Cartesian Geometry

Practice Questions

Find the distance between the following pairs of points.

1. (4, 5) and (2, 1)
2. (−2, 4) and (3, 3)
3. (4, −3) and (0, −1)
4. (3, 5) and (1, 5)
5. (2, 4) and (−5, −2)
6. (−4, 2) and (−2, 7)
7. (2, −3) and (−2, 1)
8. (−1, −6) and (−4, −8)

In each case, find the equation of the straight line satisfying the given conditions.

9. Gradient 2, y-intercept 5.
10. Gradient $\frac{1}{2}$, y-intercept −3.
11. Gradient −3, y-intercept $\frac{1}{2}$.
12. Passing through (1, 4), gradient 3.
13. Passing through (2, 1), gradient 2.
14. Passing through (3, −1), gradient −2.
15. Passing through (−5, 1), gradient $\frac{1}{2}$.
16. Passing through points (4, 2) and (3, 1).
17. Passing through points (2, 3) and (4, 1).
18. Passing through points (5, −1) and (2, −2).
19. Parallel to $y = 2x + 3$ with y-intercept 1.
20. Perpendicular to $y = 2x + 3$ with y-intercept −1.
21. Parallel to $y = −3 + \frac{1}{2}x$ and passing through (1, 3).
22. Perpendicular to $y = −3 + \frac{1}{2}x$ and passing through (−2, 1).
23. Parallel to $x − 3y = 4$ and passing through (−1, −1).
24. Perpendicular to $x − 3y = 4$ with y-intercept 3.

For each of the following, find the distance between the point and the line.

25. (2, 1), $x + y − 4 = 0$
26. (−1, −3), $2x − y + 7 = 0$
27. (3, −2), $y = \frac{3}{2}x − \frac{1}{2}$
28. (−5, 2), $y = 4x + 3$
29. ($\frac{1}{2}$, $\frac{2}{3}$), $4x − 6y = 5$
30. (−1, $\frac{1}{2}$), $y = \frac{3}{4}x + 1$

Identify the curves represented by the following equations, identifying any descriptive features (eg. the centre of circle, vertex of parabola).

31. $x^2 + y^2 = 9$
32. $y = x^2 + 4$
33. $3x + y = 8$
34. $x^2 + y^2 = 4x$
35. $x^2 + y^2 + 6x − 8y = −24$
36. $y = 2x^2 + 4x − 3$
37. $x = 3$

Sketch the curves represented by the following equations.

38. $y = 3x − 4$
39. $(x − 4)^2 + (y + 2)^2 = 9$
40. $y = 2x^2 − 8x + 8$

If possible, find the intersection between the following pairs of curves.

41. $y = x + 2$ and $y = 2x − 3$
42. $y = −3x + 4$ and $y = 2x − 4$
43. $3x + 2y = 7$ and $2x − 4y = 2$
44. $y = \frac{1}{2}x − 1$ and $2y + x = 3$
45. $y = 2x + 7$ and $y − 2x + 4 = 0$
46. $y = 2x + 7$ and $y = −\frac{1}{2}x − 2$
47. $y = (x − 1)^2$ and $y = x − 1$
48. $y = 4x^2 + 5$ and $y = −2x + 3$
49. $(x − 2)^2 + y^2 = 9$ and $y = x − 1$
50. $y = x^2 − 4$ and $x^2 + y^2 = 16$