Precalculus: The Ellipse (9.1A ws)

Name Key Date _____ out of 20 2 points each

Find the **standard form** of the equation of each ellipse with the given conditions.

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

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

$100-36=64$

1) Foci: (-6,0), (6,0); vertices (-10,0), (10,0)

$a=\pm 10$

$a^2=100$

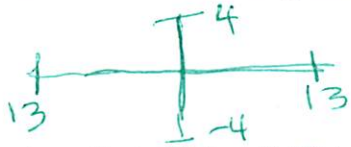
$\frac{x^2}{100}+\frac{y^2}{64}=1$

2) Foci: (0,-2), (0,2); vertices (0,-6) (0,6)

$\frac{x^2}{32}+\frac{y^2}{36}=1$

$\begin{array}{r}36\\-4\\\hline 32=b^2\end{array}$

3) major axis horizontal with length 26; length of minor axis = 8; center (0,0)

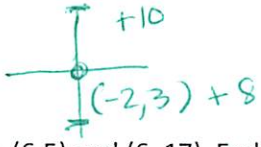


$\frac{x^2}{169}+\frac{y^2}{16}=1$

4) major axis vertical with length 20; length of minor axis = 16; center (-2, 3)

$a^2=100$

$b^2=64$



$\frac{(x+2)^2}{64}+\frac{(y-3)^2}{100}=1$

5) Endpoints of major axis: (6,5) and (6, 17) Endpoints of minor axis (4,11) and (8,11)

$2b=4$

$b=2$

$b^2=4$

12

$a^2=36$

$C=(6,11)$

$\frac{(x-6)^2}{4}+\frac{(y-11)^2}{36}=1$

6) Foci (0, -7) (0,7) x-intercepts: -7 and 7

$c^2=49$

$b^2=49$

Vertical

$\frac{x^2}{49}+\frac{y^2}{98}=1$

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

$a^2=98$

Complete the square in order to write each in standard form.

7) $x^2+4x+y^2+2y=10$ (circle)

$x^2+4x+4+y^2+2y+1=10+4+1$

$(x+2)^2+(y+1)^2=15$

$C=(-2,-1)$

$r=\sqrt{15}$

8) $4x^2+2y^2+16x-8y-40=0$

$4x^2+16x\_+2y^2-8y\_=40\_\_$

$4(x^2+4x+\underline{4})+2(y^2-4y+\underline{4})=40+\underline{16}+\underline{8}$

$\frac{4(x+2)^2}{64}+\frac{2(y-2)^2}{64}=\frac{64}{64}$

$\frac{(x+2)^2}{16}+\frac{(y-2)^2}{32}=1$

9) $x^2 + 4y^2 + 10x - 8y + 13 = 0$

$x^2+10x+25+4(y^2-2y+1)=-13+25+4$

$(x+5)^2+4(y-1)^2=16$

$\frac{(x+5)^2}{16}+\frac{(y-1)^2}{4}=1$

10) $9x^2 + 16y^2 - 18x + 64y - 71 = 0$

$9(x^2-2x+1)+16(y^2+4y\underline{+4})=71\underline{+9}\ \underline{+64}$

$\frac{9(x-1)^2}{144}+\frac{16(y+2)^2}{144}=\frac{144}{144}$

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