1. x = # of tickets Michael had
y = # of tickets Fran had

$8x + 4y = 128 \mid \div 4$
$0.75x + 0.5y = 14 \mid \times 2$

$2x + y = 32$
$1.5x + y = 28 \mid \times -1$

$$\begin{array}{r} 2x + y = 32 \\ +\ -1.5x - y = -28 \\ \hline 0.5x = 4 \end{array}$$

$x = 8$

$8(8) + 4y = 128$
$64 + 4y = 128$
$4y = 64$
$y = 16$

check: $0.75(8) + 0.5(16) = 14$
$6 + 8 = 14$
$14 = 14$

Michael had 8 tickets & Fran had 16 tickets

2. $p + 1 = n$
$3p - 6 = 2n$

by substitution

$3p - 6 = 2(p+1)$
$3p - 6 = 2p + 2$
$p - 6 = 2$
$p = 8$

$p + 1 = n$
$8 + 1 = n$
$n = 9$

check: $3(8) - 6 = 2n$
$24 - 6 = 2n$
$18 = 2n$
$9 = n$

There are 9 neutrons

3. x = space occupied by small cases
y = space occupied by large cases

$$51x + 98y = 39.6 \quad |\times -2$$
$$102x + 49y = 35.1$$
$$-102x - 196y = -79.2$$
$$+\ 102x + 49y = 35.1$$
$$-147y = -44.1$$
$$y = 0.3$$

$120(0.3) = \boxed{36\ m^3}$

check
$51x + 98(0.3) = 39.6$
$51x + 29.4 = 39.6$
$51x = 10.2$
$x = 0.2$
$102(0.2) + 49(0.3) = 35.1$
$20.4 + 14.7 = 35.1$
$35.1 = 35.1$ ✓

4. x = profit on short-sleeved
y = profit on long-sleeved

$$450x + 300y = 2700 \quad |\times 2$$
$$300x + 250y = 1950 \quad |\times -3$$
$$900x + 600y = 5400$$
$$+\ -900x - 750y = -5850$$
$$-150y = -450$$
$$y = 3$$

$300x + 250(3) = 1950$
$300x + 750 = 1950$
$300x = 1200$
$x = 4$

check $450(4) + 300(3) = 2700$
$1800 + 900 = 2700$
$2700 = 2700$ ✓

Profit $= 250(4) + 200(3)$
$= 1000 + 600$
$= \boxed{\$\ 1600}$

5. x: number of 5T truck trips
y: number of 3T truck trips

$$x + y = 100 \quad | \times -3$$
$$5x + 3y = 460$$

$$+ \quad -3x - 3y = -300$$
$$5x + 3y = 460$$
$$2x = 160$$
$$x = 80$$
$$y = 20$$

check: $5(80) + 3(20) = 460$
$400 + 60 = 460$
$460 = 460$

80 trips by the 5T truck & 20 trips by the 3T truck.

6. x: cost of adult ticket
y: cost of child ticket

$$2x + 3y = 149.50 \quad | \times 3$$
$$3x + 2y = 161.75 \quad | \times -2$$

$$+ \quad 6x + 9y = 448.50$$
$$-6x - 4y = -323.50$$
$$5y = 125$$
$$y = 25$$
$$2x + 3(25) = 149.50$$
$$2x + 75 = 149.50$$
$$2x = 74.50$$
$$x = 37.25$$

check: $3(37.25) + 2(25) = 161.75$
$111.75 + 50 = 161.75$
$161.75 = 161.75$ ✓

$$4x + 20y = 4(37.25) + 20(25)$$
$$= 149 + 500$$
$$= \$649$$

7. x = # of soccer balls
y = # of basketballs

$$\begin{array}{r} x+y=20 \quad |\times -40 \\ 45x+40y=825 \\ \hline -40x-40y=-800 \\ 45x+40y=825 \\ \hline 5x = 25 \\ x = 5 \\ y = 15 \end{array}$$

check: $45(5)+40(15)=825$
$225+600=825$
$825=825$ ✓

5 soccer balls

8. x: number of working appliances
y: number of defective appliances

$$\begin{array}{r} x+y=240 \\ x=11y \\ \hline 11y+y=240 \\ 12y=240 \\ y=20 \\ x=220 \end{array}$$

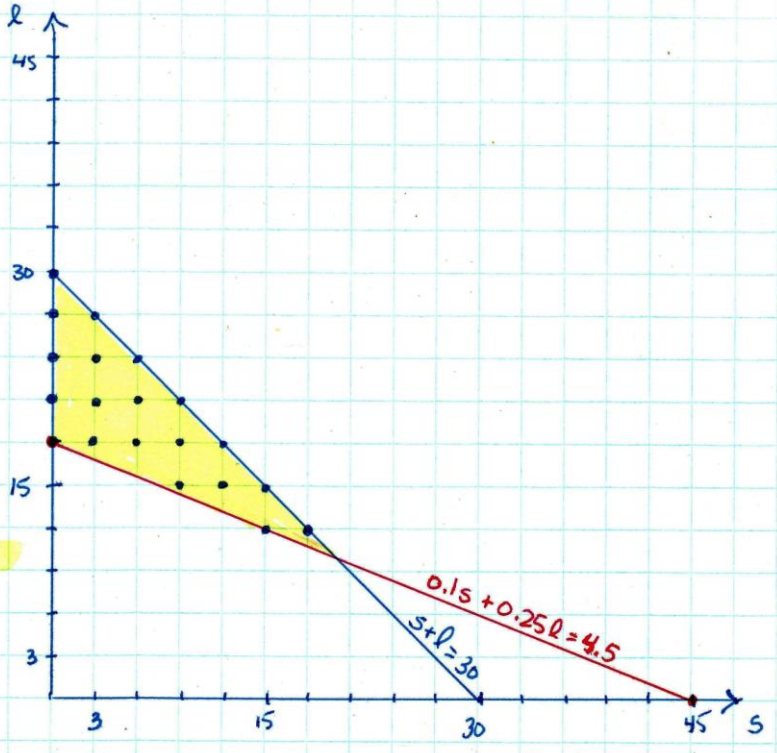
20 appliances are defective

9. $x+y \leq 40$
$\frac{1}{2}y \geq x+5$

10. ① $0.1s+0.25\ell \geq 450$
② $s+\ell \leq 30$

test (0,0)
$0 \geq 4.5$
False
shade above

test (0,0)
$0 \leq 30$
True
shade below



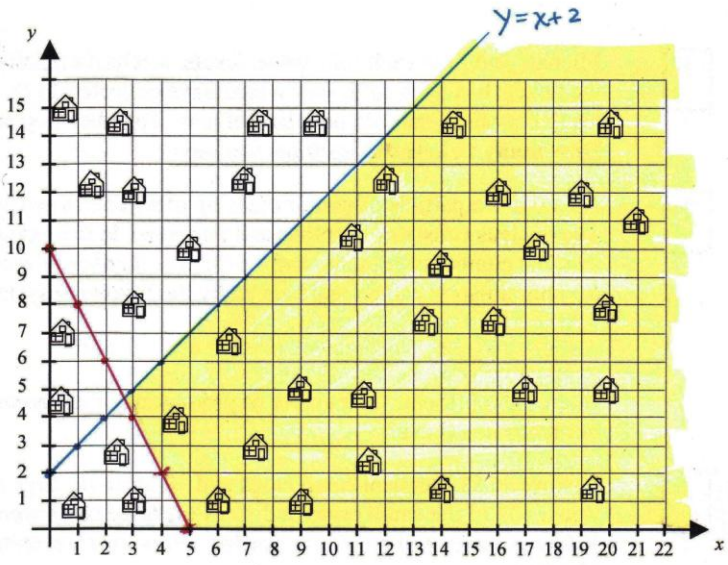
All possible solutions marked by dots (can't have fractions of bottles). Pick any 3.

11

The following graph represents a neighbourhood in your city. You are hired to carry out a census of the people who live in the region of the neighbourhood defined by the following system of inequalities:

① $y \leq x + 2$ solid; shade below

② $y \geq -2x + 10$ solid, shade above



If you are paid \$4.25 per house within the region, **calculate the amount you will earn for the census.**

24 houses × \$4.25/house

= \$102.00

misprint in fourth equation; should be 30, not 3

12

The location of a garden in a Cartesian coordinate graph is determined by the solutions for the system of inequalities given below. The scale of the graph is in metres.

① $x \leq 6$ solid; shade on the left

② $y \leq 15$ solid; shade below

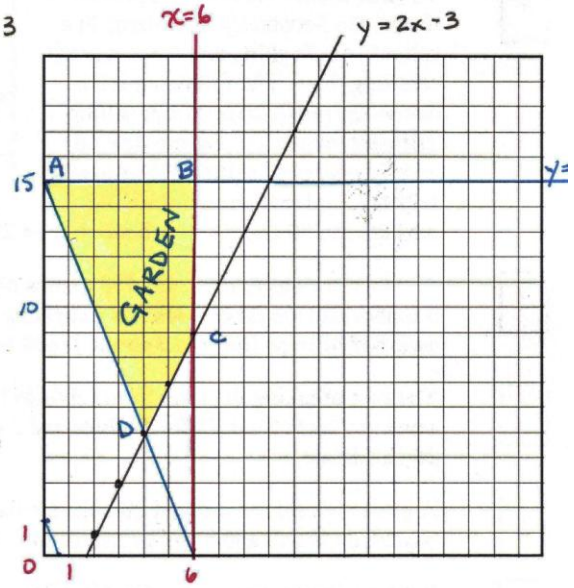
③ $y \geq 2x - 3$ solid; shade above

④ $5x + 2y \geq 30$ solid; shade above

x	y
0	15
6	0

$2y \geq -5x + 3$

$y \geq -\frac{5}{2}x + 15$



A fence was put up around the edge of the garden. **What is the length of the fence to the nearest tenth?**

vertices: A(0,15); B(6,15); C(6,9); D(4,5)

d(A,B) = 6 m

d(B,C) = 6 m

$d(C,D) = \sqrt{(6-4)^2 + (9-5)^2} = \sqrt{4 + 16} = \sqrt{20}$

$d(A,D) = \sqrt{(-4)^2 + 10^2} = \sqrt{116}$

Length of fence = $6 + 6 + \sqrt{20} + \sqrt{116}$

= 27.24 m

or 27.2 m