KELOMPOK 8

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Tugas Respons

1. Tentukan titik puncak, fokus, dan direktriks dari parabola berikut, serta gambarlah grafiknya.

a. $4y + x^2 = 0$

$x^2 = -4y$

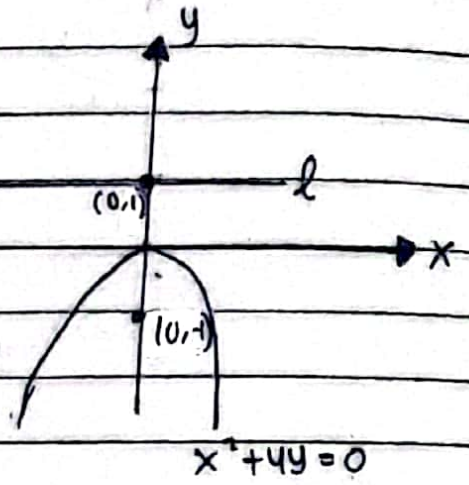
$x^2 = 4(-1)y$

$p = -1$

fokus $= (0, -1)$

puncak $= (0, 0)$

direktriks $y = -p = 1$



b. $y^2 = 12x$

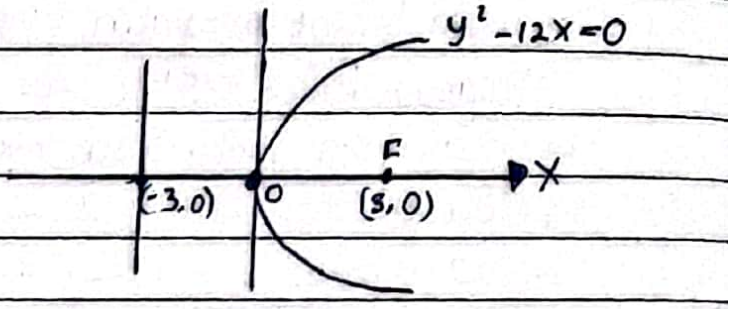
$y^2 = 4(3)x$

$p = 3$

fokus $= (3, 0)$

puncak $= (0, 0)$

direktriks $x = -p = -3$



2. Tentukan titik puncak, fokus, dan keesentrikan dari elips berikut, serta gambarlah grafiknya.

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

$a^2 = 100 \rightarrow a = 10$

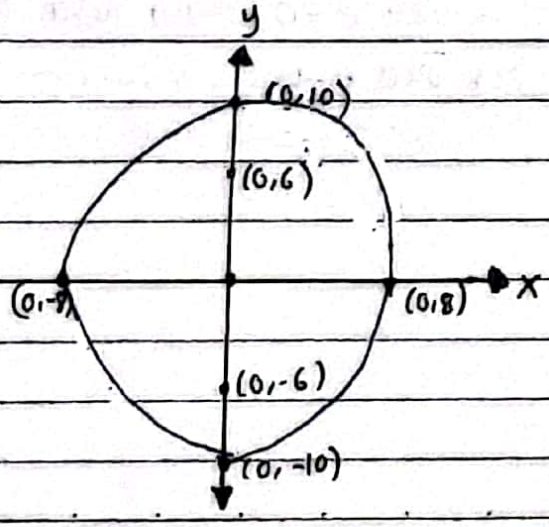
$b^2 = 64 \rightarrow b = 8$

$c = \sqrt{10^2 - 8^2} = 6$

fokus $= (0, \pm 6)$

puncak $= (0, \pm 10)$

keesentrikan $= e = \frac{c}{a} = \frac{6}{10} = \frac{3}{5}$



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

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

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

$a^2 = 25 \rightarrow a = 5$

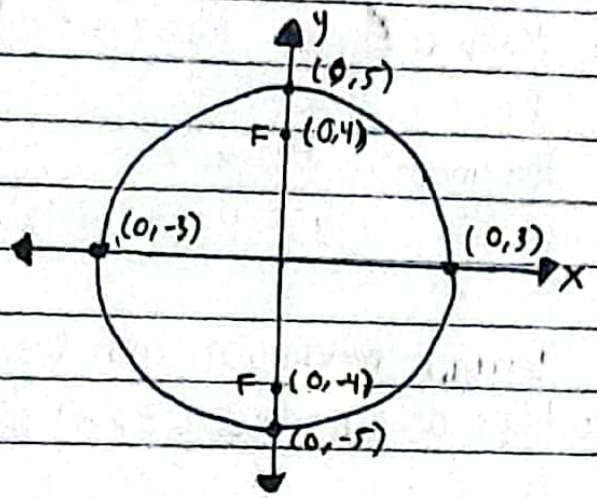
$b^2 = 9 \rightarrow b = 3$

$c = \sqrt{25-9} = \sqrt{16} = 4$

fokus $= (0, \pm c) = (0, \pm 4)$

Puncak $= (0, \pm a) = (0, \pm 5)$

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



3. Tentukan titik puncak, fokus, dan garis asimtot hiperbola berikut, serta gambarlah grafiknya.

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

$a^2 = 144 \rightarrow a = 12$

$b^2 = 25 \rightarrow b = 5$

$c = \sqrt{144+25} = \sqrt{169} = 13$

fokus $= (\pm c, 0) = (\pm 13, 0)$

Puncak $= (\pm a, 0) = (\pm 12, 0)$

Asimtot $y = \pm\left(\frac{b}{a}\right)x = \pm\left(\frac{5}{12}\right)x$

b.) $9y^2 - x^2 = 9 \rightarrow \frac{y^2}{1} - \frac{x^2}{9} = 1$

$a^2 = 1 \rightarrow a = 1$

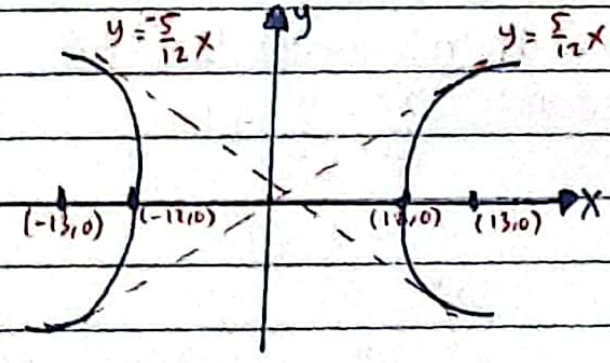
$b^2 = 9 \rightarrow b = 3$

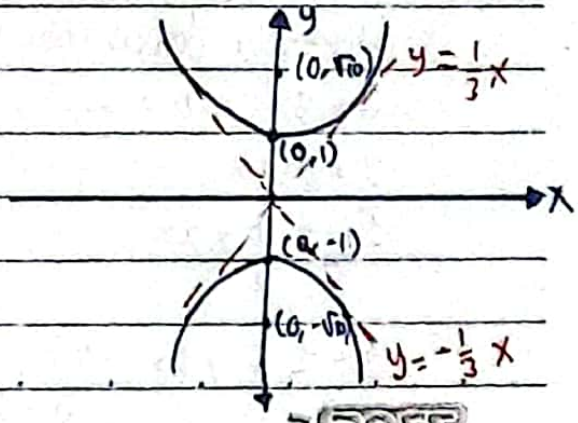
$c = \sqrt{9+1} = \sqrt{10}$

fokus $= (0, \pm c) = (0, \pm\sqrt{10})$

Puncak $= (0, \pm a) = (0, \pm 1)$

Asimtot $y = \pm\left(\frac{a}{b}\right)x = \pm\left(\frac{1}{3}\right)x$





4. Tentukan persamaan irisan kerucut berikut:

a. Parabola dengan titik puncak (0,0) dan fokus (0, -2)

$p = -2$

Persamaan: $x^2 = 4py$

$x^2 = 4(-2)y \rightarrow x^2 = -8y \rightarrow x^2 + 8y = 0$

b. parabola dengan fokus (1,0) dan direktriks $x = -1$

$p = 1$

Persamaan: $y^2 = 4px$

$y^2 = 4(1)x \rightarrow y^2 = 4x \rightarrow y^2 - 4x = 0$

5. Tentukan persamaan irisan kerucut berikut:

a. Elips dengan fokus $(\pm 2, 0)$ dan titik puncak $(\pm 5, 0)$

$a = 5$

$c = 2$

$b = \sqrt{5^2 - 2^2} = \sqrt{25 - 4} = \sqrt{21}$

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

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

$21x^2 + 25y^2 = 525 \Leftrightarrow \frac{x^2}{25} + \frac{y^2}{21} = 1$

6. Tentukan persamaan irisan kerucut berikut:

a. Hiperbola dengan fokus $(0, \pm 3)$ dan titik puncak $(0, \pm 1)$

$a = 1 \; ; \; c = 3 \; ; \; b = \sqrt{3^2 - 1^2} = \sqrt{8}$

Persamaan: $\frac{y^2}{a^2} - \frac{x^2}{b^2} = \frac{y^2}{1^2} - \frac{x^2}{(\sqrt{8})^2} \Leftrightarrow \frac{y^2}{1} - \frac{x^2}{8} = 1 \Leftrightarrow 8y^2 - x^2 = 8$

b. Hiperbola dengan titik puncak $(\pm 3, 0)$ dan garis asimtot $y = \pm 2x$

$a = 3$

$y = \pm 2x$

$\pm \frac{b}{a} x = \pm 2x$

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

$a = 3$

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

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

$\frac{x^2}{9} - \frac{y^2}{36} = 1 \Leftrightarrow 36x^2 - 9y^2 = 324$