

$$1. \quad 9(x^2 - 6x + 9) - 4(y^2 + 10y + 25) = 55 \quad (+81) \quad (-100)$$

$$\frac{9(x-3)^2 - 4(y+5)^2}{36} = 36$$

$$\frac{(x-3)^2}{4} - \frac{(y+5)^2}{9} = 1$$

$$3. \quad 9x^2 - 54x + 4y^2 - 8y = -49$$

$$9(x^2 - 6x + 9) + 4(y^2 - 2y + 1) = -49 \quad (+81) \quad (+4)$$

$$\frac{9(x-3)^2 + 4(y-1)^2}{36} = 36$$

$$\frac{(x-3)^2}{4} + \frac{(y-1)^2}{9} = 1$$

$$5. \quad 9x^2 - 18x + 4y^2 + 16y = 11$$

$$9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 11 + 9 + 16$$

$$\frac{9(x-1)^2 + 4(y+2)^2}{36} = 36$$

$$\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$$

$$7. \quad -4(y^2 + 6y + 9) + 9(x^2 - 10x + 25) = -153 \quad (-36) \quad (+225)$$

$$\frac{-4(y+3)^2 + 9(x-5)^2}{36} = 36$$

$$-\frac{(y+3)^2}{9} + \frac{(x-5)^2}{4} = 1$$

$$\text{Actual: } \frac{(x-5)^2}{4} - \frac{(y+3)^2}{9} = 1$$

$$9. \quad 9(x^2 - 4x + 4) - (y^2 + 6y + 9) = -18 + 36 - 9$$

$$\frac{9(x-2)^2 - (y+3)^2}{9} = 9$$

$$(x-2)^2 - \frac{(y+3)^2}{9} = 1$$

$$11. \quad 4(x^2 - 6x + 9) = 40y + 4 + 36$$

$$\frac{4(x-3)^2}{4} = 40y + 40$$

$$(x-3)^2 = 10y + 10$$

or $(x-3)^2 = 10(y+1)$

$$13. \quad 18(x^2 - 8x + 16) + 12(y^2 - 4y + 4) = -120 + 288 + 48$$

$$\frac{18(x-4)^2 + 12(y-2)^2}{216} = 216$$

$$\frac{(x-4)^2}{12} + \frac{(y-2)^2}{18} = 1$$

$$15. \quad 9(y^2 + 2y + 1) - 4(x^2 - 2x + 1) = -41 + 9 - 4$$

$$\frac{9(y+1)^2 - 4(x-1)^2}{-36} = -36$$

$$-\frac{(y+1)^2}{4} + \frac{(x-1)^2}{9} = 1$$

$$\text{Actual: } \frac{(x-1)^2}{9} - \frac{(y+1)^2}{4} = 1$$

$$17. \quad 2(x^2 - 8x + 16) = -16y - 64 + 32$$

$$\frac{2(x-4)^2}{2} = -16y - 32$$

$$(x-4)^2 = -8y - 16$$

or $(x-4)^2 = -8(y+2)$

$$19. \quad x^2 - 3x + \frac{9}{4} = 10y - 31 + \frac{9}{4}$$

$$(x - \frac{3}{2})^2 = 10y - 28.75 \quad \text{or} \quad (x - \frac{3}{2})^2 = 10(y - 2.875)$$