Tugas Responsi 9 Kalkulus Kelompok 4

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Kelompok 4:

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1.

DATE :

1. a.) $(x+2)^2 = 8(y-1)$ → $h=-2$, $p=2$, $k=1$

→ • Titik fokus → $(h, p+k)$

$= (-2, 3)$

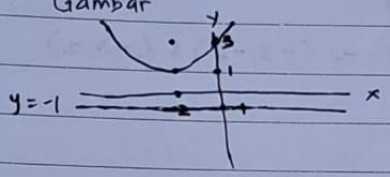
• Titik puncak → (h, k)

$= (-2, 1)$

• Direktris → $y = k-p$

$y = -1$

• Gambar



b.) $4x^2 + 16x - 16y + 32 = 0$

→ $4x^2 + 16x - 16y + 32 = 0$

$4x^2 + 16x = 16y - 32$

$(2x+4)^2 - 4^2 = 16y - 32$

$(2x+4)^2 = 16y - 32 + 16$

$4(x+2)^2 = 16y - 16$

$4(x+2)^2 = 16(y-1)$

$(x+2)^2 = 4(y-1)$ → $h=-2$, $p=1$, $k=1$

• Titik fokus → $(h, p+k)$

$= (-2, 2)$

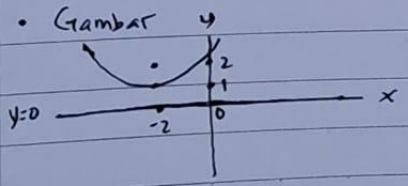
• Titik puncak → (h, k)

$= (-2, 1)$

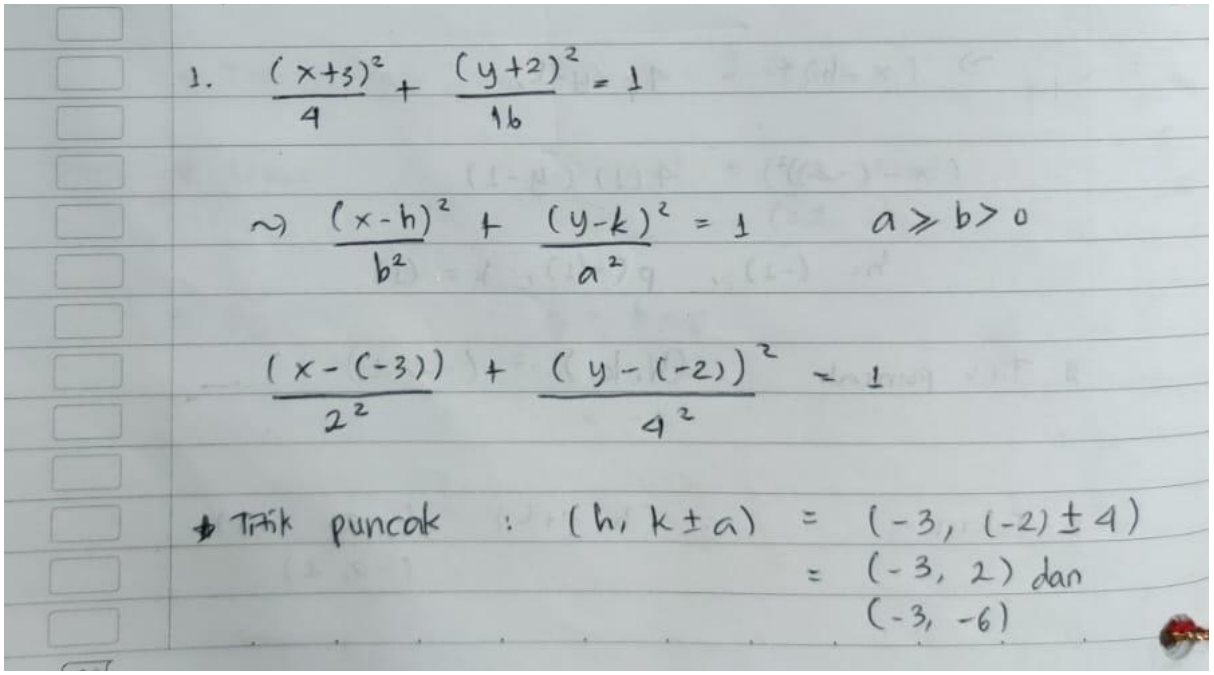
• Direktris → $y = k-p$

$y = 0$

• Gambar



2.



1. $\frac{(x+3)^2}{4} + \frac{(y+2)^2}{16} = 1$

$\rightsquigarrow \frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1 \qquad a \geq b > 0$

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

★ Titik puncak : $(h, k \pm a) = (-3, (-2) \pm 4)$

$= (-3, 2)$ dan

$(-3, -6)$

No.

★ Fokus : $(h, k \pm c) = (-3, (-2) \pm 2\sqrt{3})$

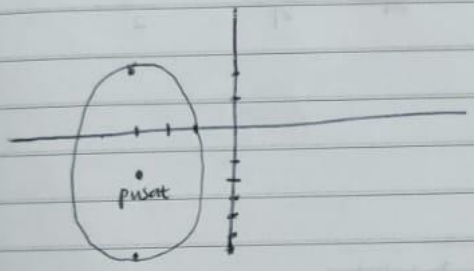
$c^2 = a^2 - b^2$

$= 4^2 - 2^2$

$c = \sqrt{12}$

$= 2\sqrt{3}$

★ Keeksentrikan : $e = \frac{c}{a} = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$



2. $x^2 + 4y^2 - 2x + 16y + 1 = 0$

$x^2 - 2x + 4y^2 + 16y + 1 = 0$

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

$(x-1)^2 + 4[(y+2)^2 - 4] = 0$

$(x-1)^2 + 4(y+2)^2 - 16 = 0$

$\frac{(x-1)^2}{16} + \frac{(y+2)^2}{4} = 1$

$\rightsquigarrow \frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

No. ..... Tgl. - -

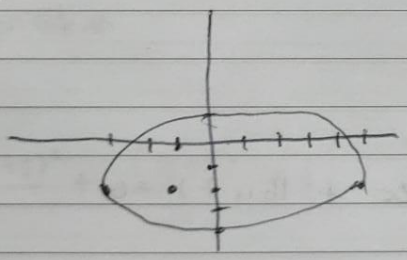
$h = 1$, $k = (-2)$, $a = 4$, $b = 2$, $c = \sqrt{4^2 - 2^2}$
$= 2\sqrt{3}$

★ Titik puncak : $(h \pm a, k)$
$(1 \pm 4, -2)$ $(5, -2)$ $(-3, -2)$

★ Fokus : $(h \pm c, k)$
$(1 \pm 2\sqrt{3}, -2)$

★ Keeksentrikan : $e = \frac{c}{a} = \frac{2\sqrt{3}}{4} = \frac{\sqrt{3}}{2}$

★ Grafik



3.

3. a.) $\frac{(x+3)^2}{4} - \frac{(y+2)^2}{16} = 1$

→ $a = 2$ $\quad h = -3$ $\quad c = \sqrt{a^2+b^2}$

$b = 4$ $\quad k = -2$ $\quad c = \sqrt{4+16} \rightarrow c = \sqrt{20} \;/\; 2\sqrt{5}$

- Titik puncak → $(h \pm a, k)$

$= (-3 \pm 2, -2) \rightarrow (-5, -2)$ & $(-1, -2)$

- Titik fokus → $(h \pm c, k)$

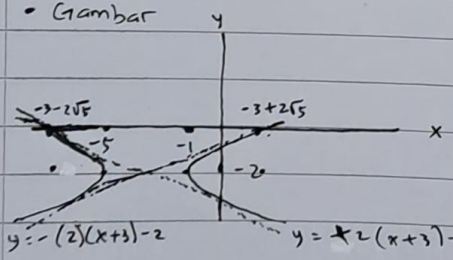
$= (-3 \pm 2\sqrt{5}, -2) \rightarrow (-3-2\sqrt{5}, -2)$ & $(-3+2\sqrt{5}, -2)$

- Asimtot → $y - k = \pm\left(\frac{b}{a}\right)(x-h)$

$y + 2 = \pm\left(\frac{4}{2}\right)(x+3)$

$y = \pm 2(x+3) - 2$

- Gambar



DATE :

b.) $9x^2 - 16y^2 + 54x + 64y - 127 = 0$

→ $9x^2 - 16y^2 + 54x + 64y - 127 = 0$

$9x^2 + 54x - 16y^2 + 64y = 127$

$9(x^2 + 6x) - 16(y^2 - 4y) = 127$

$9((x+3)^2 - 3^2) - 16((y-2)^2 - 2^2) = 127$

$9(x+3)^2 - 81 - 16(y-2)^2 + 64 = 127$

$9(x+3)^2 - 16(y-2)^2 = 127 + 81 - 64$

$9(x+3)^2 - 16(y-2)^2 = 144$

$\frac{9(x+3)^2}{144} - \frac{16(y-2)^2}{144} = \frac{144}{144}$

$\frac{(x+3)^2}{16} - \frac{(y-2)^2}{9} = 1$

→ $a = 4$ $\quad c = \sqrt{a^2+b^2}$ $\quad h = -3$

$b = 3$ $\quad c = \sqrt{16+9} = 5$ $\quad k = 2$

- Titik puncak → $(h \pm a, k)$

$= (-3 \pm 4, 2) \rightarrow (-7, 2)$ & $(1, 2)$

- Titik fokus → $(h \pm c, k)$

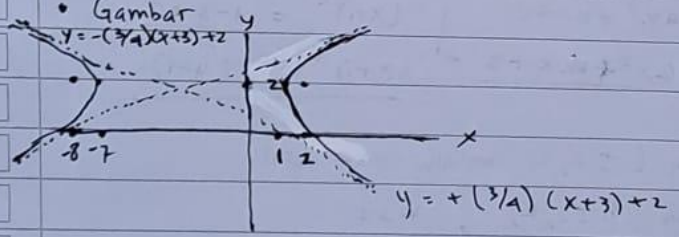
$= (-3 \pm 5, 2) \rightarrow (-8, 2)$ & $(2, 2)$

- Asimtot → $y - k = \pm\left(\frac{b}{a}\right)(x-h)$

$y - 2 = \pm\left(\frac{3}{4}\right)(x+3)$

$y = \pm\left(\frac{3}{4}\right)(x+3) + 2$

- Gambar



$y = +(3/4)(x+3)+2$

4.

DATE :

9. a) Parabola → puncak (2,3) fokus (2,5)

→ $h = 2$ Persamaan → $(x-h)^2 = 4p(y-k)$

$k = 3$ $(x-2)^2 = 4(2)(y-3)$

$p = 2$ $\underline{(x-2)^2 = 8(y-3)}$

b.) Parabola → sumbu parabola vertikal, melalui titik $(-2,3), (0,3), (1,9)$.

→ Sumbu parabola vertikal melalui 3 titik, persamaan umum ax^2+bx+c

- $(-2,3)$ → $y = ax^2+bx+c$

$3 = 4a - 2b + c$ ... (1) → $4a - 2b = 0$

- $(0,3)$ → $y = ax^2+bx+c$

$3 = c$ ... (2)

- $(1,9)$ → $y = ax^2+bx+c$

$9 = a+b+c$ ... (3) → $a+b = 6$

- Eliminasi pers (1) dan (3)

$4a-2b=0$	$\times 1$	$4a-2b=0$
$a+b=6$	$\times 4$	$\underline{4a+4b=24}$ −
		$-6b = -24$
		$b = 4$.

- $a+b=6$

$a = 2$

- $a=2$, $b=4$, $c=3$
- Persamaan : $y = ax^2+bx+c$

$\underline{y = 2x^2+4x+3}$

→ $2x^2+4x+3-y=0$

$2(x^2+2x) = y-3$

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

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

$\underline{(x+1)^2 = \frac{1}{2}(y-1)}$

c.) Elips → Fokus $(\pm 2, 2)$ melalui titik asal.

→ • Titik fokus → $(h \pm c, k)$, $k = 2$

$h + c = 2$

$h - c = -2$ +

$2h = 0$

$h = 0$, $c = 2$

DATE :

Persamaan → $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $(a>b)$

$= \frac{(x-0)^2}{a^2} + \frac{(y-2)^2}{b^2} = 1$

- Melalui asal $(0,0)$ → $\frac{(x-0)^2}{a^2} + \frac{(y-2)^2}{b^2} = 1$

$\Leftrightarrow \frac{0}{a^2} + \frac{4}{b^2} = 1$

$\Leftrightarrow b^2 = 4$

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

$a^2 = 4 + 4 = 8$

- Persamaan elips → $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

$\Leftrightarrow \frac{x^2}{8} + \frac{(y-2)^2}{4} = 1$

d.) Hiperbola → puncak $(0,0)$ dan $(0,b)$. Fokus $(0,8)$

→ • Puncak → $(h, k \pm a)$, $h = 0$

$k + a = 6$

$k - a = 0$ +

$2k = 6$

$k = 3$, $a = 3$

- Pusat → (h,k) → $(0,3)$
- Fokus → $(h, k \pm c)$ → $(0,8)$

$k + c = 8$ → (karena diatas titik pusat)

$c = 5$

- $b = \sqrt{c^2 - a^2}$

$= \sqrt{25-9} = 4$

- Persamaan → $\frac{(y-3)^2}{9} - \frac{(x-0)^2}{16} = 1$