Answer **all** the questions.

1   An isosceles triangle ABC has a length $AB = AC = (5p - 2q)$ cm and $BC = (3p + q)$ cm.
     Find the perimeter of triangle ABC in terms of p and q.

perimeter $= 2(5p - 2q) + 3p + q$ —— Ⓜ

$= 10p - 4q + 3p + q$

$= (13p - 3q)$ cm.

$[ALT:]$

Perimeter $= 5p - 2q + 5p - 2q + 3p + q$ —— Ⓜ]

$= (13p - 3q)$ cm #

Ⓐ

Answer ...$13p - 3q$.... cm [2]

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2   If $3(x - y)^2 = 51$ and $xy = 21$, find the value of $x^2 + y^2$.

$3(x^2 - 2xy + y^2) = 51$ —— Ⓜ : correct expansion.

$x^2 - 2xy + y^2 = 17$

$x^2 - 2(21) + y^2 = 17$ —— Ⓜ

$x^2 + y^2 = 17 + 42$

$= 59$ #

$[ALT:]$

$3(x^2 - 2xy + y^2) = 51$ [M1] : expansion

$3x^2 - 6xy + 3y^2 = 51$

$3x^2 - 6(21) + 3y^2 = 51$ —— [M1]

$3x^2 + 3y^2 = 51 + 126$

$3x^2 + 3y^2 = 177$

$x^2 + y^2 = 59$ #

Answer ....59 —— Ⓐ [3]

3 Expand and simplify each of the following expression.

(a) $(3a-2b)(5a+b)$

$$= 15a^2 + 3ab - 10ab - 2b^2 \quad \text{—} \quad \textcircled{M1}$$

$$= 15a^2 - 7ab - 2b^2 \quad \#$$

Answer $15a^2 - 7ab - 2b^2$ [2]
$\llcorner \textcircled{A1}$

(b) $(2x+3y)^2 + 3x^2 - xy \quad (3y)^2$

$$= 4x^2 + 12xy + 9y^2 + 3x^2 - xy \quad \text{—} \quad \textcircled{M1} : \text{correct expansion.}$$

$$= 7x^2 + 11xy + 9y^2 \quad \#$$

Answer $7x^2 + 11xy + 9y^2$ [2]
$\llcorner \textcircled{A1}$

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4 (a) Solve the equation $2x^2 + x = 15$.

$2x$	-5	$-5x$
x	3	$6x$
$2x^2$	-15	x

$$2x^2 + x - 15 = 0.$$

$$(2x - 5)(x + 3) = 0. \quad \text{—} \quad \textcircled{M1}$$

$$2x = 5 \qquad \text{or} \qquad x = -3 \quad \#$$

$$x = 2\tfrac{1}{2} \quad \#$$

* Penalise in front under Presentation if student did not write '=0', 'or.'

Answer $x = 2\tfrac{1}{2}$ or -3 [2]
$\llcorner \textcircled{A1} : \text{both correct.}$

(b) Hence, solve the equation $4(y-1)^2 + 2(y-1) = 30$.

$$4(y-1)^2 + 2(y-1) = 30$$

$$2(y-1)^2 + (y-1) = 15. \quad \text{—} \quad \textcircled{M1}$$

let $x = y-1$.

$$\therefore y-1 = 2\tfrac{1}{2} \qquad \text{or} \qquad y-1 = -3 \quad \text{—} \quad \textcircled{M1} : \text{ecf.}$$

$$y = 3\tfrac{1}{2} \quad \# \qquad\qquad y = -2 \quad \#$$

Answer $y = 3\tfrac{1}{2}$ or -2 [3]
$\llcorner \textcircled{A1} : \text{both correct.}$

5 Aqil's father is x^2 years old while Aqil is x years old now. In $5x$ years' time, Aqil's father is twice as old as him.

(a) Form an equation in x and show that it reduces to $x^2 - 7x = 0$.   [2]

$$x^2 + 5x = 2(x + 5x) \quad\text{—}\quad \text{M1}$$
$$x^2 + 5x = 12x$$
$$x^2 - 7x = 0. \quad (shown) \text{*}$$

A1 : simplify and show

(b) Solve the equation $x^2 - 7x = 0$.

$$x(x - 7) = 0 \quad\text{—}\quad \text{M1}$$
$$\underline{x = 0 \ (rej)} \qquad \text{or} \qquad \underline{x = 7} \text{*} \quad\text{—}\quad \text{A1} : \text{both solutions must be shown.}$$

Answer $x = $ ....7................[2]
↳ Do not penalise if student also included 0 as an answer.

(c) Hence, find the age of Aqil's father now.

$$Age = 7^2$$
$$= 49.$$

Answer ....49 – B1...years old [1]

6 Factorise each of the following expressions completely.

(a) $2x^3 - 50x$

$= 2x(x^2 - 25)$ — Ⓜ①

$= 2x(x+5)(x-5)$

$\}$ ＊ $a^2 - b^2 = (a+b)(a-b)$

Answer ... $2x(x+5)(x-5)$ [2] └ Ⓐ①

(b) $6y^2 + 9y - 42$

$= 3(2y^2 + 3y - 14)$ — Ⓜ①

$= 3(2y+7)(y-2)$. ＃

		7y
2y	7	
y	-2	-4y
2y²	-14	3y

[A4]:

$6y^2 + 9y - 42 = (3y-6)(2y+7)$ — [M1]

$= 3(y-2)(2y+7)$ ＃

Answer ... $3(2y+7)(y-2)$ [2] └ Ⓐ①

(c) $2ax - 5bx + 15by - 6ay$

$= x(2a-5b) + 3y(5b-2a)$ — Ⓜ①

$= x(2a-5b) - 3y(2a-5b)$

$= (x-3y)(2a-5b)$ ＃

Answer ... $(x-3y)(2a-5b)$ [2] └ Ⓐ

[Turn over]

7 The variable x and y are connected by the equation $y = 2x^2 + 6x - 3$. Some values of x and the corresponding values of y are given in the table.
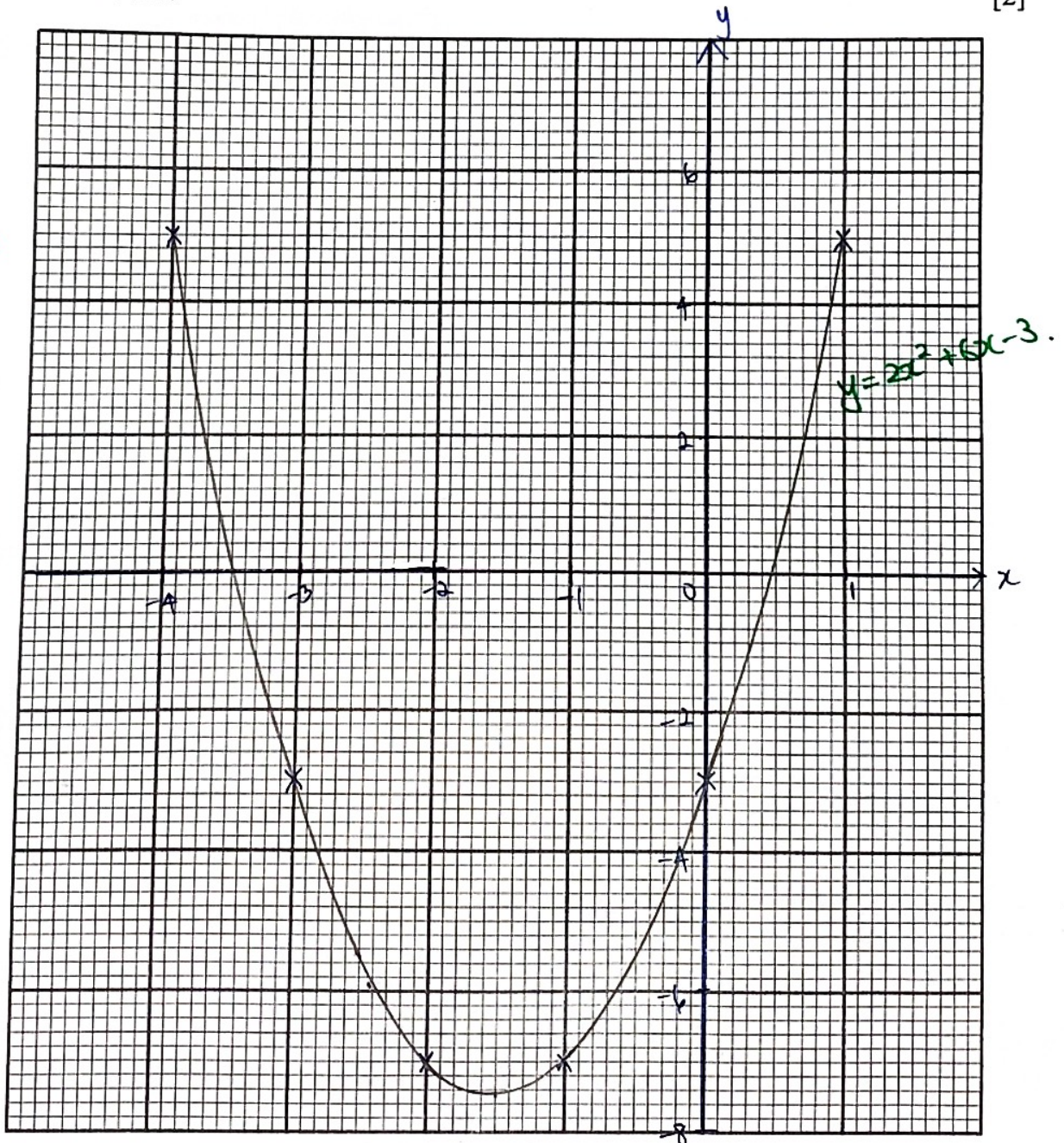
x	−4	−3	−2	−1	0	1
y	5	−3	p	−7	−3	5

(a) Find the value of p.

$$p = 2(-2)^2 + 6(-2) - 3$$
$$= -7 \text{ #}$$

Answer $p = $ ....−7 ⎯ Ⓑⱼ........[1]

(b) On the graph grid below, using a scale of 2 cm to represent 1 unit on the x-axis and 1 cm to represent 1 unit on the y-axis, draw the graph of $y = 2x^2 + 6x - 3$ for $-4 \le x \le 1$.

[2]

Ⓜ₁ : correct scale

Ⓜ₁ : correct plots + smooth curve.

$y = 2x^2 + 6x - 3$.

(c) Use your graph in (b) to find

(i) the value of y when x = −2.5

Answer y = ...−5.5 (±0.2).......[1] — Ⓑ1
(−5.7, −56, −5.4, −5.3).

(ii) the equation of the line of symmetry of the graph

Answer ....x = −1.5 (±0.1).......[1] — Ⓑ1
(−1.4, −1.45, −1.55, −1.6).

END OF PAPER