① $2 \to 5 \to \underline{8}$

② $n + n+2 + n+4 = 72$
$3n = 66 \quad n = \underline{22}$

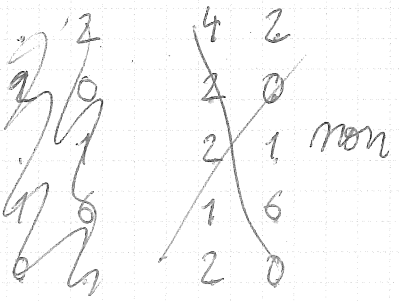
③ $3 \times 8/6 = \underline{4}$

④ Aller bus : 12 min
Aller à pied : $60 - 12 = 48$ min
A/R à pied : $2 \times 48 = 96$ min
1h 36 min

⑤

2	2
1	0
3	1
1	6
3	3

1 fois 6
1 fois 0 ?



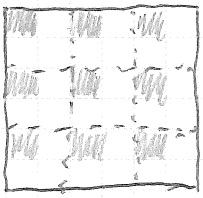
⑥ $8\ell = 32 \to \ell = 4$ m

⑦ $J - F = 4$
$J + F = 16$
$F = (16 - 4)/2 = 6$

⑧ $9 \times 17 = 153$
$223 - 153 = 70 \to 7$

⑨ $10n - n = 2016 \quad n = 2016/9 = 224$

⑩



3 ? OK

⑪ $18 = 3 \times a \times b$
$a \times b = 6$
$1 \times 6 \to 2(1\times3 + 1\times6 + 3\times6) \times 25 = 27 \times 50 = 1350\ cm^2$
$2 \times 3 \to 2(2\times3 + 2\times3 + 3\times3) \times 25 = 21 \times 50 = 1050\ cm^2$

⑫ 9 6 5 2 1
8 7 4 3 0

les + proches possible
chiffres décroissants

9 6 4 2 0
8 7 5 3 1

8 7 6 5 4 non
9 3 2 1 0

(13) $L \times l$

$(L-kL)(l+kl) = L \times l \times (1-k^2)$

$k^2 < 2/100$

$k = p/100 \qquad k^2 = p^2/10000 < 200/10000 \rightarrow p = 14$

(14) • Si (1) et (2) vraies:

$b \mid 2b+6$ donc $b \mid 6$

– $b=1 \rightarrow$	$a=7$	(3) fausse	(4) fausse	
– $b=2 \rightarrow$	$a=9$	"	(4) vraie	$(9,2)$
– $b=3 \rightarrow$	$a=11$	"	(4) fausse	
– $b=6 \rightarrow$	$a=17$	"	(4) vraie	$(17,6)$

(2) ou (3) est fausse

Si (3) est fausse, (1) et (2) vraies $\rightarrow$ 1er cas.

• Si (1), (3) et (4) vraies, et (2) fausse:

$a+7b = \underbrace{(a+b)}_{3\mid} + \underbrace{6b}_{3\mid}$ impossible.

↓ 2 sol°

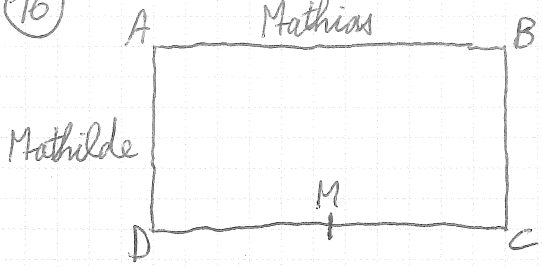
(15) 11, p et q. $pq = 11+p+q \qquad q = \frac{11+p}{p-1} = 1 + \frac{12}{p-1}$

$p-1 \mid 12$

p	q	
2	13	
3	7	
5	4	impossible
7	3	
13	2	

$\rightarrow$ 2 sol°: 2, 11, 13 et 3, 7, 11

(16)



Mathias: $L + l + L/2$
Mathide: $l + L/2$

$(L + l + L/2) / (l + L/2) = L/l = r$

$(3L + 2l) / (L + 2l) = L/l$

$3Ll + 2l^2 = L^2 + 2Ll$

$L^2 - Ll - 2l^2 = 0$

$r^2 - r - 2 = 0 \qquad r = \frac{1 \pm \sqrt{9}}{2} = 2$

~~Mathilde: 2l en 7h43~~

$6l = 2016 \rightarrow l = 336 \quad L = 672$

$AB = 672$
$AD = 336$

(17) Nb : bbb...b0

~~bbb...b107~~

bb...b007

bb_b10 [pair]

bb_b010 [impair]

b_b 0110 [pair]

10110 [impair]

010110 [pair]

~~X X X 4 X X X 8 X X X 12 X X X 16~~
~~X X X X X 6 X X X X X X 14 X X X~~

2, 4, 6, 8, ...

2, 6, 10, 14 ...

6, 14, 22, ...

6, 22, 38, ...

22, 54, 86, ...

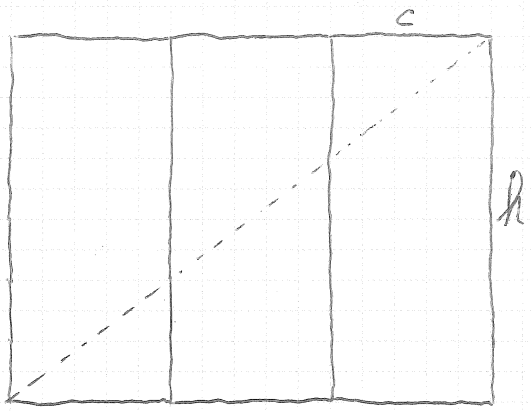
22, 86, ...

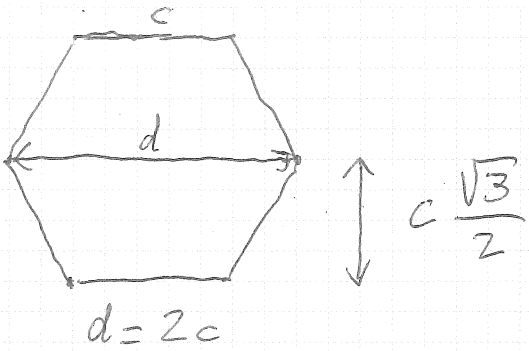
... 0101010...010110

~~1024 + 256 + 64 + 16~~

$6 + 16 + 64 + 256 + 1024 = 1366$

(18)





$$\sqrt{(3c)^2 + h^2} = d + h$$
$$= 2c + h$$

Bla $9c^2 + h^2 = 4c^2 + 4ch + h^2$

$5c^2 = 4ch$

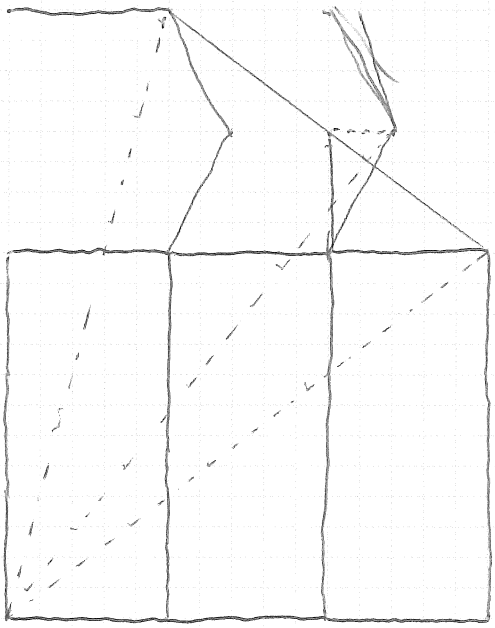
$5c = 4h$

$c = 50\ mm$

$h = 62,5\ mm$

~~62,5~~?

(mais prisme posé)



$(3c)^2 + h^2$

$(2c + c/2)^2 + (h + c\frac{\sqrt{3}}{2})^2$

$c^2 + (h + c\sqrt{3})^2$

$9c^2 + h^2$

$\frac{25}{4}c^2 + \frac{3}{4}c^2 + hc\sqrt{3} + h^2 = 7c^2 + \sqrt{3}\,hc + h^2$ → le+gd!

$4c^2 + 2\sqrt{3}\,hc + h^2$

$9c^2 = 4c^2 + 2\sqrt{3}\,hc$ → $5c = 2\sqrt{3}\,h$

$h = \frac{50}{2\sqrt{3}}\ mm = \frac{50\sqrt{3}}{6}\ mm$ $\quad h = \frac{250}{2\sqrt{3}} = \frac{250\sqrt{3}}{6}\ mm$

$\sqrt{3} \times 50 \simeq 86,6$ $\quad 86,6/6 \simeq 14,4$ ~~14,4 mm~~ (72 mm?)

$500\sqrt{3} \simeq 866$ $\quad 866/12 = 433/6 \simeq 72\ mm$