

## Worksheet #77

## Answers

1)  $c^2 = 45 - 15 = 30$ ,  $c = \sqrt{30}$ , eccentricity:  $\sqrt{30}/\sqrt{45} = \sqrt{(2/3)}$

2)  $c^2 = 49 - 1 = 48$ ,  $c = \sqrt{48} = 4\sqrt{3}$ , eccentricity =  $(4\sqrt{3})/7$

3)  $4x^2 - 16x + 9y^2 - 36y = -16$   
 $4(x^2 - 4x) + 9(y^2 - 4y) = -16$   
 $4(x^2 - 4x + 4) + 9(y^2 - 4y + 4) = -16 + 16 + 36$   
 $4(x - 2)^2 + 9(y - 2)^2 = 36$   
 $\frac{(x - 2)^2}{9} + \frac{(y - 2)^2}{4} = 1$        $c^2 = 9 - 4 = 5$ ,  $c = \sqrt{5}$ ,  
eccentricity =  $\sqrt{5}/3$

4) center: midpoint of foci:  $(h, k) = (\frac{1}{2}(-5 + -5), \frac{1}{2}(4 + -6)) = (-5, -1)$ ,  
vertical,  $c = 5$ , eccentricity =  $5/13$ ,  $a = 13$ ,  $25 = 169 - b^2$ ,  $b^2 = 144$ ,  
equation:  $\frac{(x + 5)^2}{144} + \frac{(y + 1)^2}{169} = 1$

5) center:  $(-8, 8)$ , vertex:  $(2, 8)$  tells us that major axis is horizontal and  
 $a = 10$ , eccentricity =  $\sqrt{21}/5$  or to match:  $(2\sqrt{21})/10$ ,  $c = \sqrt{84}$ ,  
 $84 = 100 - b^2$ ,  $b^2 = 16$ , equation:  $\frac{(x + 8)^2}{100} + \frac{(y - 8)^2}{16} = 1$

6) center: midpoint of vertices:  $(h, k) = (\frac{1}{2}(7 + 7), \frac{1}{2}(4 + -24)) = (7, -10)$ ,  
major axis is vertical,  $a = 14$ ,  $c = 7\sqrt{5}$ ,  $245 = 196 + b^2$ ,  $b^2 = 49$ ,  
equation:  $\frac{(y + 10)^2}{196} - \frac{(x - 7)^2}{49} = 1$

7) from foci center is:  $(0, 10)$ , transverse axis is horizontal,  $c = 6\sqrt{5}$ ,  
 $c^2 = 180$ , from asymptotes we know ratio of  $a:b$  is  $2:1$ ...  $180 = (2n)^2 + n^2$ ,  
 $180 = 5n^2$ ,  $n = 6$ ,  $a = 12$ ,  $b = 6$ , equation:  $\frac{x^2}{144} - \frac{(y - 10)^2}{36} = 1$

8) circumference =  $8\pi$ ,  $r = 4$ , equation:  $(x + 5)^2 + (y - 12)^2 = 16$

9) with center on x-axis  $k$  from  $(h, k) = 0$ ,  $h = \text{median/mean of } x = 7$   
and  $x = -13$ :  $\frac{1}{2}(7 + -13) = -3$ , center:  $(-3, 0)$ ,  $r = 10$ ,  
equation:  $(x + 3)^2 + y^2 = 100$

10) center:  $(0, 0)$ ,  $p = 3$ ,  $4p = 12$ , vertical, equation:  $12y = x^2$

11) center:  $(8, 9)$ , directrix:  $x = 10$ , axis is horizontal,  $p = -2$ ,  $4p = -8$ ,  
equation:  $-8(x - 8) = (y - 9)^2$