M1.

(a) $30y + 120w$ or $30(y + 4w)$

oe

B1 for 30y or 120w or 0.3y + 1.2w

Do not ignore fw for B2

SC1 for 30p + 120c

B2

Additional Guidance

$30yp + 120wp$

B2

$30p + 120w$

B1

$30y = 120w$

B1

$0.3y + 120w$

B1

$30y + 1.20w$

B1

$30y + w120$

B1

$30y + 120w = 150yw$

B1

$30w + 120y$

B0

$30a + 120b$

B0

$y30 + w120$

B0

$30p + 120p$

B0

$30py + 120pw$

B0

Use of letters other than y or w is B0

Ignore p as units

(b) **Alternative method 1**

$2p + r = 265$ or $p + 5r = 200$
or $3p + 6r = 465$

May work in pence or pounds

M1

$(2p + r = 265)$
$2p + 10r = 400$
$10p + 5r = 1325$
$(p + 5r = 200)$

Equating coefficients
oe

M1

$9r = 135$
or $r = 15$
$9p = 1125$
or $p = 125$

Eliminating a variable
oe

A1

Pen = (£)1.25 and Ruler = £0.15

Condone 15p on answer line

A1

Alternative method 2

$2p + r = 265$ or $p + 5r = 200$
or $3p + 6r = 465$

May work in pence or pounds

M1

$r = 265 - 2p$

or $r = \frac{200 - p}{5}$

$p = 200 - 5r$

or $p = \frac{265 - r}{2}$

Making $\boldsymbol{p}$ *or* $\boldsymbol{r}$ *the subject*
oe

M1

$9p = 1125$
or $p = 125$
$9r = 135$
or $r = 15$
Eliminating a variable
oe
A1

Pen = (£)1.25 and Ruler = £0.15
Condone 15p on answer line
A1

Additional Guidance
Accept: £0.15p or 125p with £ sign crossed out
Do not accept: 0.15p with £ sign crossed out or £125p
Answers reversed
M1M1A1

2 × pens + 1 ruler = 265 with no further working
M0

T&I scores 0 or 4
Use any two different letters, e.g. x and y, p and r

Letters not words required for the first M mark, but can be recovered by showing correct working for following M mark(s)
[6]

M2.

Alternative method 1
$4x - 6y = 48$
and
$18x + 6y = -15$

$6x - 9y = 72$

(and
$6x + 2y = -5$)
oe
Equating coefficients
M1

$22x = 33$

or $x = 1.5$

$-11y = 77$

or $y = -7$

oe

Elimination of one variable

M1 dep

$x = 1.5$ and $y = -7$

oe

SC1 for $x = 1.5$ and $y = -7$ without working or using trial and improvement

A1

Alternative method 2

$x = \frac{24 + 3y}{2}$ or $y = \frac{2x - 24}{3}$

or $x = \frac{-5-2y}{6}$ or $y = \frac{-5-6x}{2}$

oe

Rearranging

M1

$22x = 33$

or $x = 1.5$

$-11y = 77$

or $y = -7$

oe

Elimination of one variable

M1 dep

$x = 1.5$ and $y = -7$

oe

SC1 for $x = 1.5$ and $y = -7$ without working or using trial and improvement

A1

[3]

M3.

$3f + 4p = 82.97$

Or
$5f + 6p = 131.95$

Must be algebraic not word form

M1

$9f + 12p = 248.91$
And
$10f + 12p = 263.90$

or $15f + 20p = 414.85$
and
$15f + 18p = 395.85$
Condone one error in totals

M1

$f = 14.99$

A1

$p = 9.5(0)$

A1

£205.42

B1ft

Logical argument with steps shown and correct conclusion made

Must gain method marks and make conclusion QWC strand iii

Q1ft

Alternative method
$3f + 4p = 82.97$
Or
$5f + 6p = 131.95$

M1

$15f + 20p = 414.85$
and
$15f + 18p = 395.85$

M1

$p = 9.5(0)$

A1

$82.97 + 131.95 -$ their 9.5(0)
or $214.92 -$ their 9.5(0)

Subtracting cost of one post from total of 8 panels and 10

posts

M1

£205.42

ft their 9.50

A1 ft

Logical argument with steps shown and correct conclusion made

Must gain method marks and make conclusion QWC strand iii

Q1 ft

[6]

M4.

$x - 1 = 3(y - 2)$

or

$x + 6 = 4(y - 1)$

oe Rearranging one of the two equations

$x - 1 = 3y - 6$ or $x + 6 = 4y - 4$

M1

$x - 3y = -5$ oe

M1

$x - 4y = -10$ oe

M1

ft from their equations (no further errors)

oe e.g. attempts substitution and rearranges to a suitable form (earns M2)

$x = 10$ **or** $y = 5$

Correct elimination from their equations if at least M1 earned

A1ft

$x = 10$ **and** $y = 5$

SC1 for x = 10 and y = 5 from no (or incorrect) working

A1

[5]

M5. $4x + 6y = 20$ or $12x - 3y = -3$

oe Allow one error

M1

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

M1

$x = \frac{1}{2}$ and $y = 3$ *oe*

A1

Alternative method

$x = \frac{10 - 3y}{2}$ or $y = 4x + 1$ *oe*

or $y = \frac{10 - 2x}{3}$ or $x = \frac{y - 1}{4}$

M1

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

M1

$x = \frac{1}{2}$ and $y = 3$ *oe*

A1

[3]

M6. $2x + 3y = 53$ $6x + 9y = 159$

$9x - 3y = 57$ $6x - 2y = 38$ *oe*

Allow one error

M1

$11x = 110$ $11y = 121$

M1

$x = 10$ or $y = 11$

A1

$x = 10$ and $y = 11$

A1

Alternative method

$y = 3x - 19$ $x = \frac{y + 19}{3}$ *oe*

Allow one error

M1

$2x+3(3x - 19) = 53$ $\frac{2(y + 19)}{3} + 3y = 53$

$11x - 57 = 53$ $11y + 38 = 159$

M1

$x = 10$ or $y = 11$

A1

$x = 10$ and $y = 11$

A1

[4]

M7.

(a) $6x + 18y = 48$ and
$6x + 16y = 38$

oe

16x + 48y = 128 and

18x + 48y = 114

Coefficients of one variable equated. Allow one calculation error.

M1

$2y = 10$

2x = −14

Isolates variable

M1dep

$y = 5$

x = −7

A1

$x = -7$

y = 5

SC1 both values correct from non-algebraic method

A1

Alternative 1

$x = \frac{16 - 6y}{2}$ (= 8 – 3y)

$x = \frac{19 - 8y}{3}$

M1

$3\left(\frac{16 - 6y}{2}\right) + 8y = 19$

$2\left(\frac{19 - 8y}{3}\right) + 6y = 16$

M1dep

$y = 5$

y = 5

A1

$x = -7$

x = −7

SC1 both values correct from non-algebraic method

A1

Alternative 2

$y = \frac{16 - 2x}{6}$

$y = \frac{19 - 3x}{8}$

M1

$3x + 8\left(\frac{16 - 2x}{6}\right) = 19$

$2x + 6\left(\frac{19 - 3x}{8}\right) = 16$

)

M1dep

$= -7$

$x = -7$

M1

$y = 5$

$y = 5$

SC1 both values correct from non-algebraic method

A1

(b) Two equations with a unique solution of $x = 6$ and $y = -5$

If answer is $x = 6$ and $y = -5$ these equations must be on the answer lines

B1 one correct equation with at most one incorrect equation

B1 two correct equations where one is a multiple of the other

If four equations are given, award B2 for all four correct and B1 for two or three correct.

B2

[6]

M8.

$3a + 1.5b = 9(.00)$

or $2a + 4b = 13.2(0)$

B1

$6a + 3b = 18$ **and** $6a + 12b = 39.6$

oe equating coefficients

*Allow one error in **totals***

M1

$9b = 21.6$

Subtracting

M1

Apples = 1.80

A1

Blackberries = 2.40

1.8 and 2.4 is A1 A0

A1

[5]

M9.

(a) (5, 0)

(5x, 0y) is B0

Check diagram for answer written next to P if answer line is blank

B1

(b) Correct elimination of a letter

e.g. $2x = 15 - 3x$

oe e.g. $y = 15 - \frac{3}{2}y$

M1

Correctly collects terms

e.g. $2x + 3x = 15$

oe e.g. $y + \frac{3}{2}y = 15$

M1dep

(3, 6)

Allow x = 3 and y = 6 if not contradicted on answer line

A1

(c) $\frac{1}{2}$ × their 5 × their 6

oe e.g. $\frac{2\times6}{2} + \frac{3\times6}{2}$

their 5 from (a) and their 6 from (b)

M1

15

ft their 5 from (a) and their 6 from (b)

A1ft

[6]

M10. $6x - 9y = 21$ **and** $6x + 8y = 4$

or $8x - 12y = 28$ **and** $9x + 12y = 6$

Must be correct, no arithmetic or sign errors

M1

$x = 2$ **or** $y = -1$

A1

$6x - 9y = 21$ **and** $6x + 8y = 4$

or $8x - 12y = 28$ **and** $9x + 12y = 6$

(new set of balanced equations)

or substitution of their x or y into any of the previous linear equations.

ie balances the other coefficient or substitutes their value for x or y

M1dep

$y = -1$ **or** $x = 2$

ie the other value not already found

***NB** answers only or from T&I SC1*

A1

Alternative method

$x = \frac{3y}{2} + \frac{7}{2}$ **and** $3(\frac{3y}{2} + \frac{7}{2}) + 4y = 2$

This is one example of a substitution scheme. Others marked the same way

*First M1 for rearranging one equation correctly to make x or y the subject **and** substituting into the other*

M1

$y = -1$

A1 is for solving to get one of the values

A1

$x = \frac{3x - 1}{2} + \frac{7}{2}$

This M1 is for doing a different substitution as above to find the other variable or substituting their value into one of the linear equations

M1dep

$x = 2$

A1

[4]

M11. $(5x - 4y = 24)$ $(5x - 4y = 24)2x + 4y = 18$ $5x + 10y = 45$

oe for equating coefficients

*Allow error in **one** term*

M1

$7x = 42$ $14y = 21$

Correct elimination from their equations

M1

$x = 6$ **and** $y = 1.5$

SC1 correct answers with no working or using trial and improvement

A1

Alternative method

$x = 9 - 2y$ **and** $5(9 - 2y) - 4y = 24$

or

$y = \frac{9 - x}{2}$ **and** $5x - \frac{4(9 - x)}{2} = 24$

*Allow **one** error ... it can be a substitution error (eg x = 9 + 2y)or a sign error in the equation*

M1

Simplifying and solving as far as $14y = 21$ or $7x = 42$

Correct simplification from their substitution

M1

$x = 6$ **and** $y = 1.5$

SC1 correct answers with no working or using trial and improvement

A1

[3]