Topic: Simultaneous Equations

06·01

a) $5a + 3c = 158{\cdot}25$ $\quad \times 3$

b) $3a + 2c = 98{\cdot}00$ $\quad \times -5$

c) $15a + 9c = 474{\cdot}75$

$-15a - 10c = -490{\cdot}00$

$-c = -15{\cdot}25$

$c = 15{\cdot}25$

$5a + 3c = 158{\cdot}25$

$5a + 3(15{\cdot}25) = 158{\cdot}25$

$5a = 112{\cdot}50$

$a = 22{\cdot}50$

child = £15·25

adult = £22·50

0602

a) $x + y = 130$ $\quad \times -50$

b) $30x + 50y = 6000$

c) $-50x - 50y = -6500$

$30x + 50y = 6000$

$-20x = -500$

$x = 25$

25 seats sold at £30

105 seats sold at £50

$x + y = 130$

$(25) + y = 130$

$y = 105$

Topic: Simultaneous Equations

06·03

a) $14x + 4y = 55{\cdot}00$ $\times -6$

b) $13x + 6y = 54{\cdot}50$ $\times 4$

c)

$$-84x - 24y = -330$$
$$52x + 24y = 218$$
$$-32x = -112$$
$$x = 3{\cdot}5$$

adult = £3·50
child = £1·50

$14x + 4y = 55{\cdot}00$
$14(3{\cdot}5) + 4y = 55{\cdot}00$
$4y = 6$
$y = 1{\cdot}5$

06·04

$2b + 5p = 5{\cdot}2$ $\times -3$

$3b + 2p = 5{\cdot}6$ $\times 2$

$$-6b - 15p = -15{\cdot}6$$
$$6b + 4p = 11{\cdot}2$$
$$-11p = -4{\cdot}4$$
$$p = 0{\cdot}4$$

pearl = 0·4 cm
bead = 1·6 cm

$2b + 5p = 5{\cdot}2$
$2b + 5(0{\cdot}4) = 5{\cdot}2$
$2b = 3{\cdot}2$
$b = 1{\cdot}6$

Topic: Simultaneous Equations

06·05

a) $280x + 70y = 52.50$ $\times -40$

b) $210x + 40y = 38.00$ $\times 70$

c) $-11200x - 2800y = -2100$

$14700x + 2800y = 2660$

$3500x = 560$

$x = 0.16$

call = £0·16

text = £0·11

$280x + 70y = 52.50$

$280(0.16) + 70y = 52.50$

$70y = 7.7$

$y = 0.11$

06·06

a) $14x + 60y = 344.30$ $\times -40$

b) $21x + 40y = 368.95$ $\times 60$

c) $-560x - 2400y = -13772$

$1260x + 2400y = 22137$

$700x = 8365$

$x = 11.95$

car = £11·95

passenger = £2·95

$14x + 60y = 344.30$

$14(11.95) + 60y = 344.30$

$60y = 177$

$y = 2.95$

Topic: Simultaneous Equations

06·07

a) $24x + 6y = 60$ $\times -10$

b) $20x + 10y = 40$ $\times 6$

c) $-240x - 60y = -600$

$120x + 60y = 240$

$-120x = -360$

$x = 3$

$24x + 6y = 60$

$24(3) + 6y = 60$

$6y = -12$

$y = -2$

* David $= 17x + 13y$

$= 17(3) + 13(-2)$

$= 51 + (-26)$

$= 25$ points

06·08

a) $6x + 2y = 3148$ $\times -5$

b) $5x + 3y = 3022$ $\times 6$

c) $-30x - 10y = -15740$

$30x + 18y = 18132$

$8y = 2392$

$y = 299$

$6x + 2y = 3148$

$6x + 2(299) = 3148$

$6x = 2550$

$x = 425$

* Third Group $= 2x + 4y$

$= 2(425) + 4(299)$

$= 850 + 1196$

$= 2046$

This group has been overcharged by £10

Topic: Simultaneous Equations

06·09

a) $3x + 4y = 65$ $\quad \times -5$

b) $5x + 7y = 112$ $\quad \times +3$

c) $-15x - 20y = -325$
$+15x + 21y = 336$

$y = 11$

Substitute $y = 11$ into original equation

$3x + 4y = 65$
$3x + 4(11) = 65$
$3x = 65 - 44 = 21$
$x = 7$

Iron = 7g
Lead = 21g

06·10

a) $2x + 3y = 580$

b) $x + y = 250$ $\quad \times -3$

c) To calculate how many tickets were sold to members we must eliminate y = non-members

$2x + 3y = 580$
$-3x - 3y = -750$

$-x = -170$
$x = 170$

170 tickets were sold to members

Topic: Simultaneous Equations

06·11

a) $4p + 3g = 1{\cdot}30$ $\quad \times -2$

b) $2p + 4g = 1{\cdot}20$ $\quad \times 4$

c) Firstly we need to find the cost of 1 peach & 1 grapefruit and then we can find $3p+2g$.

$$-8p - 6g = -2{\cdot}60$$
$$+8p + 16g = 4{\cdot}80$$
$$10g = 2{\cdot}2$$
$$g = 0{\cdot}22$$

substitute $g = 0{\cdot}22$ into original equation

$$4p + 3g = 1{\cdot}30$$
$$4p + 3(0{\cdot}22) = 1{\cdot}30$$
$$4p = 1{\cdot}30 - 0{\cdot}66$$
$$4p = 0{\cdot}64$$
$$p = 0{\cdot}16$$

* $3p+2g$

$= 3(0{\cdot}16)+2(0{\cdot}22) \Rightarrow £0{\cdot}92$

06·12

a) $3n + 2b = 145$ $\quad \times -5$

b) $5n + 3b = 240$ $\quad \times 3$

c) To find the cost of 1 breakfast we must eliminate n.

$$-15n - 10b = -725$$
$$+15n + 9b = 720$$
$$-b = -5$$
$$b = 5$$

* Breakfast = £5

Topic: Simultaneous Equations

06·13

a) $x+y=20 \quad \times -2$

b) $5x+2y=79$

c) To calculate the number of games Euan wins we must eliminate y.

$$-2x-2y=-40$$
$$5x+2y=79$$
$$3x=39$$
$$x=13$$

Euan wins 13 games.

06·14

a) $x+y=60 \quad \times -20$

b) $50x+20y=17{\cdot}40$

c) To find the number of 50p coins we must eliminate y.

$$-20x-20y=-1200$$
$$50x+20y=1740 \longrightarrow$$ Turn the pounds into pence.
$$30x=540$$
$$x=18$$

Aaron has 18 coins of value 50p.

Topic: Simultaneous Equations

06·15 a) $x + 5x + 2y = 42$

$6x + 2y = 42$

b) $PR = QR + 2$

$5x = 2y + 2$

$5x - 2y = 2$

re-arrange eqn 3

$6x + 2y = 42$

$5x - 2y = 2$

$11x = 44$

$x = 4\text{ cm}$

substitute $x = 4$ into original equation →

$5x - 2y = 2$

$5(4) - 2y = 2$

$20 - 2y = 2$

$-2y = -18$

$y = 9\text{ cm}$