Homework #74 **Answers**

From Houghton-Mifflin Precalculus 3rd Edition

p710-711:

17) $x^2 + 5y^2 - 8x - 30y - 39 = 0$

$x^2 - 8x + 5y^2 - 30y = 39$

$(x^2 - 8x) + 5(y^2 - 6y) = 39$

$(x^2 - 8x + 16) + 5(y^2 - 6y + 9) = 39 + 16 + 45$

$(x - 4)^2 + 5(y - 3)^2 = 100$

$\frac{(x - 4)^2}{100} + \frac{(y - 3)^2}{20} = 1$

$a = 10$ $b = 2\sqrt{5}$. $c^2 = 100 - 20 = 80$, $c = 4\sqrt{5}$

center: (4, 3), horizontal, vertices: (14, 3), (-6, 3),

foci: $(4 + 4\sqrt{5}, 3)$, $(4 - 4\sqrt{5}, 3)$, eccentricity = $2\sqrt{5}/5$

18) $3x^2 + y^2 + 18x - 2y - 8 = 0$

$3x^2 + 18x + y^2 - 2y = 8$

$3(x^2 + 6x) + (y^2 - 2y) = 8$

$3(x^2 + 6x + 9) + (y^2 - 2y + 1) = 8 + 27 + 1$

$3(x + 3)^2 + (y - 1)^2 = 36$

$\frac{(x + 3)^2}{12} + \frac{(y - 1)^2}{36} = 1$

$a = 6$, $b = 2\sqrt{3}$, $c^2 = 36 - 12 = 24$, $c = 2\sqrt{6}$

center: (-3, 1), vertical, vertices: (-3, 7), (-3, -5),

foci: $(-3, 1 + 2\sqrt{6})$, $(-3, 1 - 2\sqrt{6})$, eccentricity: $\sqrt{6}/3$

30) center: (0, 0), vertices: (0, -8), (0, 8), foci: (0, -4), (0, 4)

$a = 8$, $c = 4$, $16 = 64 - b^2$, $b^2 = 48$, vertical; equation: $\frac{x^2}{48} + \frac{y^2}{64} = 1$

47) vertices: (-5, 0), (5, 0), $e = 3/5$, center: (0, 0),

$a = 5$, $c = 3$, $9 = 25 - b^2$, $b^2 = 16$, horizontal, equation: $\frac{x^2}{25} + \frac{y^2}{16} = 1$

48) vertices: (0, -8), (0, 8), $e = \frac{1}{2}$, center: (0, 0),

$a = 8$, $e = 4/8$, $c = 4$, $16 = 64 - b^2$, $b^2 = 48$, vertical, equation: $\frac{x^2}{48} + \frac{y^2}{64} = 1$