

les derniers mechants bms problemes (Revision)

#1 a) $\frac{5\pi}{9} \text{ rad} = x^\circ$

$$\frac{\frac{5\pi}{9} \cdot 180}{\pi} = \underline{100^\circ}$$

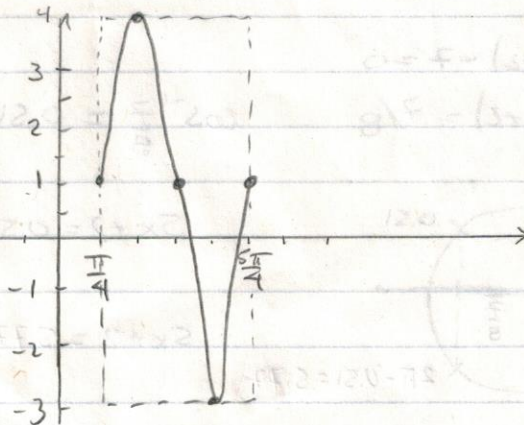
$\pi \text{ rad} = 180$

b) $20 \text{ rad} = x \text{ tours}$
 $2\pi \text{ rad} = 1 \text{ tour}$

$x = \frac{20}{2\pi} = 3,18 \text{ tours}$ $0,18 \text{ t} \rightarrow$ I gradient

#2 a) $a = 3$ $p = \frac{2\pi}{2} = \pi$

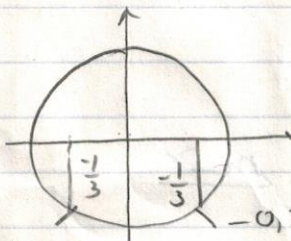
b) $h, k = (\frac{\pi}{4}, 1)$



c) $0 = 3 \sin 2(x - \frac{\pi}{4}) + 1$

$-\frac{1}{3} = \sin 2(x - \frac{\pi}{4})$

$\sin^{-1} -\frac{1}{3} = -0,34$



$\pi - 0,34 = 3,48$

$2(x - \frac{\pi}{4}) = -0,34 \Rightarrow x = 0,62 + \pi n$

$n \in \mathbb{Z}$

$2(x - \frac{\pi}{4}) = 3,48 \Rightarrow x = 2,53 + \pi n$

#3 $y = 3 \sin \pi(x-1) - 1$ ou $y = 3 \cos \pi(x+0,5) - 1$

#4a) $-2 \cos(\pi(x+1)) - \sqrt{3} = 0$

$\cos(\pi(x+1)) = \frac{\sqrt{3}}{2}$

$\pi(x+1) = \frac{\pi}{6} \quad x = \frac{-5}{6} + 2n \quad n \in \mathbb{Z}$

$\pi(x+1) = \frac{11\pi}{6} \quad x = \frac{5}{6} + 2n \quad n \in \mathbb{Z}$

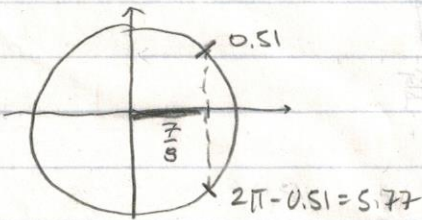
b) $3 \tan 5x = 3$

$\tan 5x = 1$

$5x = \frac{\pi}{4} \quad x = \frac{\pi}{20} + \frac{\pi}{5}n \quad n \in \mathbb{Z}$

c) $8 \cos(5x+2) - 7 = 0$

$\cos(5x+2) = 7/8 \quad \cos^{-1} \frac{7}{8} = 0.51$



$5x+2 = 0.51 \quad x = -0.30 + \frac{2\pi}{5}n \quad n \in \mathbb{Z}$

$5x+2 = 5.77 \quad x = 0.754 + \frac{2\pi}{5}n \quad n \in \mathbb{Z}$

d) $2 \sin 4(x - \frac{\pi}{2}) - \sqrt{2} = 0$

$\sin 4(x - \frac{\pi}{2}) = \frac{\sqrt{2}}{2}$

$4(x - \frac{\pi}{2}) = \frac{\pi}{4} \Rightarrow x - \frac{\pi}{2} = \frac{\pi}{16} \Rightarrow x = \frac{9\pi}{16} + \frac{\pi}{2}n \quad n \in \mathbb{Z}$

$4(x - \frac{\pi}{2}) = \frac{3\pi}{4} \Rightarrow x - \frac{\pi}{2} = \frac{3\pi}{16} \Rightarrow x = \frac{11\pi}{16} + \frac{\pi}{2}n \quad n \in \mathbb{Z}$

④
→ Attention!

5e) $\frac{\cot^2 \theta + 1}{\cot \theta} - \cot \theta = \tan \theta$

$$\frac{\csc^2 \theta}{\frac{\cot \theta}{\sin \theta}} - \frac{\cot \theta}{\sin \theta} = \frac{1}{\frac{\cot \theta}{\sin \theta}} - \frac{\cot \theta}{\sin \theta} = \frac{\sin \theta}{\sin^2 \theta \cot \theta} - \frac{\cot \theta}{\sin \theta}$$

$$\frac{1}{\sin \theta \cot \theta} - \frac{\cot \theta}{\sin \theta} = \frac{1}{\sin \theta \cot \theta} - \frac{\cos^2 \theta}{\sin \theta \cot \theta} = \frac{1 - \cos^2 \theta}{\sin \theta \cot \theta} = \frac{\sin^2 \theta}{\sin \theta \cot \theta}$$

$$= \frac{\sin \theta}{\cot \theta}$$

$$= \tan \theta \quad \square$$

f) $\frac{\cot \theta}{\csc \theta - \sin \theta} = \sec \theta$

$$\frac{\cot \theta}{\sin \theta} = \frac{\cot \theta}{\sin \theta} = \frac{\cot \theta}{\sin \theta} = \frac{\cot \theta}{\sin \theta} = \frac{\sin \theta \cot \theta}{\sin \theta \cos^2 \theta}$$

$$\frac{1}{\sin \theta} - \sin \theta = \frac{1}{\sin \theta} - \frac{\sin^2 \theta}{\sin \theta} = \frac{1 - \sin^2 \theta}{\sin \theta} = \frac{\cos^2 \theta}{\sin \theta} = \frac{1}{\cos \theta} = \sec \theta \quad \square$$

g) $\frac{\csc A - \sin A}{\cos A} = \cot A$

$$\frac{1}{\sin A} - \sin A = \frac{1}{\sin A} - \frac{\sin^2 A}{\sin A} = \frac{1 - \sin^2 A}{\sin A} = \frac{\cos^2 A}{\sin A}$$

$$= \frac{\cos^2 A}{\sin A \cos A} = \frac{\cos A}{\sin A} = \cot A \quad \square$$

Σ

4

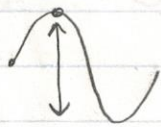
$$h) \tan x + \cot x = \sec x \csc x$$

$$\frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}$$

$$\frac{\sin^2 x}{\cos x \sin x} + \frac{\cos^2 x}{\sin x \cos x} = \frac{\sin^2 x + \cos^2 x}{\cos x \sin x} = \frac{1}{\cos x \sin x} = \sec x \csc x \quad \square$$

$$\#6 \quad f(x) = 20 \sin \frac{\pi}{4} x + 100$$

$$120 = k+a$$



$$80 = k-a$$

40 km/h on 2A

$$b) \quad 110 = 20 \sin \frac{\pi}{4} x + 100$$

$$0,5 = \sin \frac{\pi}{4} x$$

$$P = \frac{2\pi}{\frac{\pi}{4}} = 8$$

$$\frac{\pi}{4} x = \frac{\pi}{6}$$

$$x = \underline{0,66}, \underline{8,66}, \underline{16,66}$$

$$\frac{\pi}{4} x = \frac{5\pi}{6}$$

$$x = \underline{3,33}, \underline{11,33}, \underline{19,33}$$

+8

+8

$$\#7 \quad \arcsin \left(\cos \frac{5\pi}{6} \right)$$

$$a) \quad \arcsin \left(-\frac{\sqrt{3}}{2} \right) =$$

$$\frac{5\pi}{3} \text{ ou } \frac{-\pi}{3}$$

$$b) \quad \arccos \left(-\frac{1}{2} \right) = \frac{2\pi}{3}$$

#5 a) $\frac{\sec x}{\cos x} - \frac{\tan x}{\cot x} = 1$

$$\frac{1}{\cos x} - \frac{\sin x}{\cos x} = \frac{1}{\cos^2 x} - \frac{\sin^2 x}{\cos^2 x} = \frac{1 - \sin^2 x}{\cos^2 x} = \frac{\cos^2 x}{\cos^2 x} = 1$$

b) $\tan x (\sin x + \cot x \cos x) = \sec x$

$$\frac{\sin x}{\cos x} \left(\sin x + \frac{\cos x \cdot \cos x}{\sin x} \right)$$

$$\frac{\sin^2 x}{\cos x} + \frac{\sin x \cos^2 x}{\cos x \sin x}$$

$$\frac{\sin^2 x}{\cos x} + \cos x = \frac{\sin^2 x + \cos^2 x}{\cos x} = \frac{1}{\cos x} = \sec x$$

c) $\frac{1 - \sin^2 x}{\sin x} \sec x = \cot x$

$$\frac{\cos^2 x}{\sin x} \cdot \frac{1}{\cos x} = \frac{\cos x}{\sin x} = \cot x \quad \square$$

d) $\frac{\cos^2 \theta \tan \theta}{\cot \theta} = \sin^2 \theta$

$$\frac{\cos^2 \theta \cdot \sin \theta}{\cos \theta} = \frac{\cos \theta \sin \theta}{\frac{\cos \theta}{\sin \theta}} = \frac{\cos \theta \sin^2 \theta}{\cos \theta} = \sin^2 \theta \quad \square$$

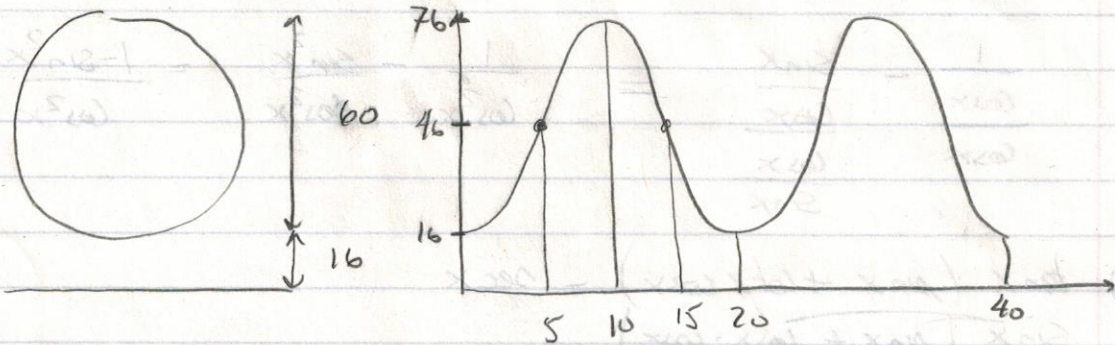
2

6

#8

$$3t \rightarrow 60\text{N}$$

$$1t \rightarrow 20\text{N} \Rightarrow \underline{p = 20}$$



Si 

$$a = -30$$

$$p = 20 = \frac{2\pi}{b} \quad b = \frac{\pi}{10}$$


$$h = 0$$

$k = 46$ MILIEU en y des cycles!

$$y = -30 \cos\left(\frac{\pi}{10}x\right) + 46$$

Si 

$$y = 30 \sin\left(\frac{\pi}{10}(x-5)\right) + 46$$

Si 

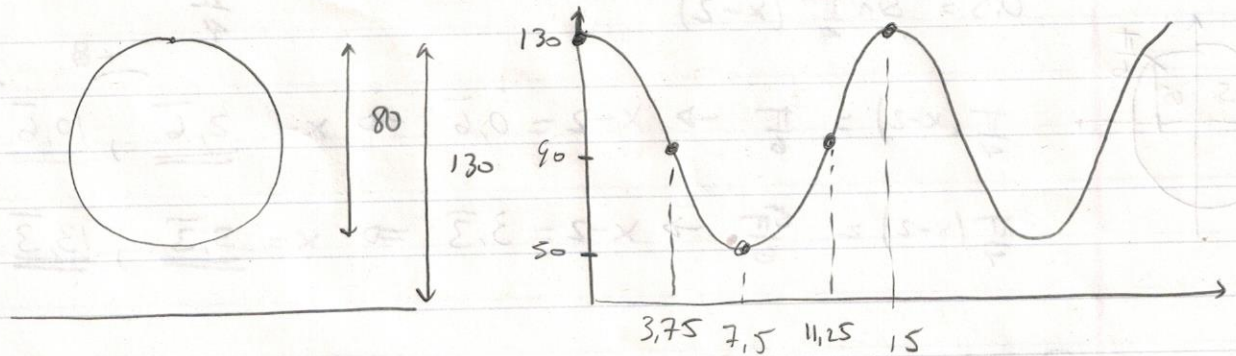
$$y = 30 \cos\left(\frac{\pi}{10}(x-10)\right) + 46$$

b) $x=10$ $y=?$ peu importe la règle choisie

$$y = -30 \cos\left(\frac{\pi}{10}(10)\right) + 46 = 76 \text{ cm} \quad \text{logique car } 10\text{N} = \frac{1}{2} \text{ tour}$$

$\frac{1}{2}$ tour

#9 $4t \rightarrow \cos x$
 $1t \rightarrow 15N = \text{période}$



c) si $a = 40$
 $p = 15 = \frac{2\pi}{\omega} \quad \omega = \frac{2\pi}{15}$

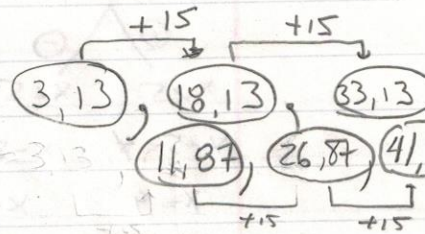
$h = 0 \quad k = 90$ milicimètres en "y"

$y = 40 \cos \frac{2\pi}{15} x + 90$

si $y = -40 \cos \frac{2\pi}{15} (x - 7,5) + 90$

si $y = 40 \sin \frac{2\pi}{15} (x - 11,25) + 90$

si $y = -40 \sin \frac{2\pi}{15} (x - 3,75) + 90$

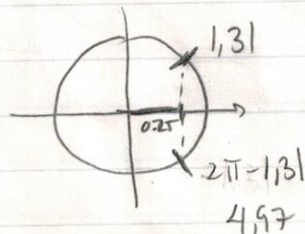


b) Peu importe la règle choisie

$100 = 40 \cos \frac{2\pi}{15} x + 90$

$0,25 = \cos \frac{2\pi}{15} x$

$\cos^{-1} 0,25 = 1,107 \text{ rad}$



$\frac{2\pi}{15} x = 1,31 \quad x = 3,13$

$\frac{2\pi}{15} x = 4,97 \quad x = 11,87$

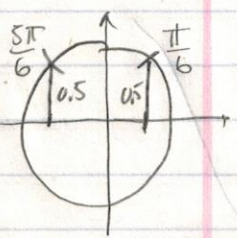
(F)

(8)

#10 $1,5 = 3 \sin \frac{\pi}{4} (x-2)$

$0,5 = \sin \frac{\pi}{4} (x-2)$

$p = \frac{2\pi}{\frac{\pi}{4}} = 8$



$\frac{\pi}{4} (x-2) = \frac{\pi}{6} \rightarrow x-2 = 0,6 \Rightarrow x = \underline{\underline{2,6}}, \underline{\underline{10,6}}, \underline{\underline{18,6}}$

$\frac{\pi}{4} (x-2) = \frac{5\pi}{6} \rightarrow x-2 = 3,3 \Rightarrow x = \underline{\underline{5,3}}, \underline{\underline{13,3}}$

#11 Revision

#11 $y = a|x-h|+k$

$y = a x-5 +6$	}	$y = -0,4 x-5 +6$
$4 = a 0-5 +6 \quad \leftarrow (0,4)$		
$4 = a(5)+6$		
$-2 = a(5)$		
$a = -0,4$		

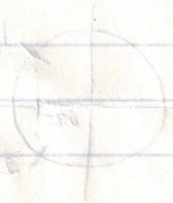
$4,40 = -0,4|x-5|+6$

$4 = |x-5|$



$x > 5$	$x < 5$
$x-5 = 4$	$x-5 = -4$
$x = 9$	$x = 1$

8 mois



#12

$$-2|3x-4|+5=-7$$

a)

$$-2|3x-4|=-12$$

$$|3x-4|=6$$

\oplus	\ominus
$3x-4=6$	$3x-4=-6$
$x=\frac{10}{3}$	$x=-\frac{2}{3}$

b) $4|x-1|+1=8x-3$

$$4|x-1|=8x-4$$

$$|x-1|=2x-1$$

\oplus	\ominus
$x-1=2x-1$	$x-1=-2x+1$
$-x=0$	$3x=2$
$x=0$	$x=\frac{2}{3}$

NON

ok

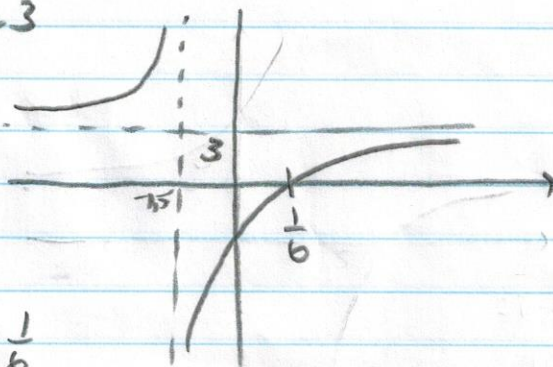
Attention
#13c)

#13c) $h(x) = \frac{6x-1}{2x+3}$

$$\frac{6x-1}{2x+3} = \frac{2x+3}{3} + \frac{-10}{2x+3}$$

$$y = \frac{-10}{2x+3} + 3$$

$$y = \frac{-10}{2(x+1.5)} + 3$$



$$\oplus -\infty, -1.5 [\cup] \frac{1}{6}, +\infty$$

$$\ominus] -1.5, \frac{1}{6} [$$

Zero

$$\frac{6x-1}{2x+3} = 0$$

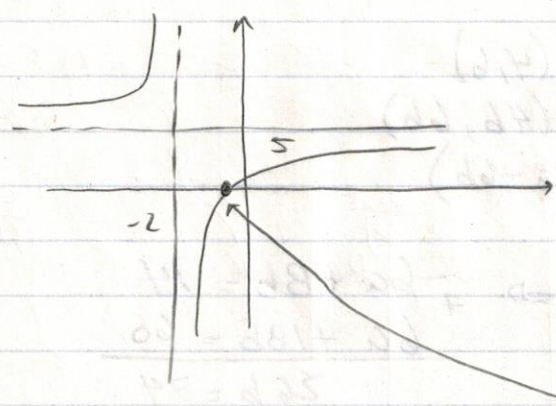
$$6x-1=0 \Rightarrow x=\frac{1}{6}$$

$$6x-1=0 \Rightarrow x=\frac{1}{6}$$

Hilroy

#13

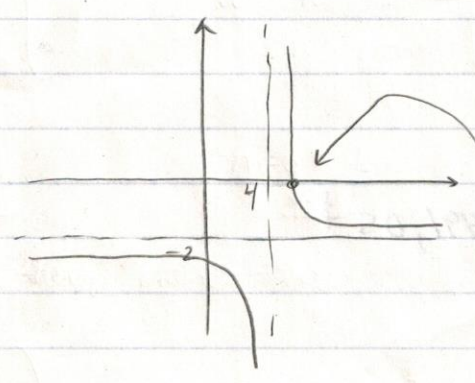
a)



Zéro $0 = \frac{-3}{x+2} + 5$
 $-5 = \frac{-3}{x+2}$
 $-5(x+2) = -3$
 $x+2 = 0,6$
 $x = -1,4$

RÉP: $\oplus -\infty, -2[0] -1,4, +\infty$
 $\ominus]-2, -1,4[$

b)



Zéro $0 = \frac{8}{x-4} - 2$
 $2 = \frac{8}{x-4}$
 $2(x-4) = 8$
 $x-4 = 4$
 $x = 8$

RÉP: $\oplus]4, 8[$
 $\ominus -\infty, 4[0] 8, +\infty$

c) VOIR AVANT PAGE ***

#14

$\vec{w} = a\vec{u} + b\vec{v}$

$(-8, 14) = a(2, 5) + b(-3, 1)$
 $(-8, 14) = (2a, 5a) + (-3b, b)$
 $(-8, 14) = (2a - 3b, 5a + b)$

$2a - 3b = -8 \Rightarrow$
 $3 \cdot (5a + b = 14)$
 $2a - 3b = -8$
 $15a + 3b = 42$

 $17a = 34$
 $a = 2$
 $b = ? \quad 2(2) - 3b = -8$
 $b = 4$

$\vec{w} = 2\vec{u} + 4\vec{v}$

#14b) $(7, 20) = a(-3, 2) + b(4, 6)$
 $(7, 20) = (-3a, 2a) + (4b, 6b)$
 $(7, 20) = (-3a + 4b, 2a + 6b)$

$$2 \cdot (-3a + 4b = 7) \Rightarrow -6a + 8b = 14$$

$$3 \cdot (2a + 6b = 20) \Rightarrow \underline{6a + 18b = 60}$$

$$26b = 74$$

$$b = 2,85 \Rightarrow 2a + 6(2,85) = 20$$

$$\Rightarrow a = 1,46$$

$$\vec{w} = 1,46\vec{u} + 2,85\vec{v}$$

#15 5% → 12 mois $x = 1,25\%$
 $x \rightarrow 3$ mois

a) $V_f = 8000 \cdot (1,0125)^{16} = 10\,491,05\text{ \$}$

b) 5% → 12 mois $x = 0,41\bar{6}\%$
 $x \rightarrow 1$ mois

$$V_f = 8000 (1,0041\bar{6})^{48} = 10\,499,70\text{ \$}$$

c) 5% → 12 mois $x = 2,5\%$
 $x \rightarrow 6$ mois

$$12000 = 8000 (1,025)^x$$

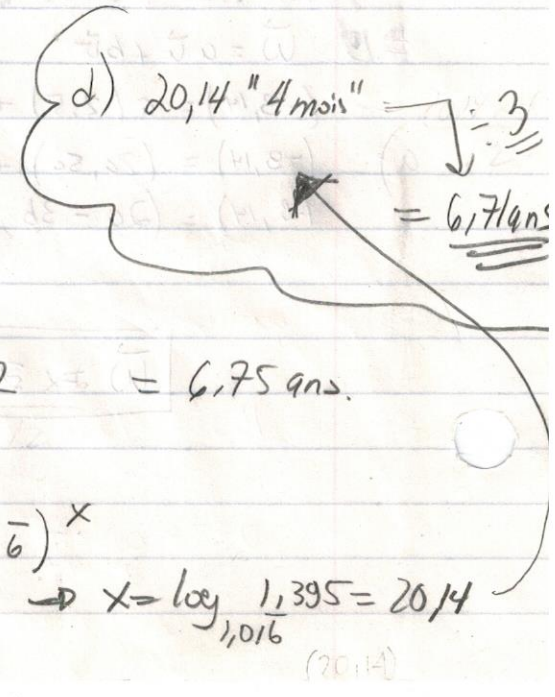
$$1,395 = 1,025^x$$

$$x = \log_{1,025} 1,395 = 13,49 \text{ "6 mois"} \Rightarrow \div 2 = 6,75 \text{ ans.}$$

d) 5% → 12 mois $x = 1,6\%$
 $x \rightarrow 4$ mois

$$12000 = 8000 (1,016)^x$$

$$1,395 = 1,016^x \Rightarrow x = \log_{1,016} 1,395 = 20,14$$



#16 $4^{x+3} = 9^{-2x+3}$

a) $4^{x+3} = (4^{\log_4 9})^{-2x+3}$

$4^{x+3} = (4^{1,585})^{-2x+3}$

$4^{x+3} = 4^{-3,17x+4,75}$

$x+3 = -3,17x+4,75$

$x = 0,42$

b) $3^{4x} = 15^{5x+6}$

$3^{4x} = (3^{\log_3 15})^{5x+6}$

$3^{4x} = (3^{2,46})^{5x+6}$

$3^{4x} = 3^{12,32x+14,76}$

$4x = 12,32x + 14,76$

$x = -1,77$

c) $12 \cdot 2^{x-10} - 13 = 2$

$\frac{12 \cdot 2^{x-10}}{12} = \frac{15}{12}$

$2^{x-10} = 1,25 \Rightarrow x-10 = \log_2 1,25$

$x = 10,32$

d) $-4 \cdot 5^{4x} + 9 = -20$

$-4 \cdot 5^{4x} = -29$

$5^{4x} = 7,25 \Rightarrow 4x = \log_5 7,25$

$x = 0,31$

e) $2^{x-1} \cdot (2^{\log_2 5})^{2x-3} = (2^{\log_2 13})^{5x+6}$

$2^{x-1} \cdot (2^{2,32})^{2x-3} = (2^{3,7})^{5x+6}$

$2^{x-1} \cdot 2^{4,64x-6,96} = 2^{18,5x+22,2}$

$2^{5,64x-7,96} = 2^{18,5x+22,2}$

$5,64x - 7,96 = 18,5x + 22,2$

$-12,86x = 30,16$

$x = -2,35$

#17 a) $\log_2 (x+4) + \log_2 (2x-1) = 3$

$\frac{x > -4}{2x-1 > 0} \Rightarrow \underline{x > 0,5}$

$\log_2 (2x^2 + 7x - 4) = 3$

EXP!

$2^3 = 2x^2 + 7x - 4$

$8 = 2x^2 + 7x - 4$

$0 = 2x^2 + 7x - 12$

$\frac{-7 \pm \sqrt{49 - 4(2)(-12)}}{4}$

⊕ $x = 1,26$ ***

⊖ $x = -4,76$ rejectee

b) $\log_{\frac{1}{2}} x + \log_{\frac{1}{2}} (x+10) = -4$

$x > 0$
 $x > -10$

$\log_{\frac{1}{2}} (x^2 + 10x) = -4$

EXP

$(\frac{1}{2})^{-4} = x^2 + 10x$

$16 = x^2 + 10x$

$0 = x^2 + 10x - 16$

$\frac{-10 \pm \sqrt{100 - 4(1)(-16)}}{2}$

⊕ $1,4$ ***

⊖ $-11,4$ rejectee

c) $\log_5 (3x-2) - \log_5 (x-6) = 2$

$x > \frac{2}{3}$ $x > 6$

$\log_5 \frac{3x-2}{x-6} = 2$

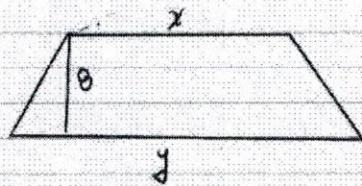
$5^2 = \frac{3x-2}{x-6}$

$\Rightarrow 25(x-6) = 3x-2$

$25x - 150 = 3x - 2$

$x = 6,73$

#15

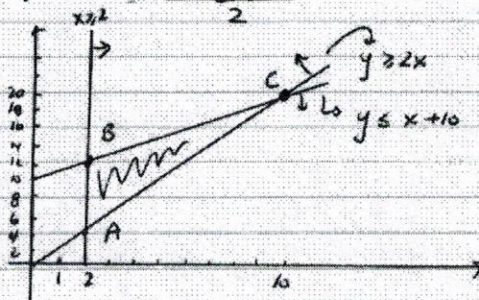


• $y \leq x + 10$

• $x \geq 2$

• $y \geq 2x$

Single objective: $A_{\text{tr}} = \frac{(x+y) \cdot h}{2}$



$C(10, 20)$ MAX $A_{\text{tr}} = \frac{(10+20) \cdot 8}{2} = \underline{\underline{120 \text{ cm}^2}}$

Library