-2.99-(-3)} = -5.99$
–2.999	8.994001	$\frac{8.994001-9}{-2.999-(-3)} = -5.999$

$\therefore$ gradient = –6

3 **a** gradient = $2x$

b **i** 12 **ii** 4.8 **iii** –6.4

4 possible answers are:

a let A be (1, 1)

x-coordinate of B	y-coordinate of B	gradient of AB
2	16	$\frac{16-1}{2-1} = 15$
1.1	1.4641	$\frac{1.4641-1}{1.1-1} = 4.641$
1.01	1.04060401	$\frac{1.04060401-1}{1.01-1} = 4.060401$
1.001	1.004006004	$\frac{1.004006004-1}{1.001-1} = 4.006004$

$\therefore$ gradient = 4

b let A be (2, –3)

x-coordinate of B	y-coordinate of B	gradient of AB
3	–3	$\frac{-3-(-3)}{3-2} = 0$
2.1	–3.09	$\frac{-3.09-(-3)}{2.1-2} = -0.9$
2.01	–3.0099	$\frac{-3.0099-(-3)}{2.01-2} = -0.99$
2.001	–3.000999	$\frac{-3.000999-(-3)}{2.001-2} = -0.999$

$\therefore$ gradient = –1

c let A be (4, 2)

x-coordinate of B	y-coordinate of B	gradient of AB
5	2.236067977	$\frac{2.236067977-2}{5-4} = 0.236068$
4.1	2.024845673	$\frac{2.024845673-2}{4.1-4} = 0.248457$
4.01	2.002498439	$\frac{2.002498439-2}{4.01-4} = 0.249844$
4.001	2.000249984	$\frac{2.000249984-2}{4.001-4} = 0.249984$

$\therefore$ gradient = 0.25

d let A be (2, 1)

x-coordinate of B	y-coordinate of B	gradient of AB
3	0.666666667	$\frac{0.666666667-1}{3-2} = -0.333333$
2.1	0.952380952	$\frac{0.952380952-1}{2.1-2} = -0.476190$
2.01	0.995024876	$\frac{0.995024876-1}{2.01-2} = -0.497512$
2.001	0.999500250	$\frac{0.999500250-1}{2.001-2} = -0.499750$

$\therefore$ gradient = –0.5

5 **a** possible answers are:

i let A be (1, 1)

x-coordinate of B	y-coordinate of B	gradient of AB
2	8	$\frac{8-1}{2-1} = 7$
1.1	1.331	$\frac{1.331-1}{1.1-1} = 3.31$
1.01	1.030301	$\frac{1.030301-1}{1.01-1} = 3.0301$
1.001	1.003003001	$\frac{1.003003001-1}{1.001-1} = 3.003001$

$\therefore$ gradient = 3

ii let A be (2, 8)

x-coordinate of B	y-coordinate of B	gradient of AB
3	27	$\frac{27-8}{3-2} = 19$
2.1	9.261	$\frac{9.261-8}{2.1-2} = 12.61$
2.01	8.120601	$\frac{8.120601-8}{2.01-2} = 12.0601$
2.001	8.012006001	$\frac{8.012006001-8}{2.001-2} = 12.006001$

$\therefore$ gradient = 12

iii let A be (3, 27)

x-coordinate of B	y-coordinate of B	gradient of AB
4	64	$\frac{64-27}{4-3} = 37$
3.1	29.791	$\frac{29.791-27}{3.1-3} = 27.91$
3.01	27.270901	$\frac{27.270901-27}{3.01-3} = 27.0901$
3.001	27.027009	$\frac{27.027009-27}{3.001-3} = 27.009$

$\therefore$ gradient = 27

b gradient = $3x^2$

c **i** 48 **ii** 12 **iii** 6.75