Year 11 Calculus Scholarship Workbook

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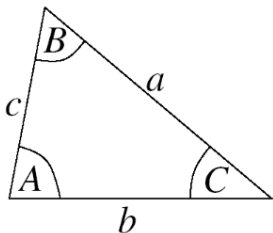
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Contents

1 Non right-angle trigonometry

Given a triangle with no right angles, with sides and angles labelled as below, there are three useful rules that we can use:

Sine Rule

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

Cosine Rule

$c^2 = a^2 + b^2 - 2ab\cos C$

Area of triangle

$A = \frac{1}{2}ab\sin C$

Questions

(Answers - page 12)

Questions go here

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

2 Coordinate geometry

Equations of lines

Perpendicular lines

Midpoints

Perpendicular bisectors

Questions

(Answers - page 13)

Questions go here

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

3 Sequences and series

Arithmetic Sequences

Geometric sequences

Questions

(Answers - page 14)

Questions go here

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

4 Networks

Euler paths

Hamilton paths

Questions

(Answers - page 15)

Questions go here

1. $(x + y)^3$
2. $(2x + y)^4$
3. $(2x - 3)^5$
4. $(3x + 2y)^4$
5. $\left(2x + \frac{1}{x^2}\right)^4$

Solutions

Answers - Non right-angle trignometry (page 4)

1. $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$

Answers - Coordinate geometry (page 6)

1. $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$

Answers - Sequences and series (page 8)

1. $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$

Answers - Networks (page 10)

1. $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$