11/19

Sunday, November 19, 2017 7:27 PM

Chapter 10 Review

1) b) Find foci, vertices and the center of:

$$\frac{(x+3)^2}{36} + \frac{(y+1)^2}{9} = 1 \quad \text{(ellipse)}$$

$36 = a^2$, $9 = b^2$

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

center : $(-3, -1)$

$a^2 = 36$, $b^2 = 9$

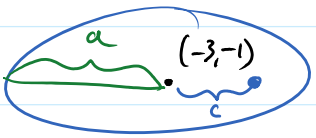
vertices: $(-3 \pm 6, -1)$ (a)

$= (-9, -1), (3, -1)$

$c^2 = 36 - 9 = 27$

$c = \sqrt{27} = \sqrt{9 \cdot 3} = 3\sqrt{3}$

foci: $(-3 \pm 3\sqrt{3}, -1)$ (c)



1) a) $3x^2 + 4y^2 - 36x + 32y + 160 = 0$

$3x^2 - 36x + 4y^2 + 32y = -160$

$3(x^2 - 12x + (-6)^2) + 4(y^2 + 8y + 4^2) = -160 + 3 \cdot (-6)^2 + 4 \cdot 4^2$

$\frac{-12}{2} = -6$ $\frac{8}{2} = 4$

$-160 + 108 + 64$

172

$$\frac{3(x-6)^2}{12} + \frac{4(y+4)^2}{12} = \frac{12}{12}$$

$$\frac{(x-6)^2}{4} + \frac{(y+4)^2}{3} = 1$$

$\frac{12}{3} = 4 = a^2$ $b^2 = \frac{12}{4}$

$\frac{12}{3} = \frac{4}{a^2}$ $\quad \frac{3}{b^2} = \frac{12}{4}$

center: $(6, -4)$

vertices: $(6 \pm 2, -4)$ $\quad a = 2$

$= \boxed{(8, -4), (4, -4)}$

foci: $(6 \pm 1, -4)$

$= \boxed{(7, -4), (5, -4)}$

$a^2 = 4, \quad b^2 = 3$

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

$c^2 = 4 - 3 = 1$

$c = 1$

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2) b)

$9y^2 - 16x^2 = 144$ $\quad = 12^2$

$\frac{144}{144}$

$\frac{y^2}{\frac{12^2}{9}} - \frac{x^2}{\frac{12^2}{16}} = 1$

$\frac{y^2}{\left(\frac{12}{3}\right)^2} - \frac{x^2}{\left(\frac{12}{4}\right)^2} = 1$

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

$4^2 = a^2$ $\quad 3^2 = b^2$

$\rightarrow a^2$ is under the positive term } for hyperbola

center: $(0, 0)$

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

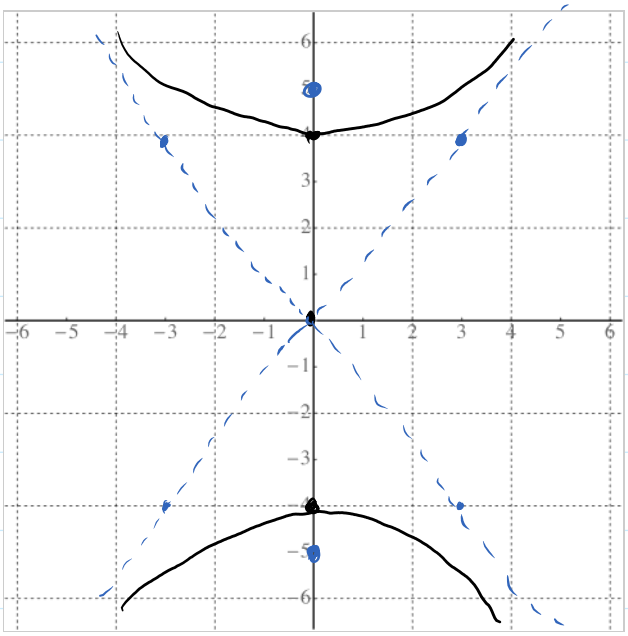
$c^2 = 16 + 9 = 25$

$c = 5$

$a = 4$

vertices: $(0, 0 \pm 4)$

$= \boxed{(0, 4), (0, -4)}$



$= (0,4), (0,-4)$

foci: $= (0, 0 \pm 5)$

$= (0,-5), (0,5)$

asym: $y = \pm \frac{4}{3}(x-0)$

$y = \pm \frac{4}{3}x$

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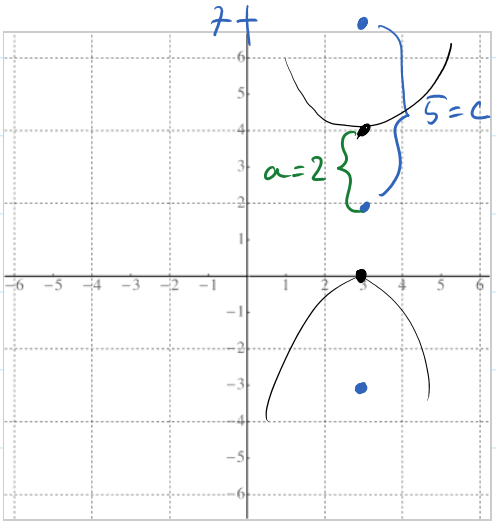
5) Find the hyp. with center $(3,2)$ vertex $(3,4)$ focus $(3,-3)$



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

$$\frac{(y-2)^2}{4} - \frac{(x-3)^2}{21} = 1$$

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

$5^2 = 2^2 + b^2$

$b^2 = 25 - 4 = 21$

$b = \sqrt{21}$

asym: $y - 2 = \pm \frac{2}{\sqrt{21}}(x-3)$

$y = 2 \pm \frac{2}{\sqrt{21}}(x-3)$

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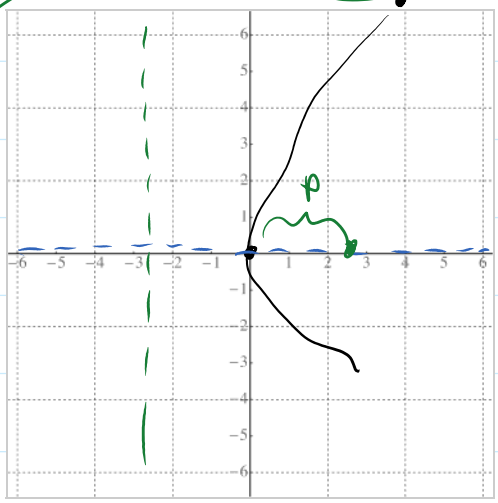
19) Find the parabola, vertex: $(0,0)$, x-axis as the axis of symmetry and passing through the pt. $(4,9)$

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

$y^2 = 4px$

pt. $(4, 9)$

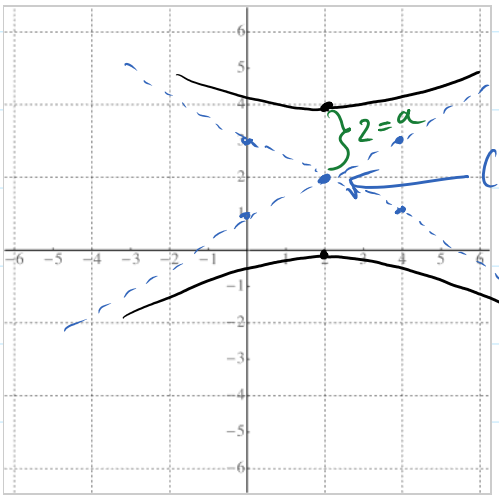


$9^2 = 4p \cdot 4$

$81 = 16p \rightarrow p = \frac{81}{16}$

$$y^2 = 4 \cdot \left(\frac{81}{16}\right) x$$

$$y^2 = \frac{81}{4} x$$



slope $= \frac{1}{2}$

slope $= -\frac{1}{2}$

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

slope $= \pm\frac{2}{b}$

$\frac{1}{2} = \frac{2}{b}$

$b = 2 \cdot 2$

$b = 4$

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

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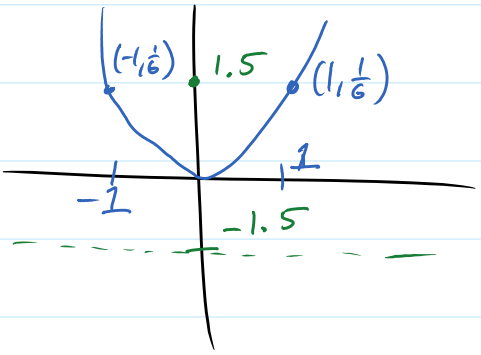
21) Graph the eq: $x^2 = 6y$

$x^2 = 4py$

$6 = 4p$

$p = \frac{6}{4} = \frac{3}{2}$



$x = 1$

$1 = 6y$

$y = 1/6$

Identify each conic section

- $-4x^2 = 8y^2 + 2x - 3y + 100 = 0$

  The same ⇒ ellipse

- $x^2 + 3x - 4y + 98 = 0$

  missing y^2 ⇒ parabola

- $x^2 - 3y^2 + x - y - 22 = 0$

  different signs ⇒ hyperbola

- $3x^2 + 3y^2 - x + y - 33 = 0$

  The same ⇒ circle