1.- a) $\frac{x}{6} - \frac{4(x-1)}{2} - \frac{5(x-2)}{2} = \frac{x}{3} \Rightarrow x - 12(x-1) - 15(x-2) = 2x \Rightarrow$

$\Rightarrow x - 12x + 12 - 15x + 30 = 2x \Rightarrow -28x = -42 \Rightarrow x = \frac{42}{28} = \boxed{\frac{3}{2}}$

b) $\frac{11}{6} - \frac{(x-2)^2}{3} = \frac{14x-5}{6} \Rightarrow 11 - 2(x-2)^2 = 14x - 5 \Rightarrow$

$\Rightarrow 11 - 2(x^2 - 4x + 4) = 14x - 5 \Rightarrow 11 - 2x^2 + 8x - 8 - 14x + 5 = 0 \Rightarrow$

$\Rightarrow -2x^2 - 6x + 8 = 0 \Rightarrow x^2 + 3x - 4 = 0 \Rightarrow$

$\Rightarrow x = \frac{-3 \pm \sqrt{9+16}}{2} = \frac{-3 \pm 5}{2} < \begin{matrix} \boxed{1} \\ \boxed{-4} \end{matrix}$

c) $x - 1 + (2x-1)(x-3) = x(3x-3) - 2x \Rightarrow$

$\Rightarrow x - 1 + 2x^2 - 6x - x + 3 - 3x^2 + 3x + 2x = 0 \Rightarrow -x^2 - x + 2 = 0 \Rightarrow$

$\Rightarrow x^2 + x - 2 = 0 \Rightarrow x = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm 3}{2} < \begin{matrix} \boxed{1} \\ \boxed{-2} \end{matrix}$

d) $5x(4x^2 - 25)(x^4 - 13x^2 + 36) = 0$

- $5x = 0 \Rightarrow \boxed{x = 0}$
- $4x^2 - 25 = 0 \Rightarrow \boxed{x = \pm \frac{5}{2}}$
- $x^4 - 13x^2 + 36 = 0 \Rightarrow t^2 - 13t + 36 = 0 \Rightarrow$

$\Rightarrow t = \frac{13 \pm \sqrt{169 - 144}}{2} = \frac{13 \pm 5}{2} < \begin{matrix} 9 \Rightarrow \boxed{x = \pm 3} \\ 4 \Rightarrow \boxed{x = \pm 2} \end{matrix}$

e) $(x+6)^2 - (x-6)^2 - (x-5)(x+5) = (3-x)(3+x) \Rightarrow$

$\Rightarrow x^2 + 12x + 36 - x^2 + 12x - 36 - x^2 + 25 = 9 - x^2 \Rightarrow$

$\Rightarrow 24x = -16 \Rightarrow x = \frac{-16}{24} = \boxed{\frac{-2}{3}}$

2.- a) $\left.\begin{matrix} \frac{2(x+1)}{3} - y = -3 \\ 3(x+5-y) + 3x = 12 \end{matrix}\right\} \begin{matrix} 2x + 2 - 3y = -9 \\ 3x + 15 - 3y + 3x = 12 \end{matrix} \left\} \begin{matrix} 2x - 3y = -11 \\ 6x - 3y = -3 \end{matrix} \right\}$

$-4x = -8 \Rightarrow \boxed{x = 2}$

$2 \cdot 2 - 3y = -11 \Rightarrow \boxed{y = 5}$ REDUCCIÓN

b) $\left.\begin{matrix} \frac{2x-1}{2} + \frac{y-3}{3} = \frac{11}{6} \\ \frac{-2x}{5} + \frac{y-1}{10} = -\frac{6}{5} \end{matrix}\right\} \begin{matrix} 6x - 3 + 2y - 6 = 11 \\ -4x + y - 1 = -12 \end{matrix} \left\} \begin{matrix} 6x + 2y = 20 \\ -4x + y = -11 \end{matrix} \right\}$

SUSTITUCIÓN $y = -11 + 4x \rightarrow y = -11 + 4 \cdot 3 \Rightarrow \boxed{y = 1}$

$6x + 2(-11 + 4x) = 20 \Rightarrow 6x - 22 + 8x = 20 \Rightarrow 14x = 42 \Rightarrow \boxed{x = 3}$

c) $\left.\begin{matrix} \frac{x+2y}{5} = 3 \\ 2x + 5y - 8 = 4(y+1) \end{matrix}\right\} \begin{matrix} x + 2y = 15 \\ 2x + 5y - 8 = 4y + 4 \end{matrix} \left\} \begin{matrix} x + 2y = 15 \\ 2x + y = 12 \end{matrix} \right\}$

SUSTITUCIÓN: $x = 15 - 2y \rightarrow x = 15 - 2 \cdot 6 \Rightarrow \boxed{x = 3}$

$2(15 - 2y) + y = 12 \Rightarrow 30 - 4y + y = 12 \Rightarrow -3y = -18 \Rightarrow \boxed{y = 6}$

d) $\left.\begin{matrix} \frac{x}{3} + \frac{y}{2} = 5 \\ \frac{x}{2} - \frac{y}{4} = 1 \end{matrix}\right\} \begin{matrix} 2x + 3y = 30 \\ 2x - y = 4 \end{matrix} \left\} \begin{matrix} 4y = 26 \Rightarrow \boxed{y = \frac{26}{4} = \frac{13}{2}} \\ 2x - \frac{13}{2} = 4 \Rightarrow 4x - 13 = 8 \Rightarrow \end{matrix} \right\}$

$\Rightarrow \boxed{x = \frac{21}{4}}$

REDUCCIÓN

3.- a) x: kg de té de Tailandia

$5'20x + 6'20(100 - x) = 6 \cdot 100 \Rightarrow 5'20x + 620 - 6'20x = 600 \Rightarrow$

$\Rightarrow -x = -20 \Rightarrow x = 20$

Hay que mezclar 20 kg de té de Tailandia con 80 kg de té de India

b) x: kg de azúcar de 1'125 €/kg

$1'125x + 1'4(200 - x) = 1'29 \cdot 200 \Rightarrow$

$\Rightarrow 1'125x + 280 - 1'4x = 258 \Rightarrow -0'275x = -22 \Rightarrow x = 80$

Hay que mezclar 80 kg de azúcar de 1'125 €/kg con 120 kg de azúcar de 1'4 €/kg

4.- a) x: precio ordenador y: precio televisor

$\left.\begin{matrix} x + y = 2000 \\ 1'1x + 1'15y = 2260 \end{matrix}\right\} \begin{matrix} x = 2000 - y \rightarrow x = 800 \\ 1'1(2000 - y) + 1'15y = 2260 \\ 2200 - 1'1y + 1'15y = 2260 \\ 0'05y = 60 \rightarrow y = 1200 \end{matrix}$

El ordenador costó 800€ y el televisor 1200€

b) x: edad de Rubén   y: edad del padre

$x = \frac{y}{5}$, $x+3 = \frac{y+3}{4}$ $\Big\}$ $5x = y$, $4x+12 = y+3$ $\Big\}$ $4x+12 = 5x+3$, $9 = x \rightarrow y = 45$ 0'75

Rubén tiene 9 años y su padre 45 años

(5.) a) x: superficie del jardín

$\frac{x}{2} + \frac{1}{3}\cdot\frac{x}{2} + 30 = x \Rightarrow 3x + x + 180 = 6x \Rightarrow 180 = 2x \Rightarrow$

$\Rightarrow$ **x = 90 m² tiene el jardín**

b) x: precio camisa
2x: precio chaqueta
4x: precio zapatos

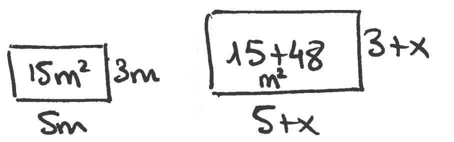
$x + 2x + 4x = 126 \Rightarrow x = 18$

La camisa cuesta 18€, la chaqueta 36€ y los zapatos 72€

c) $\frac{2}{7}x + \frac{2}{5}\cdot\frac{5}{7}x + 6 = x$ x: longitud del poste

$2x + 2x + 42 = 7x \Rightarrow 42 = 3x \Rightarrow$ **x = 14 m mide el poste**

d)



$(3+x)(5+x) = 63$
$15 + 3x + 5x + x^2 = 63$
$x^2 + 8x - 48 = 0$ 3'5

$x = \frac{-8 \pm \sqrt{64+192}}{2} = \frac{-8 \pm 16}{2}$ ⟨ 4, ~~−12~~

Hay que aumentar 4 m cada lado

e) $x(x+1) = 4x - 2 \Rightarrow x^2 + x - 4x + 2 = 0 \Rightarrow x^2 - 3x + 2 = 0 \Rightarrow$

$\Rightarrow x = \frac{3 \pm \sqrt{9-8}}{2} = \frac{3 \pm 1}{2}$ ⟨ 2, 1

Los nºs son 2 y 3 o 1 y 2

(6.) A(−2,3), B(4,5)

$m = \frac{5-3}{4+2} = \frac{2}{6} = \frac{1}{3} \rightarrow y = \frac{1}{3}x + n$

$A(-2,3) \rightarrow 3 = \frac{1}{3}\cdot(-2) + n \Rightarrow n = 3 + \frac{2}{3} = \frac{11}{3}$

$\Big\}$ $y = \frac{1}{3}x + \frac{11}{3}$ ← recta que pasa por A y B

$C = (k, -2)$
$-2 = \frac{1}{3}k + \frac{11}{3}$
$-6 = k + 11 \Rightarrow$ **k = −17**   1

(7.) $5x - 3y = 8 \Rightarrow y = \frac{5x-8}{3} \Rightarrow m = \frac{5}{3}$

$y = \frac{5}{3}x + n$ $(-1,-3) \Rightarrow -3 = \frac{5}{3}(-1) + n \Rightarrow n = -3 + \frac{5}{3} = \frac{-4}{3}$

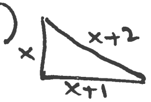
t: $y = \frac{5}{3}x - \frac{4}{3}$ 0'75

(9.) a) x: dinero herencia

$\frac{x}{3} + \frac{3}{5}\cdot\frac{2}{3}x + 0'1x + 260 = x \Rightarrow 5x + 6x + 1'5x + 3900 = 15x$

$\Rightarrow 3900 = 2'5x \Rightarrow$ **x = 1560€ heredó Antonio**

b)



$x^2 + (x+1)^2 = (x+2)^2 \Rightarrow x^2 + x^2 + 2x + 1 = x^2 + 4x + 4$

$\Rightarrow x^2 - 2x - 3 = 0 \Rightarrow x = \frac{2 \pm \sqrt{4+12}}{2} = \frac{2 \pm 4}{2}$ ⟨ 3, ~~−1~~

Los lados miden 3, 4 y 5 cm

c) x: billetes de 50€
x+6: " de 20€
x+6: " de 10€
2(x+6): " de 5€

$50x + 20(x+6) + 10(x+6) + 5\cdot 2(x+6) = 1140 \Rightarrow$

$\Rightarrow 50x + 20x + 120 + 10x + 60 + 10x + 60 = 1140 \Rightarrow$

$\Rightarrow 90x = 900 \Rightarrow x = 10$

Hay 10 billetes de 50€, 16 billetes de 20€, 16 billetes de 10€ y 32 billetes de 5€

d) x: edad de Pedro   3

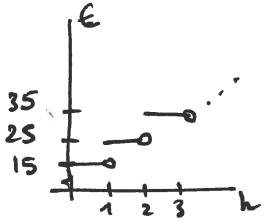
$x + 11 = \frac{(x-13)^2}{2} \Rightarrow 2x + 22 = x^2 - 26x + 169 \Rightarrow$

$\Rightarrow x^2 - 28x + 147 = 0 \Rightarrow x = \frac{28 \pm \sqrt{196}}{2} = \frac{28 \pm 14}{2}$ ⟨ 21, ~~7~~

Pedro tiene 21 años

10. $y = 5 + 10x$ $\quad y: €$, $x:$ hora o fracción de hora

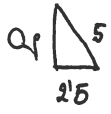
x	y
[0,1)	15
[1,2)	25
[2,3)	35
...	



No es continua. Presenta saltos en $x = 1, 2, 3, \ldots$

1

12. a)



$ap^2 + 2'5^2 = 5^2$

$ap = 4'33$

3'5

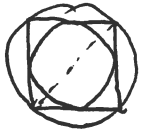
$A = A_0 - A_{hex} = \pi r^2 - \frac{P \cdot ap}{2} = \pi \cdot 5^2 - \frac{30 \cdot 4'33}{2} = \boxed{13'59\ cm^2}$

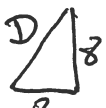
b)

$L = 2\pi r \Rightarrow 37'7 = 2\pi r \Rightarrow r = 6\,m$

$A_{\text{sector } 30°} = \frac{\pi r^2 \cdot 30°}{360°} = \frac{\pi \cdot 6^2 \cdot 30°}{360} = \boxed{25'13\ m^2}$

c)





$D^2 = 8^2 + 8^2 \Rightarrow D = 11'31$ cm

$R = \frac{D}{2} = 5'66$ cm

$r = \frac{8}{2} = 4$

$A_{\text{corona circular}} = \pi(R^2 - r^2) = \pi \cdot (5'66^2 - 4^2) = \boxed{50'27\ cm^2}$

d)

$A_{\text{trapecio circular}} = \frac{\pi(R^2 - r^2) \cdot \alpha°}{360°}$ ($\alpha°$)

$A = \frac{\pi(10^2 - 5^2) \cdot 70°}{360°} = \boxed{45'81\ cm^2}$

11. a) $2x + 3y = 6 \Rightarrow y = \frac{-2x+6}{3}$ → c) $m = -\frac{2}{3}$ (decreciente) $n = 2$

x	y
-1	8/3
0	2
1	4/3

$2x - y = 2$

$y = 2x - 2$ → c) $m = 2$ (creciente), $n = -2$

x	y
-1	-4
0	-2

b) $\left.\begin{matrix} 2x+3y=6 \\ 2x-y=2 \end{matrix}\right\} \; 4y = 4 \Rightarrow y = 1$

$2x - 1 = 2$

$x = 3/2$

Son secantes. Se cortan en $(\frac{3}{2}, 1)$

20. x: edad de la primera, y: edad de la segunda

$\left.\begin{matrix} x - 10 = 4(y - 10) \\ x + 20 = 2(y + 20) \end{matrix}\right\} \; \left.\begin{matrix} x - 4y = -30 \\ x - 2y = 20 \end{matrix}\right\} \; -2y = -50 \Rightarrow y = 25$

$x - 4 \cdot 25 = -30 \Rightarrow x = 70$

La 1ª persona tiene 70 años y la otra 25

0'75

21. $A = (-2, 5)$, $B = (3, -7)$

$m = \frac{-7-5}{3+2} = \frac{-12}{5}$

$y = \frac{-12}{5}x + \frac{1}{5}$ ← recta que pasa por A y B

$y = \frac{-12}{5}x + n$. $A = (-2, 5) \rightarrow 5 = \frac{-12}{5} \cdot (-2) + n \Rightarrow n = \frac{1}{5}$

$C = (k, -2) \rightarrow -2 = \frac{-12}{5}k + \frac{1}{5} \Rightarrow -10 = -12k + 1 \Rightarrow \boxed{k = \frac{11}{12}}$

1

22. $r: 4x - 7y = 5 \Rightarrow y = \frac{4x-5}{7} \rightarrow m = \frac{4}{7}$

$y = \frac{4}{7}x + n$. $(3, -2) \rightarrow -2 = \frac{4}{7} \cdot 3 + n \Rightarrow n = \frac{-26}{7}$

$\boxed{t: \frac{4}{7}x - \frac{26}{7}}$

0'75

23. a) Dominio $= \mathbb{R} - \{-3\}$ $\quad$ Recorrido $= \{-4\} \cup [-2, \infty)$

b) $M = (0, 4)$, $m = (-1'5, -2)$

c) Crece: $(-\infty, -3) \cup (-1'5, 0)$

Decrece: $(-3, -1'5) \cup (0, 1)$

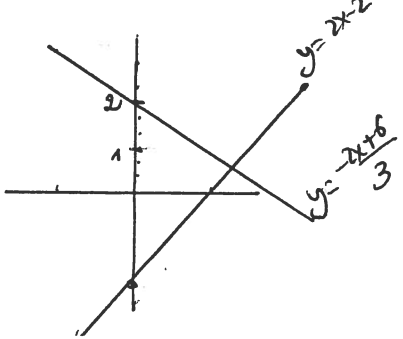
Constante: $(1, \infty)$

d) $(-2'5, 0)$, $(-1, 0)$, $(1, 0)$, $(0, 4)$

e) No es continua

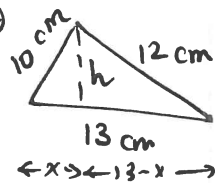
$x = -3$ (ramas infinitas)

$x = 1$ (salto)



1'5

13.-



$h^2+x^2=10^2$
$h^2+(13-x)^2=12^2$ } $\Rightarrow x^2-(13-x)^2=10^2-12^2 \Rightarrow$

$\Rightarrow \cancel{x^2}-169+26x-\cancel{x^2}=100-144 \Rightarrow$

$\Rightarrow 26x=125 \Rightarrow x=4'8$ cm

$h=\sqrt{100-4'8^2}=\boxed{8'77 \text{ cm}}$

$A=\frac{b\cdot h}{2}=\frac{13\cdot 8'77}{2}\simeq \boxed{57 \text{ cm}^2}$

14.-

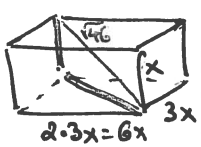
$h_{cilindro}=3\cdot 6'6=19'8$ cm

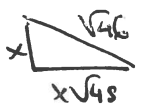
$V_{parte\ vacía}=V_{cilindro}-3\cdot V_{pelota}=$

$=\pi r^2 h-\cancel{3}\cdot\frac{4}{\cancel{3}}\pi r^3=\pi\cdot 3'3^2\cdot 19'8-4\pi\cdot 3'3^3=$

$=\boxed{225'8 \text{ cm}^3}$

15.-





$\Rightarrow d=\sqrt{(3x)^2+(6x)^2}=\sqrt{45x^2}=x\sqrt{45}$

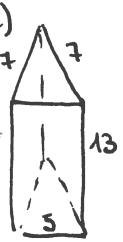
$\Rightarrow x^2+(x\sqrt{45})^2=\sqrt{46}$

$x^2=1 \rightarrow x=1$ cm

$A=P_B\cdot h+2\cdot A_B=2(6+3)\cdot 1+2\cdot 6\cdot 3=\boxed{54 \text{ cm}^2}$

$V=A_B\cdot h=6\cdot 3\cdot 1=\boxed{18 \text{ cm}^3}$

16.- a)



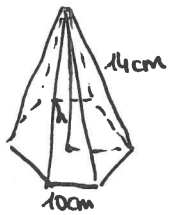
$h=\sqrt{7^2-2'5^2}=6'54$ dm

$A_B=\frac{b\cdot h}{2}=\frac{5\cdot 6'54}{2}=16'35$ dm^2

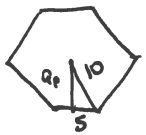
$A=P_B\cdot h+2\cdot A_B=(5+2\cdot 7)\cdot 13+2\cdot 16'35=279'69$ dm^2

$V=A_B\cdot h=16'35\cdot 13=212'55$ dm^3

b)

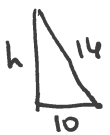


$a=\sqrt{14^2-5^2}=13'08$ cm



$a_p=\sqrt{10^2-5^2}=8'66$ cm

$A_B=\frac{P\cdot a_p}{2}=\frac{60'66}{2}=259'81$ cm^2



$h=\sqrt{14^2-10^2}=9'8$ cm

$A=\frac{P_B\cdot a}{2}+\frac{P_B\cdot a_p}{2}=\frac{P_B}{2}(a+a_p)=\frac{60}{2}(13'08+8'66)=$

$=\boxed{652'2 \text{ cm}^2}$

$V=\frac{1}{3}A_B\cdot h=\frac{1}{3}\cdot 259'81\cdot 9'8=\boxed{848'71 \text{ cm}^3}$

17.- $A_T=\frac{1}{2}\cdot 4\pi r^2+2\pi rh+\pi r^2=2\pi\cdot 10^2+2\pi\cdot 10\cdot 15\cdot\pi\cdot 10^2=$

$=600\pi=1884'96$ m^2

$V=\frac{1}{2}\cdot\frac{4}{3}\pi r^3+\pi r^2 h=\frac{2}{3}\pi 10^3+\pi\cdot 10^2\cdot 15=6806'784$ m^3

$=6806784$ dm$^3=\boxed{6806'784 \text{ l}}$

18.- a) $\vec{AB}=(2-(-1),-5-3)=(3,-8)$ $\quad\|\vec{AB}\|=\sqrt{3^2+8^2}=\sqrt{73}$

b) $(2,3)=(-1-x,-4-y) \Rightarrow$ $2=-1-x \Rightarrow x=-3$, $3=-4-y \Rightarrow y=-7$ } $A=(-3,-7)$

c) $(-2,-5)=(x+\frac{1}{3},y-\frac{5}{6}) \Rightarrow -2=x+\frac{1}{3} \Rightarrow x=-\frac{7}{3}$, $-5=y-\frac{5}{6} \Rightarrow y=\frac{-25}{6}$ } $B=(-\frac{7}{3},-\frac{25}{6})$

8.- 1's
24.- 1
25.- 1's
26.- 1's
27.- 1
28.- 4's
29.- 1's

19.- 3

1. a) $2(2x+4)-3(4x-2)=7-2(-5x+4) \Rightarrow$

$\Rightarrow 4x+8-12x+6=7+10x-8 \Rightarrow -18x=-15 \Rightarrow x=\frac{15}{18}=\boxed{\frac{5}{6}}$

b) $2\left(\frac{3x+5}{2}-\frac{x-3}{3}\right)-4x=3x+\frac{5}{6} \Rightarrow 3x+5-\frac{2(x-3)}{3}-4x=3x+\frac{5}{6} \Rightarrow$

$\Rightarrow 18x+30-4x+12-24x=18x+5 \Rightarrow -28x=-37 \Rightarrow \boxed{x=\frac{37}{28}}$

c) $\frac{71}{2}-3x=\frac{5x+2}{9}-\frac{2x+1}{6} \Rightarrow 639-54x=10x+4-6x-3 \Rightarrow$

$\Rightarrow -58x=-638 \Rightarrow \boxed{x=11}$

d) $(x+6)^2-(x-6)^2-(x-5)(x+5)=(3-x)(3+x) \Rightarrow$

$\Rightarrow x^2+12x+36-x^2+12x-36-x^2+25=9-x^2 \Rightarrow 24x=-16 \Rightarrow$

e) $64x^2-81=0 \Rightarrow \boxed{x=\pm\frac{9}{8}}$ $\Rightarrow x=\frac{-16}{24}=\boxed{\frac{-2}{3}}$

f) $\frac{x^2+2}{5}-\frac{x^2+x}{2}=\frac{3x+1}{10} \Rightarrow 2x^2+4-5x^2-5x=3x+1 \Rightarrow$

$\Rightarrow -3x^2-8x+3=0 \Rightarrow x=\frac{8\pm\sqrt{64+36}}{-6}=\frac{8\pm10}{-6}<\begin{matrix}\boxed{-3}\\ \boxed{\frac{1}{3}}\end{matrix}$

g) $21x^2-7x=0 \Rightarrow 7x(3x-1)=0 \Rightarrow \boxed{x=0,\frac{1}{3}}$

h) $x-1+(2x-1)(x-3)=x(3x-3)-2x \Rightarrow$

$\Rightarrow x-1+2x^2-6x-x+3-3x^2+3x+2x \Rightarrow -x^2-x+2=0 \Rightarrow$

$\Rightarrow x=\frac{1\pm\sqrt{1+8}}{-2}=\frac{1\pm3}{-2}<\begin{matrix}\boxed{-2}\\ \boxed{1}\end{matrix}$

6/

i) $\frac{x(x-3)}{2}+\frac{x(x-2)}{4}=\frac{(3x-2)^2}{8}-1 \Rightarrow$

$\Rightarrow 4x^2-12x+2x^2-4x=9x^2-12x+4-8 \Rightarrow -3x^2-4x+4=0$

$\Rightarrow x=\frac{4\pm\sqrt{16+48}}{-6}=\frac{4\pm8}{-6}<\begin{matrix}\boxed{-2}\\ \boxed{\frac{2}{3}}\end{matrix}$

j) $(x+2)^2-(x-3)^2=5 \Rightarrow$

$\Rightarrow x^2+4x+4-x^2+6x-9=5 \Rightarrow 10x=10 \Rightarrow \boxed{x=1}$

k) $\frac{x}{6}-\frac{4(x-1)}{2}-\frac{5(x-2)}{2}=\frac{x}{3} \Rightarrow x-12x+12-15x+30=2x \Rightarrow$

$\Rightarrow -28x=-42 \Rightarrow x=\frac{42}{28}=\boxed{\frac{3}{2}}$

l) $\frac{11}{6}-\frac{(x-2)^2}{3}=\frac{14x-5}{6} \Rightarrow 11-2(x^2-4x+4)=14x-5 \Rightarrow$

$\Rightarrow -2x^2-6x+8=0 \Rightarrow x^2+3x-4=0 \Rightarrow x=\frac{-3\pm\sqrt{9+16}}{2}=\frac{-3\pm5}{2}<\begin{matrix}\boxed{1}\\ \boxed{-4}\end{matrix}$

1

2. a) x: dinero de Ana

$\frac{x}{3}+\frac{2}{3}\cdot\frac{2}{3}x+12=x \Rightarrow \frac{x}{3}+\frac{4x}{9}+12=x \Rightarrow$

$\Rightarrow 3x+4x+108=9x \Rightarrow 108=2x \Rightarrow \boxed{x=54\,€}$

2

b) x: edad de Pedro

$x+11=\frac{1}{2}(x-13)^2 \Rightarrow 2x+22=x^2-26x+169 \Rightarrow$

$\Rightarrow x^2-28x+147=0 \Rightarrow x=\frac{28\pm\sqrt{196}}{2}=\frac{28\pm14}{2}<\begin{matrix}\boxed{21\text{ años}}\\ \not{7}\end{matrix}$

c) x: distancia recorrida

$\frac{x}{4}+\frac{x}{6}+\frac{3}{8}x+40=x \Rightarrow 6x+4x+9x+960=24x \Rightarrow$

$\Rightarrow 960=5x \Rightarrow \boxed{x=192\text{ km}}$

48 km en bus; 32 en moto; 72 km en bici

1's

3. a) $\left.\begin{matrix}2x-3y=13\\ 3x-6y=12\end{matrix}\right\}\cdot(-2) \rightarrow \left.\begin{matrix}-4x+6y=-26\\ 3x-6y=12\end{matrix}\right\}$

$-x=-14 \Rightarrow \boxed{x=14}$

$2\cdot14-3y=13$

$\boxed{y=5}$

REDUCCIÓN

b) $\left.\begin{matrix}3y+2=x\\ 2x-5y=5\end{matrix}\right\}$ $2(3y+2)-5y=5$

$6y+4-5y=5 \Rightarrow \boxed{y=1}$

$x=3\cdot1+2$

$\boxed{x=5}$

SUSTITUCIÓN

c) $\left.\begin{matrix}2x-5y=1\\ -x+4y=4\end{matrix}\right\}$ $\left.\begin{matrix}x=\frac{1+5y}{2}\\ x=4y-4\end{matrix}\right\}$ $\frac{1+5y}{2}=4y-4$

$1+5y=8y-8$

$9=3y \Rightarrow \boxed{y=3}$

$x=4\cdot3-4$

$\boxed{x=8}$

IGUALACIÓN

4. a) x: monedas de 20c

y: monedas de 5c

$\left.\begin{matrix}x+y=12\\ 0'2x+0'05y=1'50\end{matrix}\right\}$ $x=12-y$

$0'2(12-y)+0'05y=1'50$

$2'4-0'2y+0'05y=1'50 \Rightarrow -0'15y=0'9 \Rightarrow$

$\Rightarrow y=6 \Rightarrow x=6$

1

Tiene 6 monedas de cada tipo

b) x: edad de la primera, y: edad de la segunda

$$\left.\begin{array}{l} x-10=4(y-10) \\ x+20=2(y+20) \end{array}\right\} \left.\begin{array}{l} x-4y=-30 \\ x-2y=20 \end{array}\right\} \begin{array}{l} -2y=-50 \Rightarrow y=25 \\ x-100=-30 \Rightarrow x=70 \end{array}$$

| La primera tiene 70 años y la segunda 25 años |

1

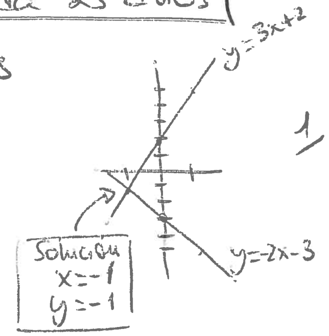
5.- $\left.\begin{array}{l} 3x-y=-2 \\ 2x+y=-3 \end{array}\right\}$

$y=3x+2$

x	y
-1	-1
0	2
1	5

$y=-2x-3$

x	y
-1	-1
0	-3
1	-5



1

6.- $\left.\begin{array}{l} 3y-2=x-2(x+y) \\ 2(y-2)=18-x-y-(x+4) \end{array}\right\}$

$$\left.\begin{array}{l} 3y-2=x-2x-2y \\ 2y-4=18-x-y-x-4 \end{array}\right\} \left.\begin{array}{l} x+5y=2 \\ +2x+3y=18 \end{array}\right\} \begin{array}{l} -2x-10y=-4 \\ 2x+3y=18 \\ \hline -7y=14 \Rightarrow \boxed{y=-2} \end{array}$$

$x+5\cdot(-2)=2 \Rightarrow \boxed{x=12}$

$\left.\begin{array}{l} \frac{2(x+1)}{3}-y=-3 \\ 3(x+5-y)+3x=12 \end{array}\right\}$ 1'5

$$\left.\begin{array}{l} 2x+2-3y=-9 \\ 3x+15-3y+3x=12 \end{array}\right\} \left.\begin{array}{l} 2x-3y=-11 \\ 6x-3y=-3 \end{array}\right\} \begin{array}{l} -4x=-8 \Rightarrow \boxed{x=2} \\ 2\cdot 2-3y=-11 \Rightarrow \boxed{y=5} \end{array}$$

7.- $\boxed{80cm^2}$ x, x+2

$x(x+2)=80 \Rightarrow x^2+2x-80=0 \Rightarrow$

$\Rightarrow x=\frac{-2\pm\sqrt{4+320}}{2}=\frac{-2\pm 18}{2}$ ⟨ 8, ~~-10~~

1

| El ancho mide 8 cm y el largo 10 cm |

8.- a) $\left.\begin{array}{l} \frac{x}{y}=3'75 \\ x+y=47'5 \end{array}\right\} \begin{array}{l} x=3'75y \\ 3'75y+y=47'5 \Rightarrow \boxed{y=10} \end{array}$ → $\boxed{x=37'5}$

b) $\left.\begin{array}{l} \frac{x}{y}=4'25 \\ x+y=42 \end{array}\right\} \begin{array}{l} x=4'25y \\ 4'25y+y=42 \Rightarrow \boxed{y=8} \end{array}$ → $\boxed{x=34}$

1

9.- a) 8 años ⇝ 12000€ = 8k ⇒ k = 1500

12 años ⇝ 12 · 1500 = 18000€

15 años ⇝ 15 · 1500 = 22500 €

TOTAL = 52500€

1'5

b) $k=\frac{59}{\frac{1}{2}+\frac{1}{5}+\frac{1}{7}}=70$

2 positivos ⇝ $\frac{70}{2}=35$ páginas

5 positivos ⇝ $\frac{70}{5}=14$ páginas

7 positivos ⇝ $\frac{70}{7}=10$ páginas

TOTAL = 59 páginas

10.- a) x: precio sin IVA

$1'04x=15 \Rightarrow \boxed{x=14'42€}$

b) $\frac{160}{200}\cdot 100=80 \rightarrow$ | 20% de descuento |

1

11.- a) 20 obreros → 400m → 6 días →(I) 8 h/d

24 obreros → 700m → 14 días → x

$\frac{24}{20}\cdot\frac{400}{700}\cdot\frac{14}{6}=\frac{8}{x} \Rightarrow \boxed{x=5h/d}$

1'5

b) $\left.\begin{array}{l} 6\ l/min \xrightarrow{I} 5h \\ 2'5\ l/min \rightarrow x \end{array}\right\}$ $\frac{6}{2'5}=\frac{x}{5} \Rightarrow \boxed{x=12h}$

c) $\left.\begin{array}{l} 150 \text{ personas} \xrightarrow{D} 6000\ l/d \\ x \text{ personas} \rightarrow 7000\ l/d \end{array}\right\}$ $\frac{150}{x}=\frac{6000}{7000} \Rightarrow x=175$

175 − 150 = | 25 personas más |

12.- a) x: dinero en total

$\frac{x}{5}+\frac{x}{4}+\frac{3}{8}x+3'5=x \Rightarrow 8x+10x+15x+140=40x \Rightarrow$

$\Rightarrow 140=7x \Rightarrow \boxed{x=20€}$

| 4€ transporte, 5€ cine
7'5€ libro |

2'5

b) $\boxed{204cm^2}$ x, x+5

$x(x+5)=204 \Rightarrow x^2+5x-204=0 \Rightarrow$

$\Rightarrow x=\frac{-5\pm\sqrt{25+816}}{2}=\frac{-5\pm 29}{2}$ ⟨ 12, ~~-17~~

| 12 cm de altura y 17 cm de base |

c) x: edad Santiago y: edad Rubén

$\left.\begin{array}{l} x=y+26 \\ x+10=2(y+10) \end{array}\right\}$ $y+26+10=2y+20 \Rightarrow y=16$, $x=42$

| Santiago tiene 42 años y Rubén 16 |

13. a) x: superficie de la huerta

$\frac{x}{2}+\frac{x}{3}+200=x \Rightarrow 3x+2x+1200=6x \Rightarrow \boxed{x=1200\,m^2}$

$\boxed{600\,m^2 \text{ pimientos}, 400\,m^2 \text{ tomates}}$

b) $\boxed{120\,cm^2}\ x$ $\quad x(x+7)=120 \Rightarrow x^2+7x-120=0$

$\Rightarrow x=\frac{-7\pm\sqrt{49+480}}{2}=\frac{-7\pm 23}{2}$ < 8, -15

$\boxed{8\text{ cm de ancho y }15\text{ cm de largo}}$

1's

14. a) $10350-3600=6950$

$k=\frac{6950}{22+23}=150$ $\quad$ 22 años $\rightsquigarrow 22\cdot 150=3300€$

23 años $\rightsquigarrow 23\cdot 150=3450€$

$150x=3600 \Rightarrow x=24$ años tiene el mayor

2

b) $k'=\frac{620}{1+\frac{1}{3}+\frac{1}{7}}=420$

1 año $\rightarrow 420€$

3 años $\rightarrow \frac{420}{3}=140€$

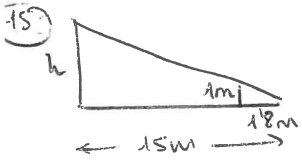
7 años $\rightarrow \frac{420}{7}=60€$

TOTAL $=620€$

c) $0'85x=36'55 \Rightarrow$

$\Rightarrow \boxed{x=43€}$

15.



$\frac{h}{1}=\frac{15}{18} \Rightarrow \boxed{h=8'33m}$

ó

16. a) 1 máquina → 8 h/d → 3 días → 6000 botellas

4 máquinas → 6 h/d → x → 9000 botellas

(I, I, D)

$\frac{4}{1}\cdot\frac{6}{8}\cdot\frac{6000}{9000}=\frac{3}{x} \Rightarrow \boxed{x=1'5\text{ días}}$

1

b) $\left.\begin{array}{l}90\text{ km/h} \xrightarrow{I} 6\text{ h}\\ 100\text{ km/h} \rightarrow x\end{array}\right\}$ $\frac{90}{100}=\frac{x}{6} \Rightarrow \boxed{x=5\text{ h }24\text{ min}}$

17. a) $y=mx$ $\quad 2=m\cdot(-4) \Rightarrow m=-\frac{1}{2}$ $\quad \boxed{y=\frac{-x}{2}}$

1

b) $y=mx+n$

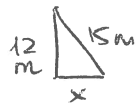
$\left.\begin{array}{l}(2,-3) \Rightarrow -3=2m+n\\ (-4,0) \Rightarrow 0=-4m+n\end{array}\right\}$ $\begin{array}{l}-3=6m \Rightarrow m=-\frac{1}{2}\\ 0=-4\cdot(-\frac{1}{2})+n \Rightarrow n=-2\end{array}$ $\boxed{y=\frac{-x}{2}-2}$

18. a) $\left.\begin{array}{l}\frac{a}{b}=5\\ a-b=7\end{array}\right\}$ $\begin{array}{l}a=5b\\ 5b-b=7 \Rightarrow \boxed{b=\frac{7}{4}}\end{array}$ $\Rightarrow \boxed{a=\frac{35}{4}}$

1

b) $\frac{180}{30}=\frac{30}{x} \Rightarrow x=5 \Rightarrow \boxed{\overline{GH}=5mm}$

19.



$x=\sqrt{15^2-12^2}=9 \Rightarrow d=18\,cm$

$A_{rombo}=\frac{D\,d}{2}=\frac{24\cdot 18}{2}=216\,m^2$

$A_{jardín}=b\,h=75\cdot 40=3000\,m^2$

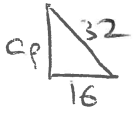
$A_{césped}=3000-216=2784\,m^2$

$\text{Coste}=2784\cdot 2'25=\boxed{6264€}$

1

20. a) $A_{\square}=l^2=2304 \Rightarrow l=48\,cm \Rightarrow p=48\cdot 4=192\,cm$

$192:6=32\,cm$ lado hexágono

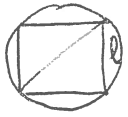


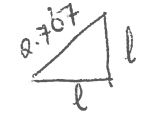
$ap=\sqrt{32^2-16^2}=27'71\,cm$

$A_{\text{hexágono}}=\frac{p\,ap}{2}=\frac{192\cdot 27'71}{2}=\boxed{2660'43\,cm^2}$

2

b)





$l^2+l^2=14'14^2$

$2l^2=199'94$

$\boxed{l^2=99'97\,cm^2=A_{\square}}$

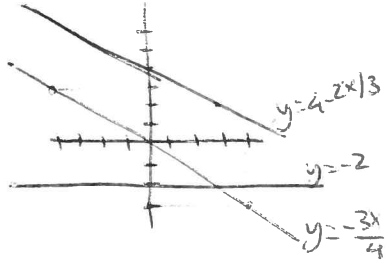
21. a) $y=\frac{-3x}{4}$

x	y
-4	+3
4	-3

b) $y=-2$

c) $y=4-\frac{2x}{3}$

x	y
-3	6
3	2



1

22. $L_{\text{arco }45^\circ}=6'28=\frac{2\pi r\alpha^\circ}{360^\circ} \Rightarrow$

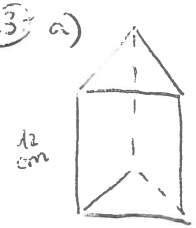
$\Rightarrow r=\frac{6'28\cdot 360}{2\cdot 3'14\cdot 45}=8\,m$

$A_{\text{sector }45^\circ}=\frac{\pi r^2\alpha^\circ}{360^\circ}=\frac{\pi\cdot 8^2\cdot 45^\circ}{360^\circ}=$

$=\boxed{25'12\,m^2}$

1

(23) a)



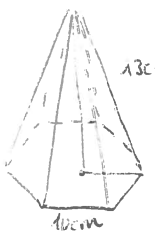
$h = \sqrt{6^2 - 2^2} = 5'66\,cm$

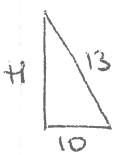
$A_\Delta = \frac{b \cdot h}{2} = \frac{4 \cdot 5'66}{2} = 11'31\,cm^2$

$\boxed{A = P_B \cdot H + 2 \cdot A_B = 16 \cdot 12 + 2 \cdot 11'31 = 214'63\,cm^2}$

$\boxed{V = A_B \cdot H = 11'31 \cdot 12 = 135'72\,cm^3}$

b)





$H = \sqrt{13^2 - 10^2} = 8'3\,cm$

ap $\triangle$ 10, 5: $ap = \sqrt{10^2 - 5^2} = 8'66\,cm$

$a = \sqrt{13^2 - 5^2} = 12\,cm$

$\boxed{A = \frac{P_B \cdot a}{2} + A_B = \frac{60 \cdot 12}{2} + \frac{60 \cdot 8'66}{2} = 619'8\,cm^2}$

$\boxed{V = \frac{A_B \cdot H}{3} = 103'92\,cm^3}$

2'5

(24)

$A_L = 2\pi rh = 2\pi \cdot 2 \cdot 5 = 62'83\,m^2$

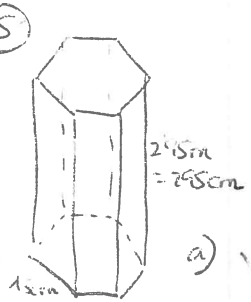
$1000 : 62'83 = 15'92\,€/m^2$

1

$A = 4\pi r^2 = 4\pi \cdot 2^2 = 50'27\,m^2$

Coste $= 50'27 \cdot 15'92 = \boxed{800'23\,€}$

(25)



ap $\triangle$ 15, 7'5: $ap = \sqrt{15^2 - 7'5^2} = 12'99\,cm$

$A_{hexágono} = \frac{P \cdot ap}{2} = \frac{156 \cdot 12'99}{2} = 584'55\,cm^2$

1'5

a) $V = A_B \cdot h = 584'55 \cdot 295 = 172442'25\,cm^3 = 0'172\,m^3$

Peso $= 0'172 \cdot 2845 = \boxed{489'34\,kg}$

b) $A_L = P_B \cdot h = 615 \cdot 295 = 26550\,cm^2 = 2'655\,m^2$

Coste $= 2'655 \cdot 30 \cdot 15 = \boxed{1194'75\,€}$

(26) a) 7 días b) 2º día; 39'5°C c) 5º día; 36°C

d) Crece $(1,2) \cup (5,5's)$ Decrece $(2,2's) \cup (3'5,5)$

e) Informe (...)

0'5

(27)

$A_{\text{hoja}} = A_\square - A_\Delta = \frac{\pi r^2}{4} - \frac{b \cdot h}{2} = \frac{\pi \cdot 0'6^2}{4} - \frac{0'6 \cdot 0'6}{2} = 0'1\,m^2$

1'5

$A_{4\,pétalos} = 8 \cdot A_{hoja} = 0'8\,m^2$ ← amarillo

$A_{verde} = A_\square - A_{4pétalos} = 1'2^2 - 0'8 = 0'64\,m^2$ ← verde

Coste $= 30 \cdot (15 \cdot 0'8 + 12 \cdot 0'64) = \boxed{590'4\,€}$

(28) $V_{pelota} = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 3'4^3 = 164'64\,cm^3$

10 pelotas: $V_{10} = 1646'4\,cm^3$

a) $V_{cilindro} = A_B \cdot h = \pi r^2 h = \pi \cdot 3'4^2 \cdot 68 = 2469'54\,cm^3$

$V_{comprendido} = V_{cilindro} - V_{10} = 823'14\,cm^3$

1

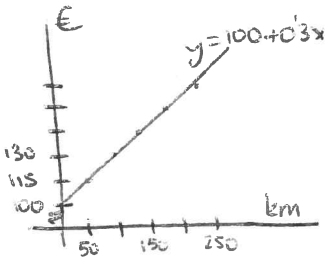
b) $V_{cortado} = A_B \cdot h = 136 \cdot 6'8 \cdot 34 = 3144'32\,cm^3$

$V_{comprendido} = V_{cortado} - V_{10} = 1497'92\,cm^3$

(29) a) $y = 100 + 0'3x$ x: km, y: €

1'5

x	y
0	100
50	115
100	130
150	145
200	160
250	175



b) $y = 100 + 0'3 \cdot 300$

$y = 190\,€$

c) $220 = 100 + 0'3x$

$x = 400\,km$