Q1. Solve the simultaneous equations

$$2x + 5y = 16$$

$$4x + 3y = 11$$

You **must** show your working.

Do **not** use trial and improvement.

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Answer ....

(Total 3 marks)

Q2. Solve these simultaneous equations

$$x + 3.6y = 2$$
$$x - 2.4y = 5$$

You **must** show all your working.
Do **not** use trial and improvement.

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Answer $x = $ ....

$y = $ ....

(Total 3 marks)

Q3. Solve the simultaneous equations $\quad 4x + 3y = 14 \qquad 2x + y = 5$

You **must** show your working.
Do **not** use trial and improvement.

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Answer $x =$ .... , $y =$ ....

(Total 3 marks)

Q4. Solve the simultaneous equations

$$x + 3y = 11$$
$$2x - y = 1$$

You **must** show your working.
Do **not** use trial and improvement.

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Answer $x =$ .... , $y =$ ....

(Total 3 marks)

Q5.   (a)   Factorise $7x + 14$

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Answer ....

(1)

(b)   Expand and simplify $4(m + 3) + 3(2m - 5)$

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Answer ....

(2)

(c)   Solve the simultaneous equations:

$$2x + 3y = 9$$
$$3x + 2y = 1$$

You **must** show all your working.
Do **not** use trial and improvement.

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Answer $x = $ ...., $y = $ ....

(4)

(d)   Factorise $x^2 + 6x - 16$

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Answer ....

(2)
(Total 9 marks)

Q6.

$$x^a \times x^b = x^7$$

$$(x^a)^b = x^{10}$$

Work out the values of *a* and *b*.

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Answer *a* = ..., *b* = ...

(Total 3 marks)

Q7. Four identical circular discs fit into a rectangle 10 cm long.
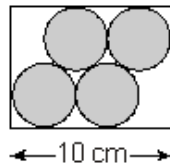
Not drawn accurately

Ten of the same discs fit into a rectangle 22 cm long.
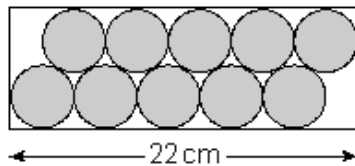
Not drawn accurately

24 discs are placed together in the same way.

How long is the rectangle?

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Answer ....cm

(Total 3 marks)

Q8. The rule for continuing a Fibonacci sequence is to add the last two terms to make the next term.

For example, the sequence that starts 1, 1, … continues as 1, 1, 2, 3, 5, 8, …

Two other Fibonacci sequences start a, $2a$, …… and b, $4b$, …

The fifth terms of these two sequences are equal.

Given that $a + b = 11$, work out the values of a and b.

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Answer a = ... b = ...

(Total 4 marks)

Q9. Two families go to a pantomime.

The Khan family of two adults and three children pay £69.

The Lewis family of three adults and five children pay £109.

Work out the cost of an adult ticket and the cost of a child ticket.

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Answer   Adult ticket £ ....   Child ticket £ ....

(Total 5 marks)

Q10. *ABC* is an isosceles triangle.
The lengths, in cm, of the sides are

$AB = 4a + 3$, $BC = 2b + 5$ and $AC = 2a + b$
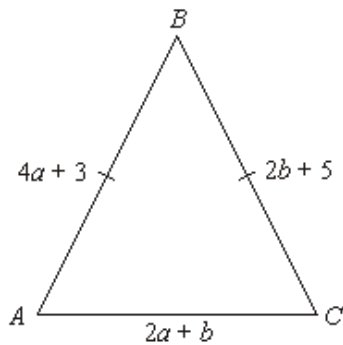
Not to scale

(a) $AB = BC$

Show that $2a - b = 1$

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(2)

(b) The perimeter of the triangle is 32 cm. Find the values of *a* and *b.*

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Answer *a* = ... cm, *b* =...................... cm

(4)
(Total 6 marks)

M1. $4x + 10y = 32$ $6x + 15y = 48$

$(4x + 3y = 11)$ $20x + 15y = 55$
oe
Allow one error

M1

$7y = 21$ or $14x = 7$
oe

A1 ft

$y = 3$ and $x = \dfrac{1}{2}$
SC1 for no working or T&I

A1

[3]

M2. trial and improvement is 0

1st-2nd

$6y = -3$ *allow 1 error eg, 12y = -3 6y = 3*
$2 - 3.6y = 5 + 2.4y$ *allow 1 error or*
2.4equation(I) + 3.6equation(2)

M1

$y = -0.5$ or $x = 3.8$

A1

$y = -0.5$ and $x = 3.8$
Must have both.
Allow reversed if both seen correct in working
ft if MI awarded

A1 ft

[3]

M3. $4x + 3y = 14$ $4x + 3y = 14$
$4x + 2y = 10$ $6x + 3y = 15$

allow error in <u>one</u> term

M1

$y = 4$ $2x = 1$

correct elimination from their equations

M1

$x = \frac{1}{2}$ **and** $y = 4$

oe
SC correct answers with no working or using T & I

A1

[3]

M4. $2x + 6y = 22$

$6x - 3y = 3$

M1

$7y = 21$

$7x = 14$

A1

$y = 3$ and $x = 2$

A1

[3]

M5.   (a) $7(x + 2)$

allow one error

B1

(b) $4m + 12 + 6m - 15$

M1

$10m - 3$

allow $10m + {}^-3$

A1

(c) $6x + 9y = 27$ $4x + 6y = 18$
        <u>and</u>   or   <u>and</u>
        $6x + 4y = 2$ $9x + 6y = 3$

M1

$5y = 25$ or $5x = -15$

M1 dep

$y = 5$ <u>or</u> $x = -3$

A1

$x = -3$ <u>and</u> $y = 5$

A1

SC1 correct answer with no working or using T&I

(d) $(x + 8)(x - 2)$

              B1 (x ± 8)(x ± 2)

                    B2

                           [9]

M6. $a + b = 7$

                    M1

    $ab = 10$

                    M1

    $a = 2, b = 5$

          a = 5, b = 2

                    B1

                           [3]

M7.   Evidence of searching for a pattern
or $r = 2$ or $d = 4$
or 6 extra discs gives extra 12 cm

                eg, 4 → 10, 10 → 22 or
                      5 → 10, 11 → 22 or markings on
                      diagram or diagram of 24 discs (2 rows)
                6 extra discs gives extra 12 cm

                    M1

$2n + 2$ or $2(n + \frac{1}{2})$

or 14 extra discs gives 28 cm
 or 20 extra discs gives 40 cm

                12d + r or 25r
                22 + 28
                10 + 40

                    M1

    50

                    A1

                         [3]

M8. $8a$

          8a = 14b or 4a = 7b M1

                    B1

    $14b$

          4a + 4b = 44 or 7a + 7b = 77 M1

                    B1

a = 7 answers only with no working is zero marks

$$11b = 44 \text{ or } 11a = 77 \text{ A1}$$

B1

b = 4 allow answers reversed

$$a = 7 \text{ and } b = 4 \text{ A1}$$

B1

[4]

M9. $2a + 3c = 69$
$3a + 5c = 109$

B1 one equation correct
Any letters may be used but need to be consistent for B2

B2

× 1st by 3 or 5
× 2nd by 2 or 3

oe (to obtain consistent coefficients)

M1

Two equations (max one error) and subtraction

$$eg, \quad 6a + 9c = 207$$
$$6a + 10c = 218 \text{ and subtraction}$$

M1 dep

Adult (*a* =) 18 Child (*c* =) 11

A1

[5]

M10.   (a) $4a + 3 = 2b + 5$

M1

(b) $4a - 2b = 2 \ (-2)$

Must indicate division by 2

A1

$4a+3+2b+5+2a+b=32$

$6a + 3b = 24$

$2a + b = 8$

Bl for any version

M1

(1) × 3: 6a – 3b = 3

M1

12a = 27

For attempt to eliminate
AB or 4a + 3 =12 and BC or 2b + 5 = 12

M1

a = 2.25

A1

[6]