# Determinants

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**Summary**

A selection of questions for the study guide on 2D conic sections.

*Before attempting these questions, it is recommended that you read Guide: Determinants.*

## Q1

Identify the type of conic.

1.1. $4x^2 + 9y^2 - 36 = 0$

1.2. $x^2 + y^2 - 4x - 6y + 9 = 0$

1.3. $9x^2 - 16y^2 - 144 = 0$

1.4. $x^2 - 4y + 8 = 0$

1.5. $2x^2 + 3xy + 2y^2 - 10 = 0$

1.6. $x^2 - y^2 + 6x - 8y + 9 = 0$

1.7. $3x^2 + 2y^2 - 6x + 4 = 5y + x^2$

1.8. $\frac{1}{2}x^2 - y + 3 = \frac{3}{4}y^2 + 2x$

1.9. $5x^2 + 4xy + y^2 + 2x - 3y = 7 - x$

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

## Q2

Identify the radius, centre, foci, vertex, and directrix (if applicable)

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

2.2. $x^2 + y^2 - 4x + 6y - 12 = 0$

2.3. $x^2 + y^2 + 8x - 10y + 9 = 0$

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

2.5. $\frac{(x+1)^2}{16} + \frac{(y-4)^2}{9} = 1$

2.6. $9x^2 + 4y^2 - 18x + 16y - 11 = 0$

2.7. $16x^2 + 9y^2 - 32x + 54y - 89 = 0$

2.8. $x^2 + 4y^2 - 6x + 8y + 9 = 0$

2.9. $4x^2 + y^2 - 8x - 6y + 9 = 0$

2.10. $9x^2 + 16y^2 - 36x + 64y - 71 = 0$

2.11. $y = (x - 2)^2 + 3$

2.12. $(x + 1)^2 = 8(y - 2)$

2.13. $(y + 3)^2 = -4(x - 2)$

2.14. $x^2 - 6x - 4y + 5 = 0$

2.15. $y^2 + 8y + 4x - 12 = 0$

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

2.17. $\frac{(y-3)^2}{16} - \frac{(x+1)^2}{9} = 1$

2.18. $9x^2 - 16y^2 - 18x + 64y - 71 = 0$

2.19. $x^2 - y^2 - 4x - 6y + 9 = 0$

2.20. $4y^2 - 9x^2 - 16y - 54x - 109 = 0$

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After attempting the questions above, please click this link to find the answers.

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## Version history and licensing

v1.0: initial version created 11/25 by Abigail Carpenter as part of a University of St Andrews VIP project.