

Honors pre-calculus

Circle Problem Set

① center: $(3, 5)$ radius: 11

② center: $(-5, 2)$ radius: 9

③ $(x+4)^2 + (y-3)^2 = 81$

④ $(x-1)^2 + (y+2)^2 = r^2$

$(x-1)^2 + (y+2)^2 = 20$

$(-3-1)^2 + (0+2)^2 = r^2$

$16 + 4 = r^2 \quad 20 = r^2$

⑤ center: $(\frac{2-4}{2}, \frac{-4+5}{2}) \Rightarrow (-1, \frac{1}{2})$

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

$(2+1)^2 + (-4-\frac{1}{2})^2 = r^2$

$d = \sqrt{(2+1)^2 + (-4-\frac{1}{2})^2}$

$9 + \frac{81}{4} = r^2$

$(x+1)^2 + (y-\frac{1}{2})^2 = \frac{117}{4}$

$d = \sqrt{3^2 + (-\frac{9}{2})^2} = \sqrt{\frac{117}{4}}$

$\frac{117}{4} = r^2$

⑥ $9x^2 + 36x + 9y^2 - 18y - 10 = 89$

$x^2 + 4x + y^2 - 2y - \frac{10}{9} = \frac{89}{9}$

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

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

center: $(-2, 1)$ radius: 4

⑦ $4x^2 + 24x + 4y^2 + 32y + 13 = 157$

$x^2 + 6x + y^2 + 8y + \frac{13}{4} = \frac{157}{4}$

$(x^2 + 6x + 9) + (y^2 + 8y + 16) = 36 + 9 + 16$

$(x+3)^2 + (y+4)^2 = 61$

center: $(-3, -4)$ radius: $\sqrt{61}$

⑧ $5x^2 - 80x + 5y^2 + 20y - 34 = 106$

$x^2 - 16x + y^2 + 4y - \frac{34}{5} = \frac{106}{5}$

$(x^2 - 16x + 64) + (y^2 + 4y + 4) = 28 + 64 + 4$

$(x-8)^2 + (y+2)^2 = 96$

center: $(8, -2)$ radius: $\sqrt{96}$

$$\textcircled{9} \quad 2x^2 + 10x + 2y^2 + 8y + 4 = 25$$

$$x^2 + 5x + y^2 + 4y + 2 = \frac{25}{2}$$

$$(x^2 + 5x + \frac{25}{4}) + (y^2 + 4y + 4) = \frac{21}{2} + \frac{25}{4} + 4$$

$$(x + \frac{5}{2})^2 + (y + 2)^2 = \frac{83}{4}$$

$$\text{Center: } (-\frac{5}{2}, -2) \quad \text{radius: } \sqrt{\frac{83}{4}}$$