§ 72. (Page 75.)

1. $x^2+y^2=5$.
2. $(x-6)^2+(y-2)^2=9$.
3. $(x+5)^2+(y+1)^2=26$.
4. $a^2+b^2=c^2$.
5. (*a*) (3, 1), 5; (*b*) $(-\frac{7}{2}, -\frac{5}{2})$, $\frac{\sqrt{330}}{8}$; (*c*) (7, 0), 7; (*d*) $(0, -b)$, $\sqrt{\quad+c^2}$.
8. $x^2+y^2-x-7y=0$.
9. $x^2+y^2-3x=19$.
11. (*a*) $f=0$; (*b*) $g=0$.
12. $x^2+y^2-4x+4y=2$.
13. $x^2+y^2-4x+6y=16$.
15. $47(x^2+y^2)-181x+341y-1996=0$.
16. $\sqrt{10}$.
17. $14\sqrt{2}$.
21. $2x-5y=15$.
22. 123.
23. $14(x+y)=17$.
24. $c=c'$.
25. $(h+k)(x^2+y^2)-(h^2+k^2)(x+y)=0$.

§ 81. (Page 85.)

1. (*a*) $3x+5y=34$; (*b*) $3x-4y+11=0$; (*c*) $12x+5y=96$; (*d*) $gx+fy=0$.
2. $y=x\pm\sqrt{70}$.
3. (*a*) $\mathbf{A}x+\mathbf{B}y=\pm r\sqrt{\mathbf{A}^2+\mathbf{B}^2}$; (*b*) $\mathbf{B}x-\mathbf{A}y=\pm r\sqrt{\mathbf{A}^2+\mathbf{B}^2}$.
4. (2, 4).
5. (6, 1).
6. (*a*) $\mathbf{C}^2=r^2(\mathbf{A}^2+\mathbf{B}^2)$; (*b*) $(\mathbf{A}g+\mathbf{B}f-\mathbf{C})^2=(\mathbf{A}^2+\mathbf{B}^2)(g^2+f^2-c)$.
7. $a^2b^2=r^2(a^2+b^2)$.
8. $c=g^2$.
9. $x^2+y^2-2(7\pm2\sqrt{5})(x+y)+69\pm28\sqrt{5}=0$.
10. $x-\sqrt{3}y+3\sqrt{3}-1=0$, and $x-\sqrt{3}y-5\sqrt{3}-1=0$.
11. $4\sqrt{\frac{3}{29}}$.
13. $(x-g)\cos\alpha+(y-f)\sin\alpha=r$.
14. $(\frac{13}{5}, -\frac{19}{5})$; $4x+3y+1=0$.
16. $x-3y=3$; $\left(\frac{21\pm3\sqrt{119}}{10}, \frac{-3\pm\sqrt{119}}{10}\right)$.
17. $(\mathbf{A}^2+\mathbf{B}^2)(x^2+y^2)=\mathbf{C}^2$.
18. $34(x^2+y^2)-476x-136y+1753=0$.
19. $(\frac{1}{5}, \frac{7}{5})$; (17, −13).
transverse, $12(5y-7)=(-21\pm5\sqrt{15})(5x-1)$;
direct, $24(y+13)=(-21\pm\sqrt{21})(x-17)$.
20. direct, $y=9$ and $3x+4y+3=0$;
transverse are imaginary.
(2, 9) and (−1, 0) on $x^2+y^2-4x-8y-5=0$;
(5, 9) and $(\frac{7}{5}, -\frac{9}{5})$ on $x^2+y^2-10x-6y-2=0$.
21. $x+3y+g+3f\pm\sqrt{10(g^2+f^2-c)}=0$.
22. $x-\sqrt{3}y\pm10=0$.