Tugas Responsi 8 Kalkulus Kelompok 4

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Kelompok 4:

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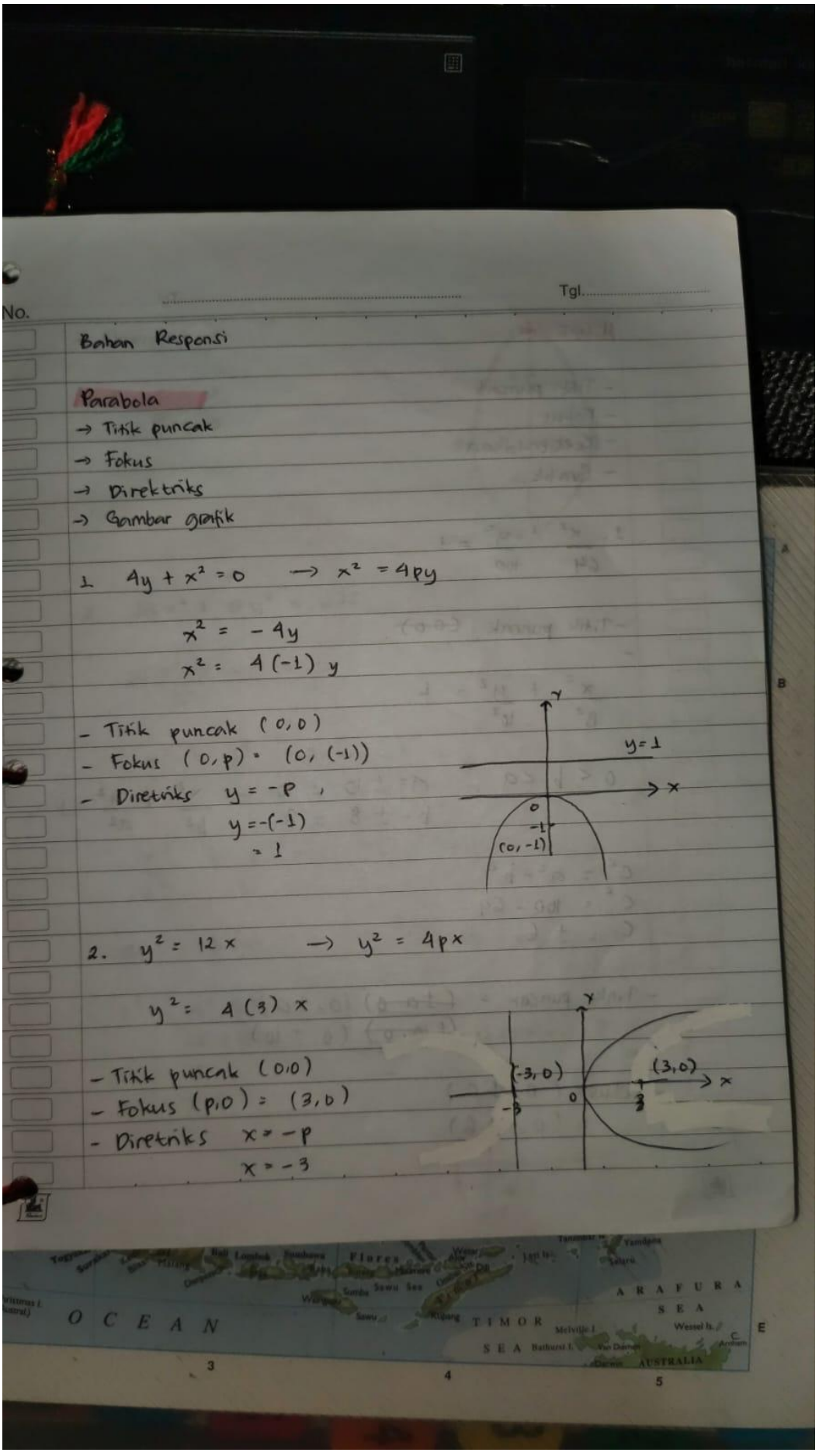
IPB University
Departemen Statistika 2022

1.



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Bahan Responsi

Parabola
→ Titik puncak
→ Fokus
→ Direktriks
→ Gambar grafik

1. $4y + x^2 = 0 \longrightarrow x^2 = 4py$

$x^2 = -4y$

$x^2 = 4(-1)y$

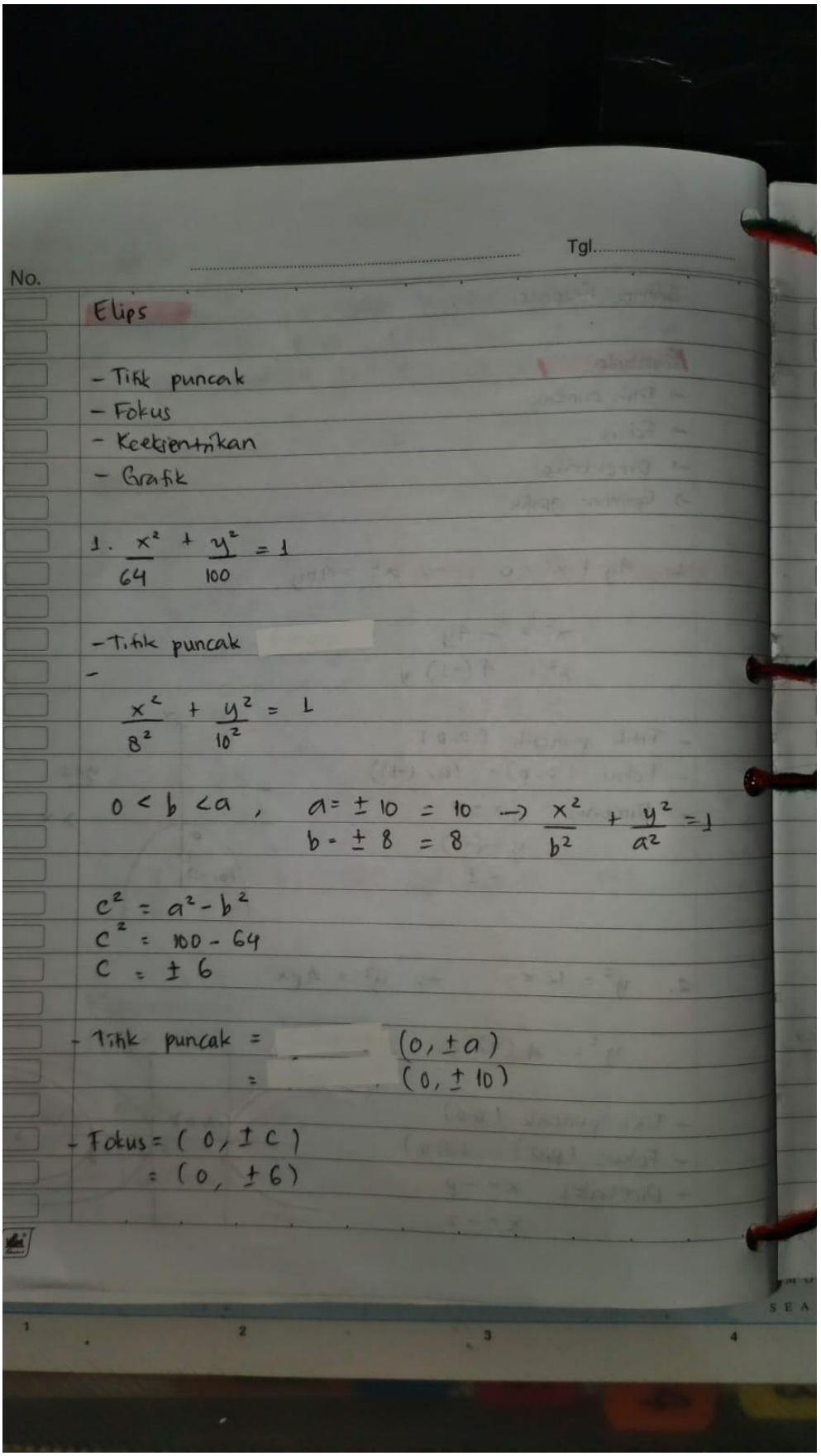
- Titik puncak $(0,0)$
- Fokus $(0,p) = (0,(-1))$
- Diretriks $y = -p$,
  $y = -(-1)$
  $= 1$

2. $y^2 = 12x \longrightarrow y^2 = 4px$

$y^2 = 4(3)x$

- Titik puncak $(0,0)$
- Fokus $(p,0) = (3,0)$
- Diretriks $x = -p$
  $x = -3$

2.



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Elips

- Titik puncak
- Fokus
- Keeksentrikan
- Grafik

1. $\frac{x^2}{64} + \frac{y^2}{100} = 1$

- Titik puncak

$\frac{x^2}{8^2} + \frac{y^2}{10^2} = 1$

$0 < b < a$, $a = \pm 10 = 10 \rightarrow \frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$

$b = \pm 8 = 8$

$c^2 = a^2 - b^2$

$c^2 = 100 - 64$

$c = \pm 6$

- Titik puncak = $(0, \pm a)$

$= (0, \pm 10)$

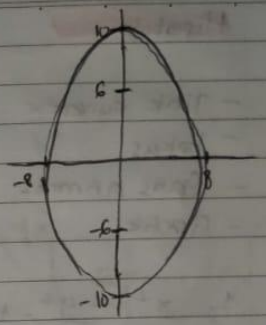
- Fokus = $(0, \pm c)$

$= (0, \pm 6)$

Tgl.

- Eksentrikan

$e = \frac{c}{a} = \frac{3}{10}$



2. $25x^2 + 9y^2 = 225$

$\frac{25x^2 + 9y^2}{225} = \frac{1}{}$

$\frac{x^2}{9} + \frac{y^2}{25} = 1 \rightarrow \frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$

$\frac{x^2}{3^2} + \frac{y^2}{5^2} = 1$

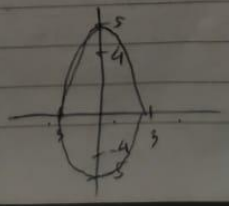
$a = 5 \;,\; b = 3$

$c^2 = a^2 - b^2$
$= 25 - 9$
$= 16$
$c = \pm 4$

- Titik puncak
$(0, \pm a) = (0, \pm 5)$

- Titik Fokus $= (0, \pm c)$
$= (0, \pm 4)$

- Keeksentrikan $e = \frac{c}{a} = \frac{4}{5}$



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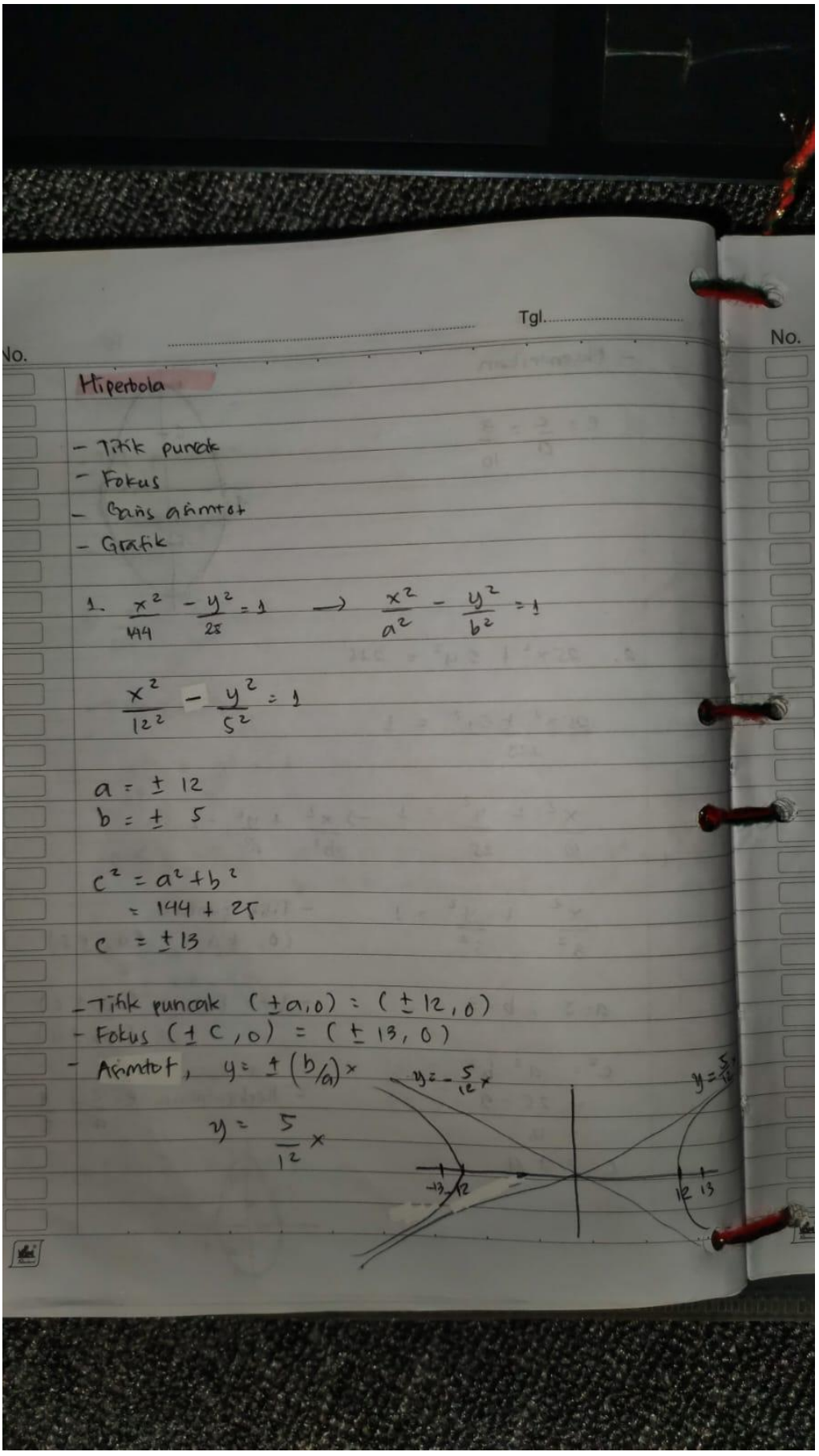

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Hiperbola

- Titik puncak
- Fokus
- Garis asimtot
- Grafik

1. $\frac{x^2}{144} - \frac{y^2}{25} = 1 \longrightarrow \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$\frac{x^2}{12^2} - \frac{y^2}{5^2} = 1$

$a = \pm 12$

$b = \pm 5$

$c^2 = a^2 + b^2$

$= 144 + 25$

$c = \pm 13$

- Titik puncak $(\pm a, 0) = (\pm 12, 0)$
- Fokus $(\pm c, 0) = (\pm 13, 0)$
- Asimtot, $y = \pm (b/a)x$

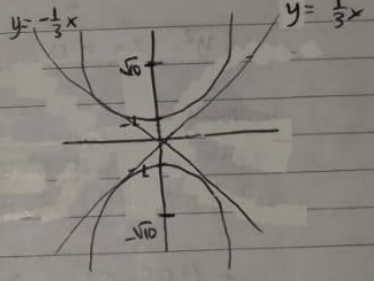
$y = \frac{5}{12}x$

No. Tgl.

2. $9y^2 - x^2 = 9$

$\frac{9y^2 - x^2}{9} = \frac{1}{1} \longrightarrow \frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

$\frac{y^2}{1^2} - \frac{1}{9}x^2 = \frac{1}{1}$



$a = \pm 1$

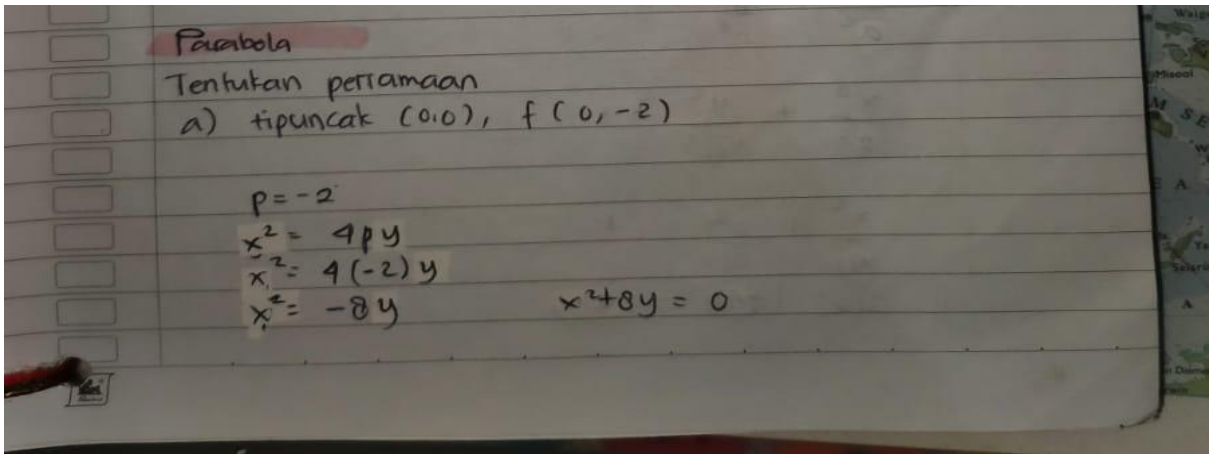
$b = \pm 3$

$c^2 = 1 + 9$

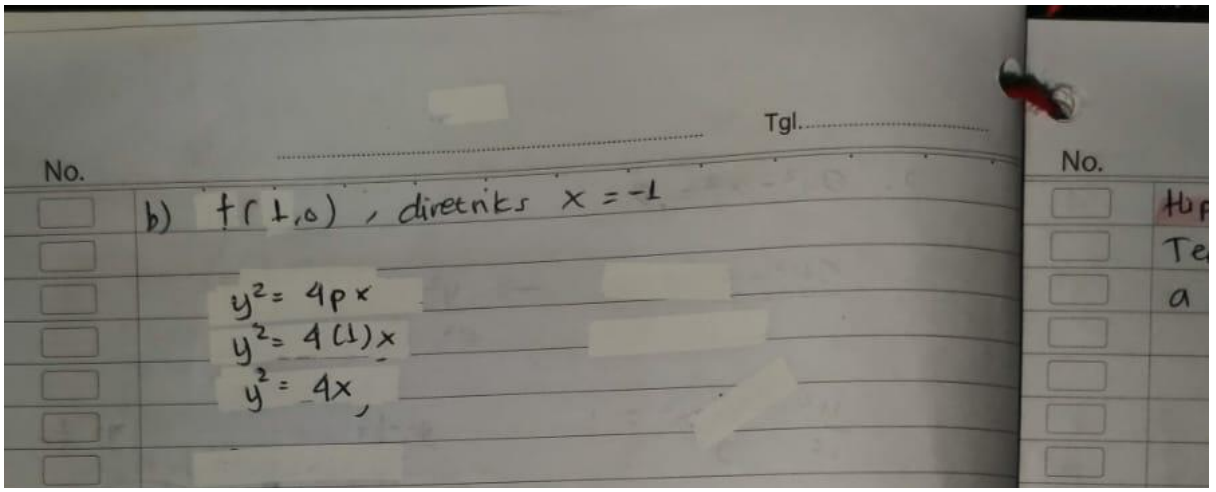
$c = \pm \sqrt{10}$

- Titik puncak $(0, \pm a) = (0, \pm 1)$
- Fokus $(0, \pm c) = (0 \pm \sqrt{10})$
- Asimtot $y = \pm \left(\frac{a}{b}\right)x = \pm \left(\frac{1}{3}\right)x = \pm \frac{1}{3}x$

4.


Parabola
Tentukan persamaan
a) titik puncak (0,0), f(0,-2)

p = -2
$x^2 = 4py$
$x^2 = 4(-2)y$
$x^2 = -8y$ $\quad x^2 + 8y = 0$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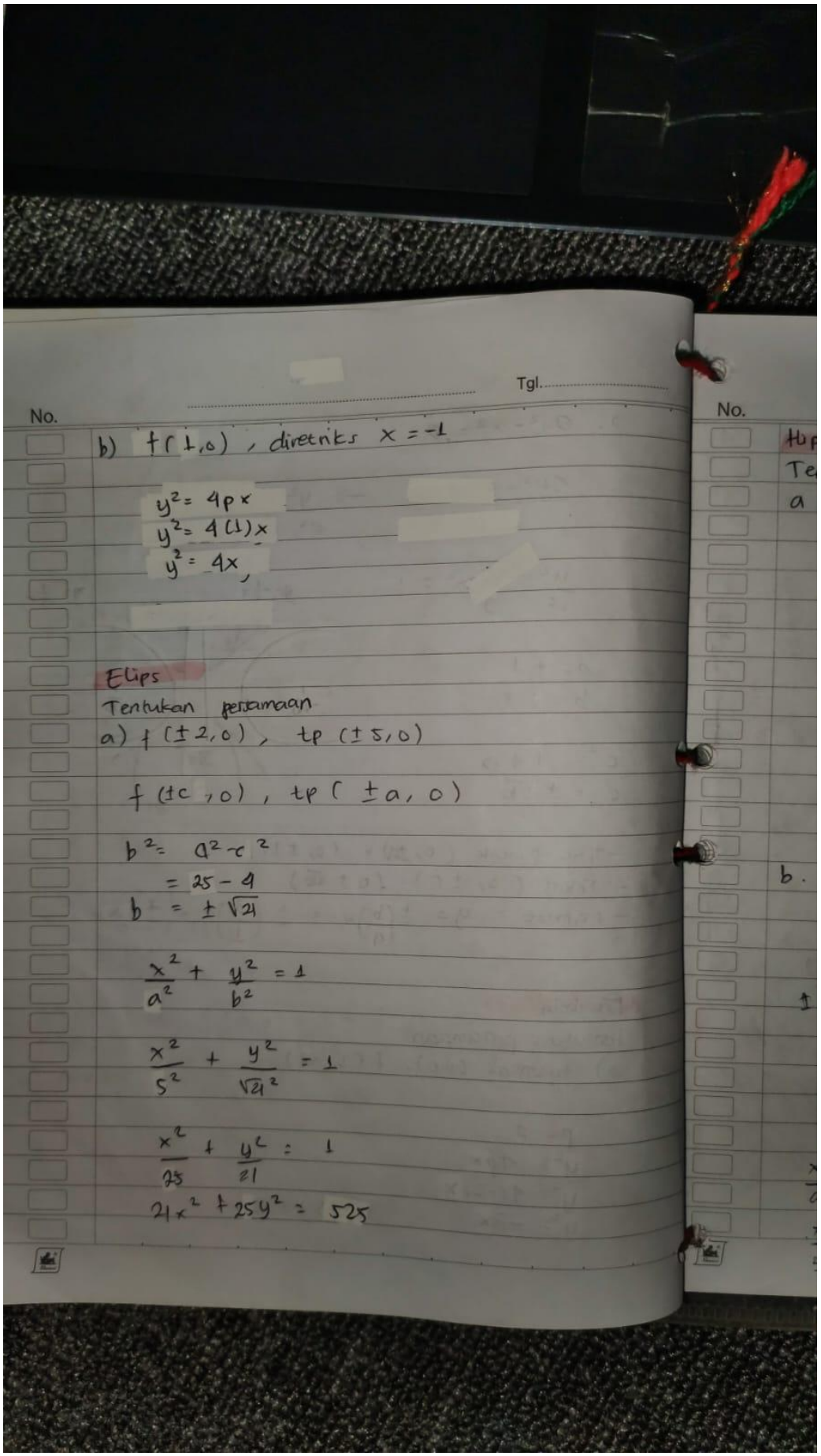
b) f(1,0), direktriks $x = -1$

$y^2 = 4px$
$y^2 = 4(1)x$
$y^2 = 4x$

5.



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b) $f(1,0)$, direktris $x = -1$

$y^2 = 4px$

$y^2 = 4(1)x$

$y^2 = 4x$

Elips

Tentukan persamaan

a) $f(\pm 2, 0)$, $tp(\pm 5, 0)$

$f(\pm c, 0)$, $tp(\pm a, 0)$

$b^2 = a^2 - c^2$

$= 25 - 4$

$b = \pm\sqrt{21}$

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

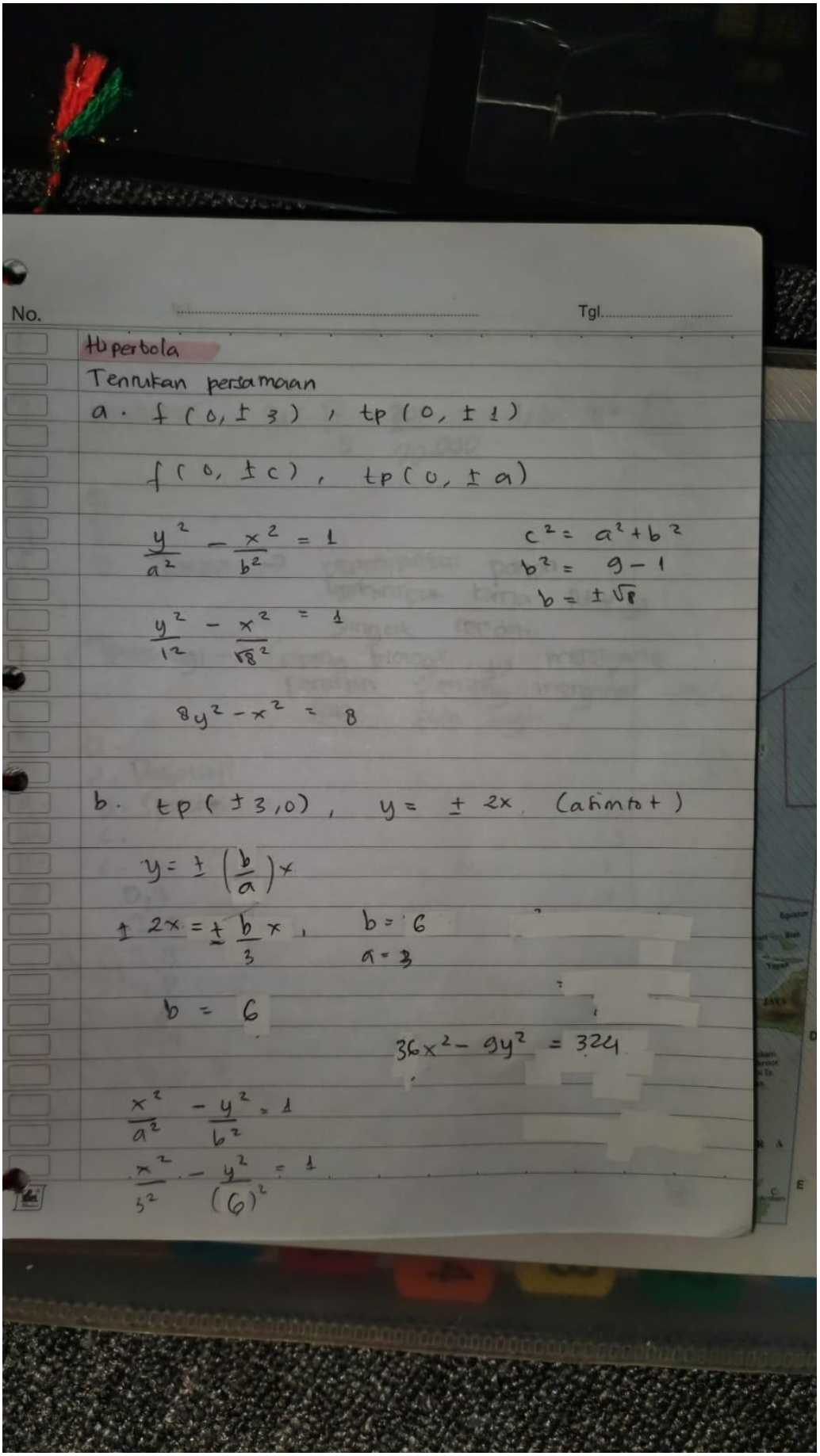
$\frac{x^2}{5^2} + \frac{y^2}{\sqrt{21}^2} = 1$

$\frac{x^2}{25} + \frac{y^2}{21} = 1$

$21x^2 + 25y^2 = 525$

No.

6.



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Hiperbola

Tentukan persamaan

a. $f(0, \pm 3)$, $tp(0, \pm 1)$

$f(0, \pm c)$, $tp(0, \pm a)$

$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$

$c^2 = a^2 + b^2$

$b^2 = 9 - 1$

$b = \pm\sqrt{8}$

$\frac{y^2}{1^2} - \frac{x^2}{\sqrt{8}^2} = 1$

$8y^2 - x^2 = 8$

b. $tp(\pm 3, 0)$, $y = \pm 2x$ (asimtot)

$y = \pm \left(\frac{b}{a}\right)x$

$\pm 2x = \pm \frac{b}{3}x$, $b = 6$, $a = 3$

$b = 6$

$36x^2 - 9y^2 = 324$

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$\frac{x^2}{3^2} - \frac{y^2}{(6)^2} = 1$