

Algebra 1

Calculator allowed for all questions

Foundation

Higher



All questions

Time : 45 minutes

Name: _____

SOLUTIONS

Clip	Grade	Title of clip	Marks	Score	Percentage
Clip 102	C	Algebraic Simplification (qu. 1, 2)	36	_____	_____
Clip 103	C	Brackets (qu. 3)	18	_____	_____
Clip 104	C	Simple factorisation (qu. 4)	8	_____	_____
Clip 105	C	Solving equations (qu. 5)	24	_____	_____
Clip 106	C	Forming equations (qu. 6)	5	_____	_____
Clip 107	C	Subject of a formula (qu. 7)	8	_____	_____
Clip 108	C	Inequalities (qu. 8)	9	_____	_____
Clip 109	C	Solving inequalities (qu. 9)	6	_____	_____
Clip 110	C	Trial and improvement (qu. 10)	4	_____	_____
Clip 111	C	Indices (qu. 11, 12, 13, 14)	8	_____	_____
Clip 112	C	nth term (qu. 15)	4	_____	_____

Out of 130

TOTAL SCORE _____

FINAL PERCENTAGE

%

1) Simplify the following:

a) $x + x = \underline{2x}$ 1

b) $a \times a = \underline{a^2}$ 1

c) $3x + 2x = \underline{5x}$ 1

d) $4a \times 3a = \underline{12a^2}$ 1

e) $2d + d = \underline{3d}$ 1

f) $2d \times d = \underline{2d^2}$ 1

g) $5x + 2x + 3y + y = \underline{7x + 4y}$ 2

h) $7a - 2a + 6x - 4x = \underline{5a + 2x}$ 2

i) $4a + 3y + 2a + 8y = \underline{6a + 11y}$ 2

j) $7x + 5t - 3x - 4t = \underline{4x + t}$ 2

k) $4y - 3t - y - 5t = \underline{3y - 8t}$ 2

l) $7g + 4e + g - 8e = \underline{8g - 4e}$ 2

m) $x^2 \times x^4 = \underline{x^6}$ 1

n) $x^4 \times x = \underline{x^5}$ 1

o) $2x^2 \times 3x^5 = \underline{6x^7}$ 2

p) $x^2y \times x^2y^3 = \underline{x^4y^4}$ 2

q) $3ey^2 \times 2e^2y^4 = \underline{6e^3y^6}$ 2

2) Expand and simplify where possible:

a) $2(x + 3) = \underline{2x + 6}$ 2

b) $3(2x - 3) = \underline{6x - 9}$ 2

c) $3(2x + 5) + 2(5x + 1) = \underline{16x + 17}$ 2

$= 6x + 15 + 10x + 2$

d) $4(3a + 1) + 2(a - 3) = \underline{14a - 2}$ 2

$= 12a + 4 + 2a - 6$

e) $7(3a - 2) - 2(a - 3) = \underline{19a - 8}$ 2

$= 21a - 14 - 2a + 6$

3) Expand and simplify:

a) $(x + 3)(x + 2)$
 $= x^2 + 3x + 2x + 6$
 $= \underline{x^2 + 5x + 6}$ 3

b) $(x + 5)(x - 2)$
 $= x^2 + 5x - 2x - 10$
 $= \underline{x^2 + 3x - 10}$ 3

c) $(x - 3)(x - 1)$
 $= x^2 - 3x - 1x + 3$
 $= \underline{x^2 - 4x + 3}$ 3

d) $(3x + 2)(2x + 5)$
 $= 6x^2 + 4x + 15x + 10$
 $= \underline{6x^2 + 19x + 10}$ 3

e) $(2x - 3)(5x + 1)$
 $= 10x^2 - 15x + 2x - 3$
 $= \underline{10x^2 - 13x - 3}$ 3

f) $(3x - 1)^2 = (3x - 1)(3x - 1)$
 $= 9x^2 - 3x - 3x + 1$
 $= \underline{9x^2 - 6x + 1}$ 3

4) Factorise:

a) $2x - 6$
 $\underline{2(x - 3)}$ 2

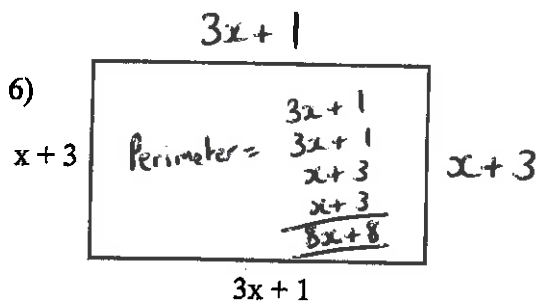
b) $x^2 + x$
 $\underline{x(x + 1)}$ 2

c) $2x^2 + 8x$
 $\underline{2x(x + 4)}$ 2

d) $8x^2 - 12x$
 $\underline{4x(2x - 3)}$ 2

5) Solve these equations:

- a) $x + 3 = 8$ $x = \underline{5}$ 2
- b) $x - 4 = 7$ $x = \underline{11}$ 2
- c) $2x = 12$ $x = \underline{6}$ 2
- d) $\frac{x}{3} = 4$ $x = \underline{12}$ 2
- e) $3x + 4 = 16$ $x = \underline{4}$ 2
- f) $2x - 1 = 11$ $x = \underline{6}$ 2
- g) $\frac{x}{2} + 1 = 7$ $x = \underline{12}$ 2
- h) $2(x + 3) = 20$ $x = \underline{7}$ 2
- i) $\frac{3x}{2} - 1 = 2$ $x = \underline{2}$ 2
- j) $3x + 1 = 2x + 9$ $x = \underline{8}$ 2
- k) $2x + 7 = 5x - 2$ $x = \underline{3}$ 2
- l) $2(2x - 3) = 2x + 1$ $x = \underline{3.5}$ 2



a) Form an expression in x for the perimeter of the rectangle, above.

$\underline{8x + 8}$ 3

b) If the perimeter of the rectangle is 60cm form an equation and solve it to find x .

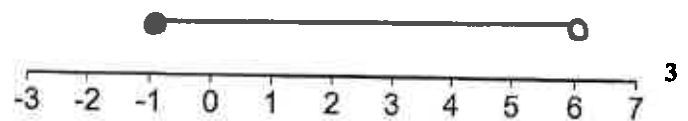
$8x + 8 = 60$

$x = \underline{6.5}$ 2

7) Make x the subject of these formulas

- a) $x + y = t$ $x = \underline{t - y}$ 2
- b) $ax = y$ $x = \underline{y \div a}$ 2
- c) $ax - t = y$ $x = \underline{(y + t) \div a}$ 2
- d) $3a^2 + yx = 7$ $x = \underline{(7 - 3a^2) \div y}$ 2

8) a) Represent $-1 \leq x < 6$ on the number line below



b) Write down this inequality



$\underline{1 < x \leq 7}$ 3

c) x is an integer and $-5 < x \leq 2$
Write down all the possible values of x .

$\underline{-4, -3, -2, -1, 0, 1, 2}$ 3

9) Solve these inequalities to find x

a) $x + 3 < 7$ $\underline{x < 4}$ 2

b) $5x > 10$ $\underline{x > 2}$ 2

c) $2x - 7 \leq 3$ $\underline{x \leq 5}$ 2

- 10) The equation $x^3 - 2x^2 = 43$ has a solution between $x = 4$ and $x = 5$. Use a trial and improvement method to find this solution to 1 decimal place. All working must be shown.

CALCULATOR
ALLOWED

	x	$x^3 - (2 \times x^2)$	43
	4	$4^3 - (2 \times 4^2)$	32 too small
lower limit	5	$5^3 - (2 \times 5^2)$	75 too big
	↘ 4.3	$4.3^3 - (2 \times 4.3^2)$	42.527 too small
	↗ 4.4	$4.4^3 - (2 \times 4.4^2)$	46.464 too big
upper limit	4.35	$4.35^3 - (2 \times 4.35^2)$	44.467875 too big so use lower limit

$x = \underline{\quad 4.3 \quad}$

11) Write as a power of 4, $4^3 \times 4^2$ 4^5 2

12) Write as a power of 6, $6^5 \div 6^2$ 6^3 2

13) Simplify the following: $x^5 \times x^2$ x^7 2

14) Simplify the following: $\frac{y \times y^6}{y^2}$ y^5 2

- 15) Find the nth term of the following two number sequences:

a) 2, 5, 8, 11, 14, ... $3n - 1$ 2

b) 8, 13, 18, 23, 28, ... $5n + 3$ 2

Algebra 2

Calculator allowed for all questions

Foundation

Higher



All questions

Time for test: 60 minutes

Name: _____

	<i>Grade</i>	<i>Title of clip</i>	<i>Marks</i>	<i>Score</i>	<i>Percentage</i>
Clip 66	D	Substitution (qu. 1, 2, 3)	8	_____	_____
Clip 113	C	Straight line graphs (qu. 4, 5)	9	_____	_____
Clip 114	C	Finding the equation of a line (qu. 6)	2	_____	_____
Clip 115	C	Simultaneous equations (qu. 7)	2	_____	_____
Clip 116	C	Quadratic graphs (qu. 8, 9)	10	_____	_____
Clip 117	C	Real-life graphs (qu. 10)	4	_____	_____
Clip 140	B	Factorising quadratics (qu. 11)	8	_____	_____
Clip 141	B	Difference of two squares (qu. 12)	4	_____	_____
Clip 142	B	Simultaneous equations (qu. 13, 14)	6	_____	_____
Clip 143	B	$y = mx + c$ (qu. 15, 16)	5	_____	_____
Clip 144	B	Regions (qu. 17)	5	_____	_____
Clip 145	B	Graphs of cubics (qu. 18)	5	_____	_____
Clip 146	B	Shapes of functions (qu. 19)	4	_____	_____

Out of 72

TOTAL
SCORE _____

FINAL
PERCENTAGE

%

1) $y = 2x + 7$

$x = 9$

Work out the value of y .

$y = (2 \times 9) + 7$

$y = \underline{25}$ 2

2) $s = t^2 - at$

$a = 4 \quad t = -3$

Work out the value of s .

$s = (-3)^2 - (4 \times -3) = 9 + 12$

$s = \underline{21}$ 3

3) $v^2 = u^2 + 2as$

$u = 3 \quad a = 2.5 \quad s = 8$

Work out a value of v .

$v^2 = 3^2 + (2 \times 2.5 \times 8) = 49$

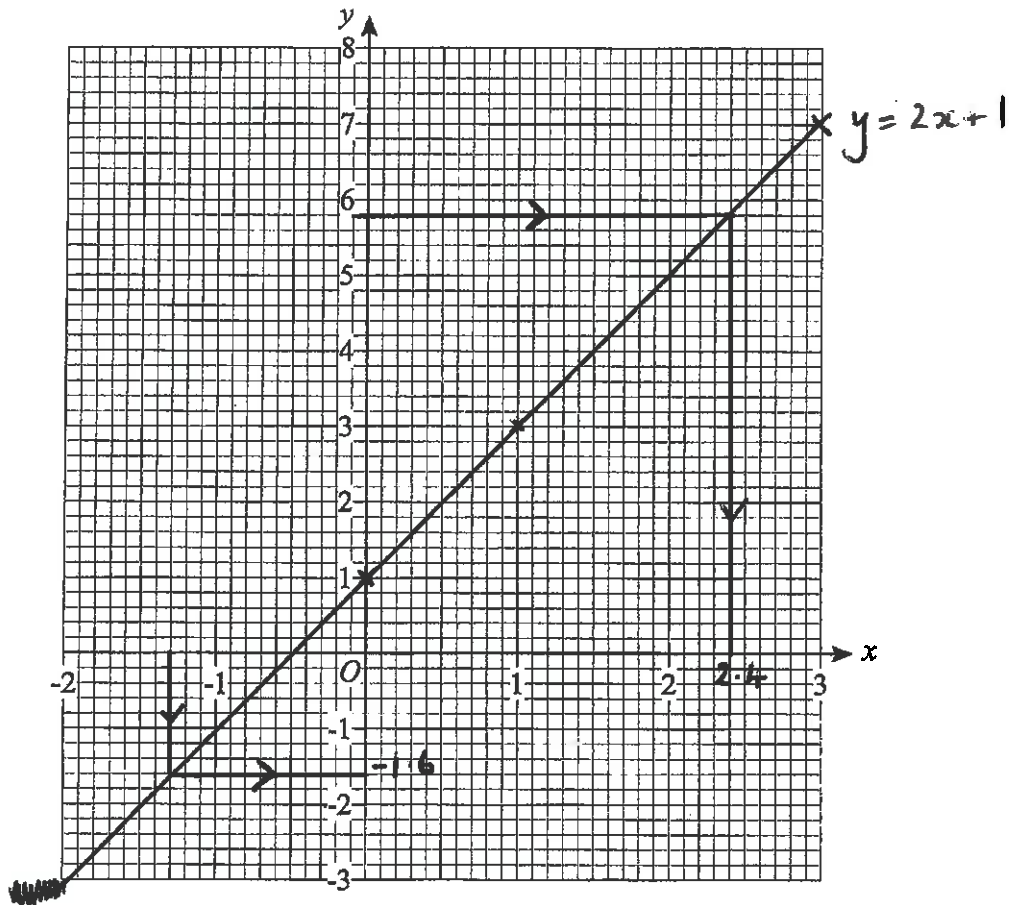
$v = \underline{\sqrt{49}} = \underline{7}$ 3

4) a) Complete the table of values for $y = 2x + 1$

x	-2	-1	0	1	2	3
y	-3	-1	1	3	5	7

2

b) On the grid, draw the graph of $y = 2x + 1$ 2



c) Use your graph to find

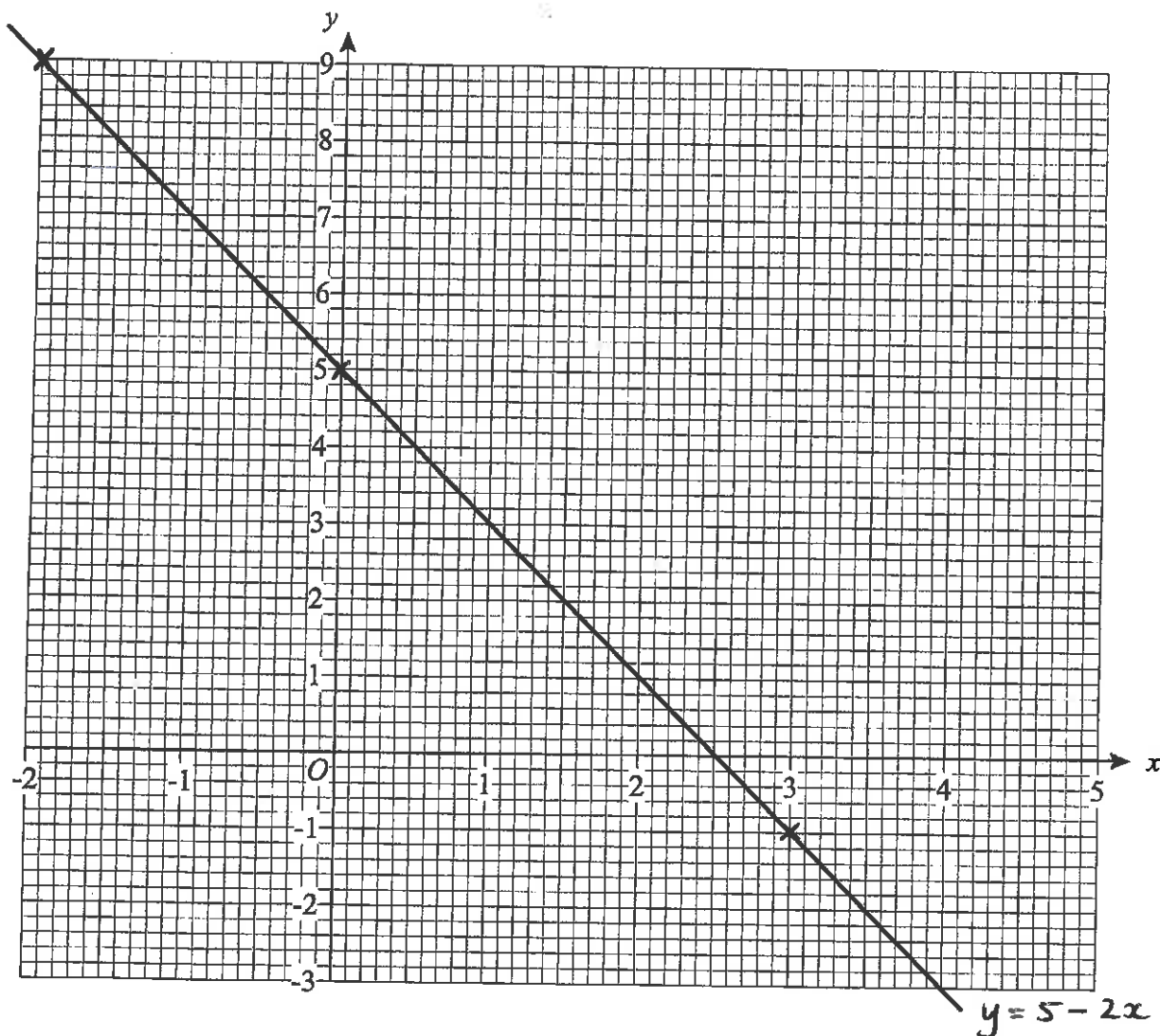
(i) the value of y when $x = -1.3$ $y = \underline{-1.6}$ 1

(ii) the value of x when $y = 5.8$ $x = \underline{2.4}$ 1

x	-2	-1	0	1	2	3	4
$y = 5 - 2x$	9	7	5	3	1	-1	-3

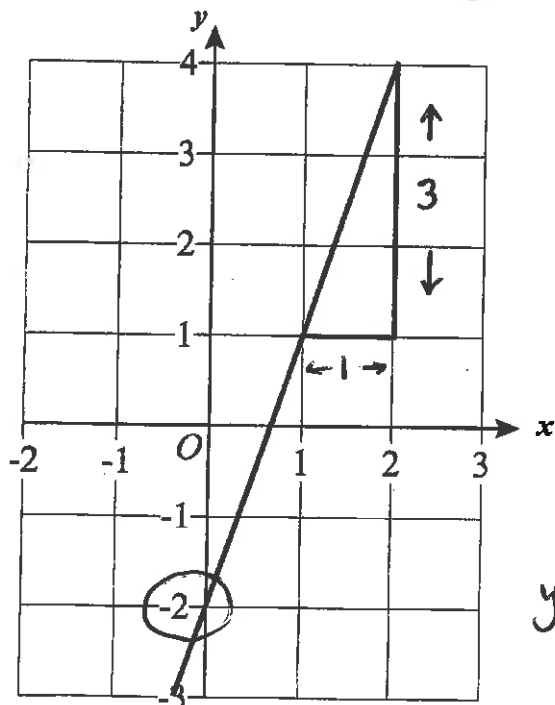
5) On the grid below, draw the graph of $y = 5 - 2x$ for values of x from -2 to 4

3



6) What is the equation of the line on the grid below? _____

2



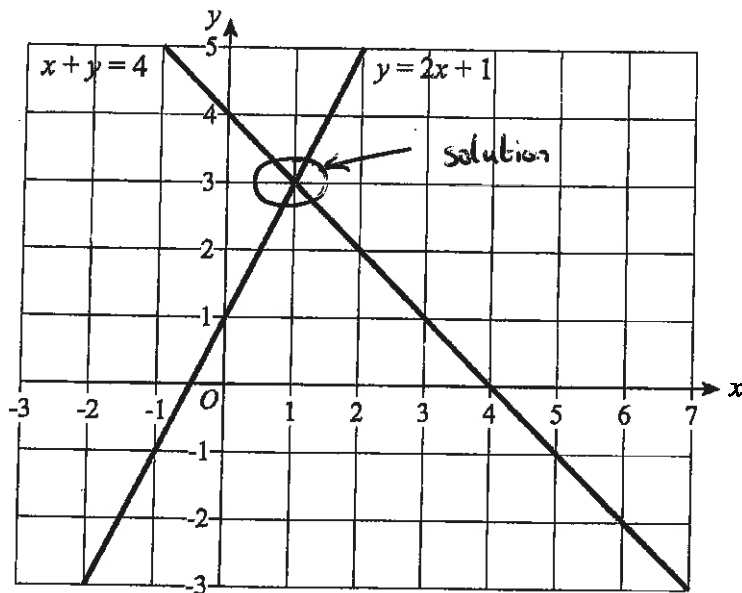
$$\text{gradient} = \frac{\text{change in } y}{\text{change in } x} = \frac{3}{1} = 3$$

$$y \text{ intercept} = -2$$

$y = mx + c$

$y = 3x - 2$

- 7) Use the graph below to solve the simultaneous equations $y = 2x + 1$ and $x + y = 4$



$$x = \frac{1}{1}$$

$$y = \frac{3}{1}$$

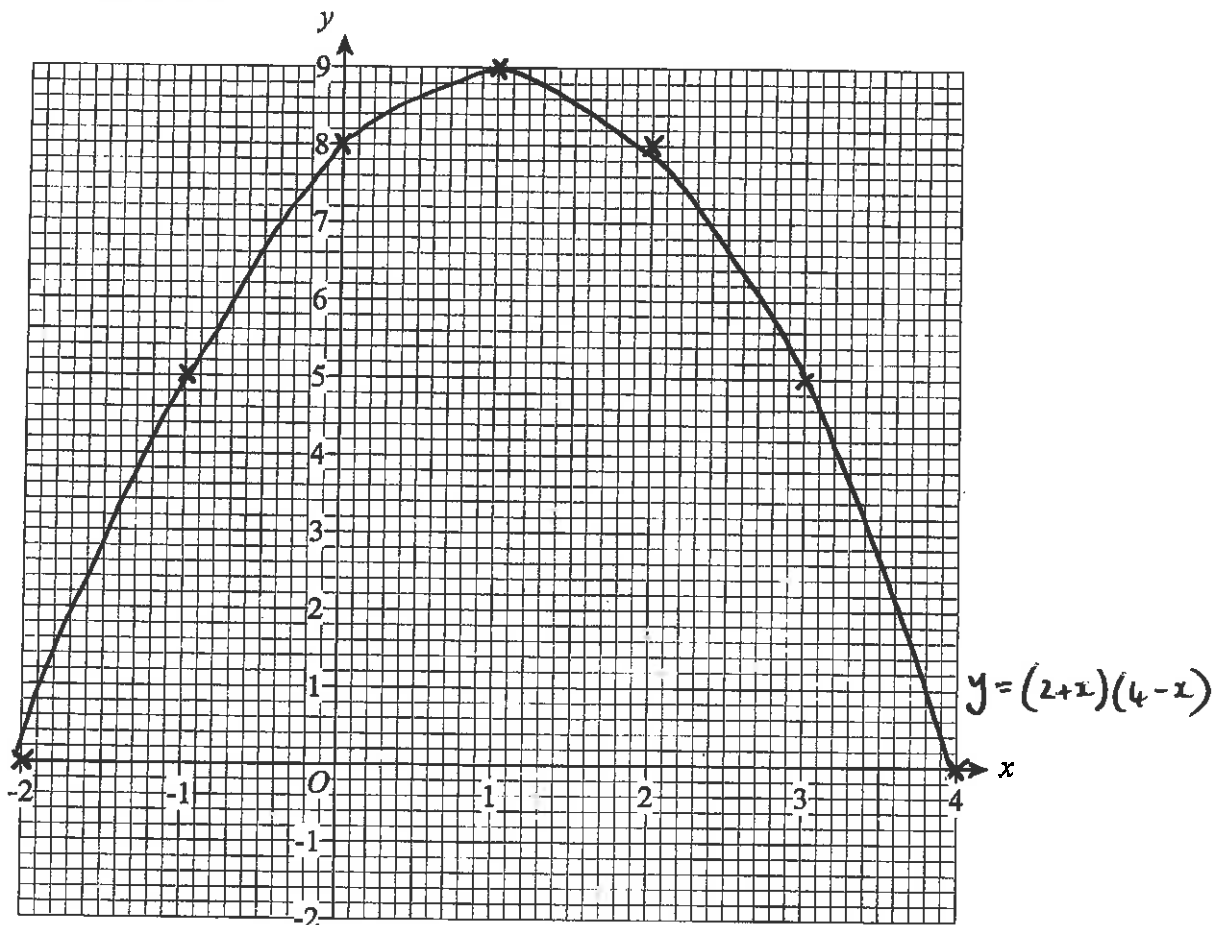
- 8) a) Complete the table of values for $y = (2 + x)(4 - x)$

x	-2	-1	0	1	2	3	4
y	0	5	8	9	8	5	0

2

- b) On the grid, draw the graph of $y = (2 + x)(4 - x)$ for values of x from -2 to 4.

2



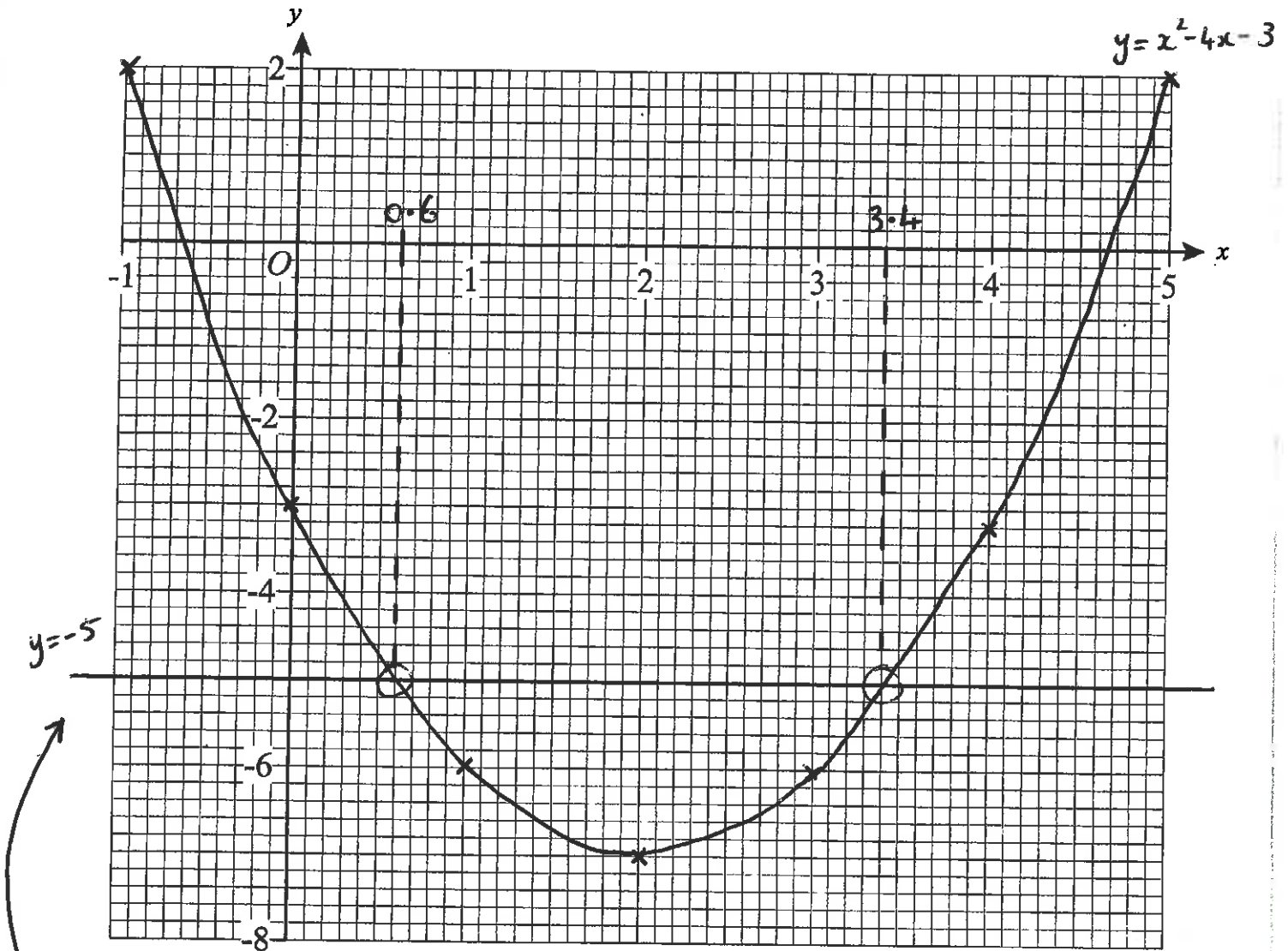
9) a) Complete the table of values for $y = x^2 - 4x - 3$

x	-1	0	1	2	3	4	5
y	2	-3	-6	-7	-6	-3	2

2

b) On the grid, draw the graph of $y = x^2 - 4x - 3$

2

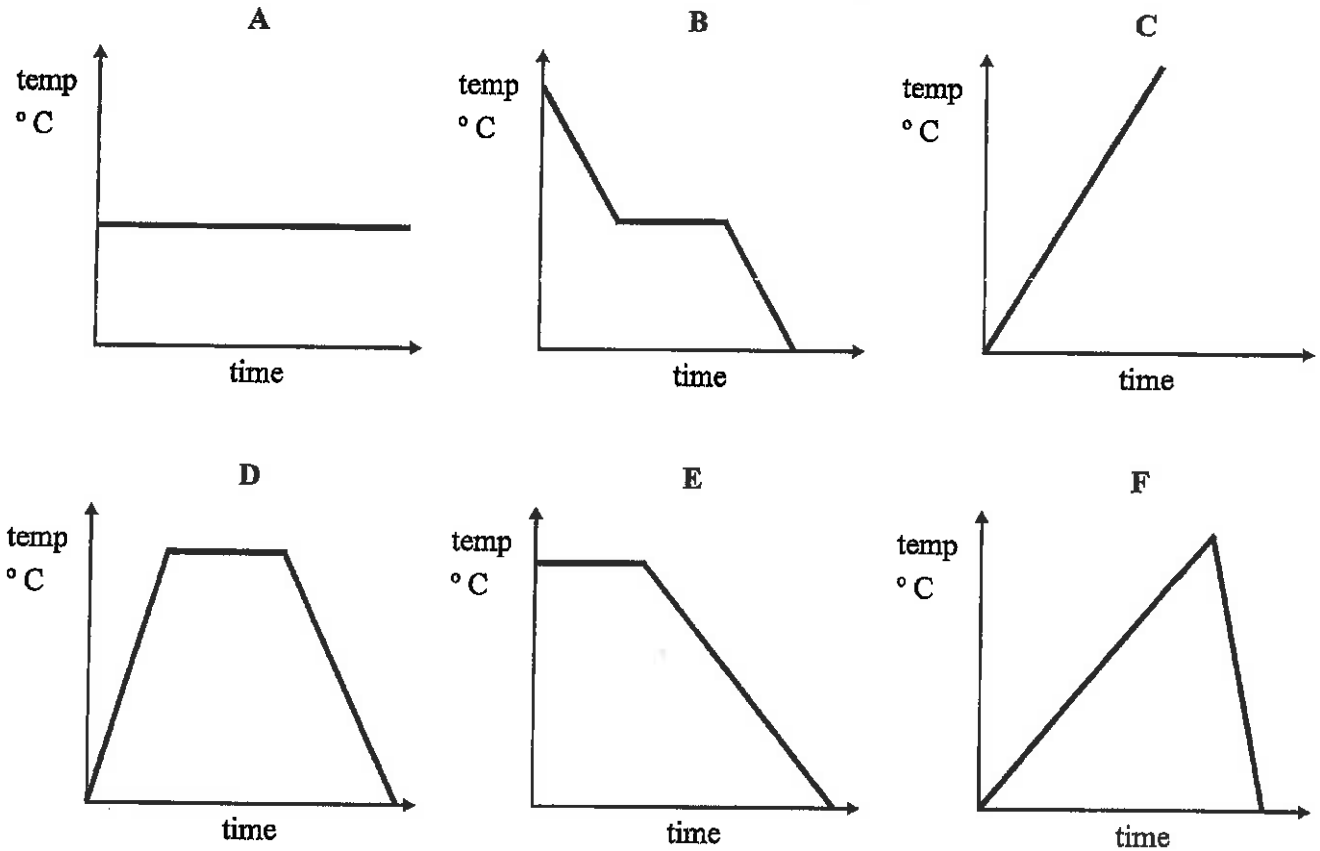


c) Use your graph to estimate the values of x when $y = -5$

$$x = \underline{0.6} \quad \text{or} \quad x = \underline{3.4}$$

2

10) Here are six temperature/time graphs.



Each sentence in the table describes one of the graphs.
Write the letter of the correct graph next to each sentence.
The first one has been done for you.

The temperature is always the same.	<u>A</u>	
The temperature stays the same for a while and then falls.	<u>E</u>	1
The temperature starts at 0 °C and keeps rising.	<u>C</u>	1
The temperature rises and then falls quickly.	<u>F</u>	1
The temperature falls, stays the same for a while and then falls.	<u>B</u>	1

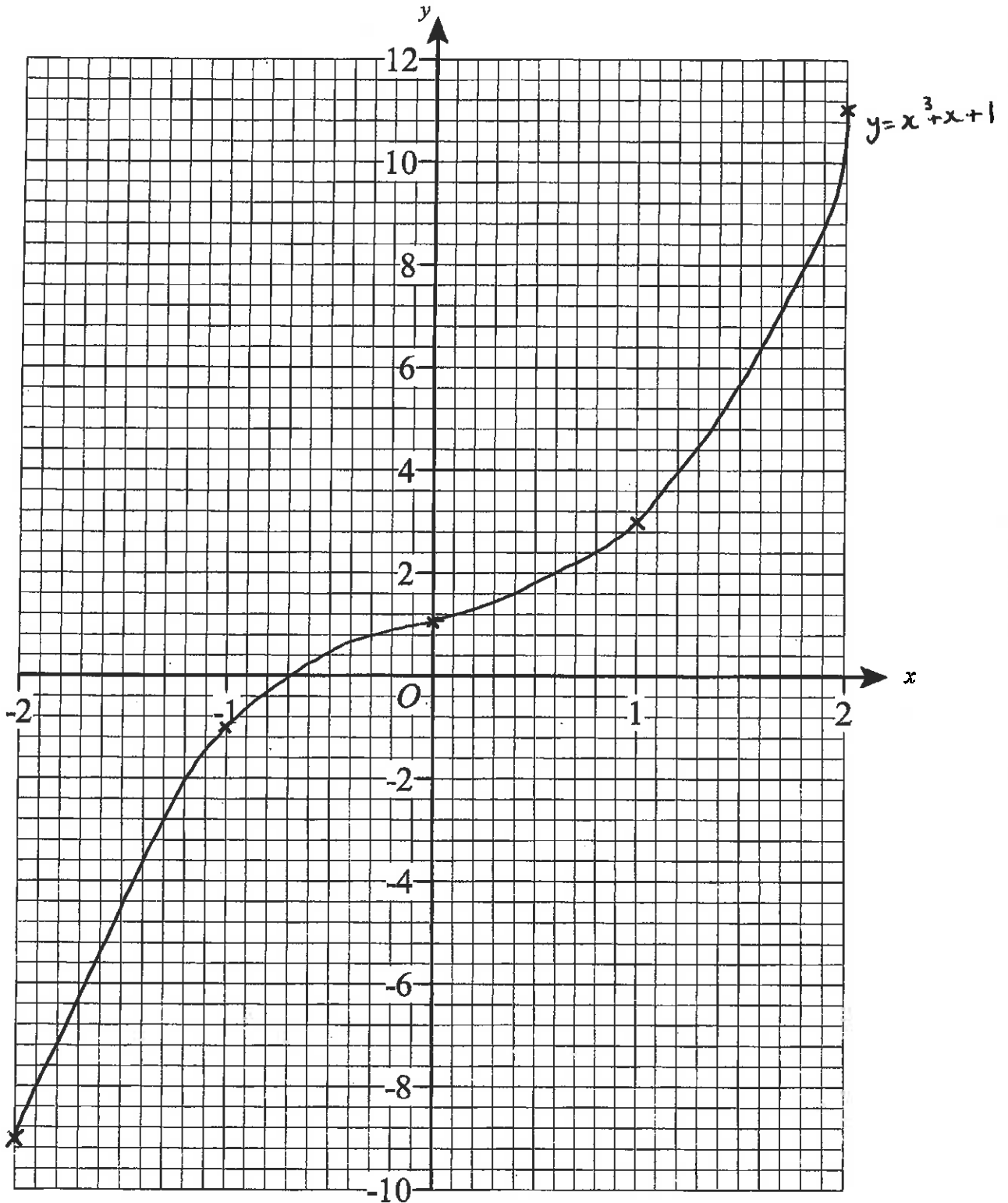
- 11) a) (i) Factorise $x^2 + 6x + 8$ $\frac{(x+4)(x+2)}{}$ 2
 (ii) Solve $x^2 + 6x + 8 = 0$ $x = \underline{-4}$ or $x = \underline{-2}$ 2
- b) (i) Factorise $x^2 + 3x - 10$ $\frac{(x+5)(x-2)}{}$ 2
 (ii) Solve $x^2 + 3x - 10 = 0$ $x = \underline{-5}$ or $x = \underline{2}$ 2

18) a) Complete the table of values for $y = x^3 + x + 1$

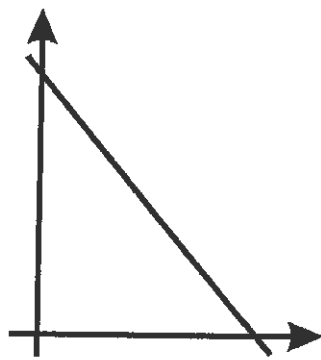
x	-2	-1	0	1	2
y	-9	-1	1	3	11

3

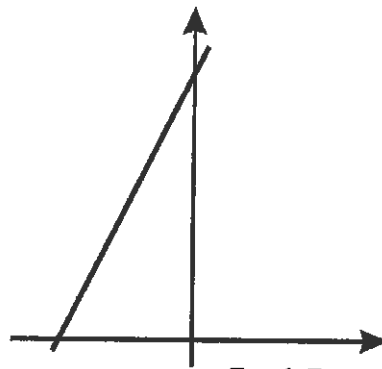
b) On the grid, draw the graph of $y = x^3 + x + 1$ 2



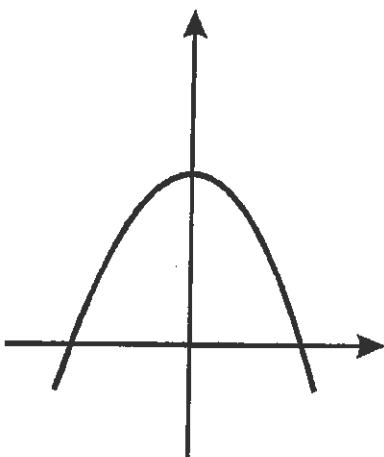
19)



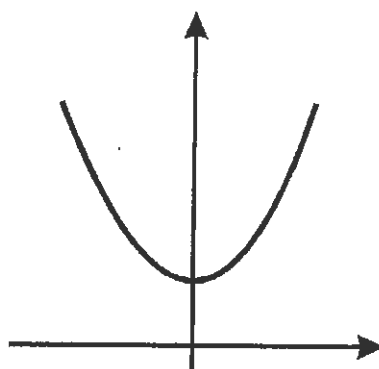
Graph A



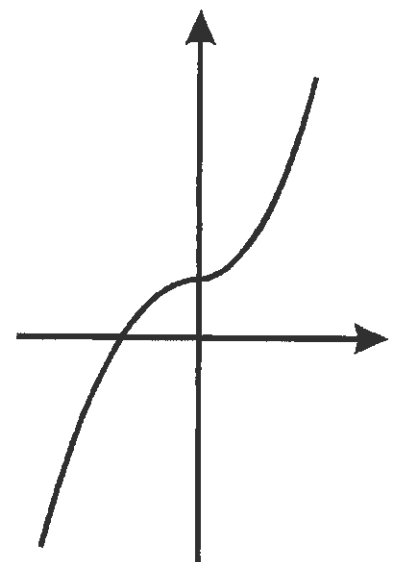
Graph B



Graph C



Graph D



Graph E

Complete the following statements

$y = 2x + 5$ matches graph B

$y = x^3 + 2$ matches graph E

$y + 2x = 5$ matches graph A

$y = x^2 + 4$ matches graph D

4