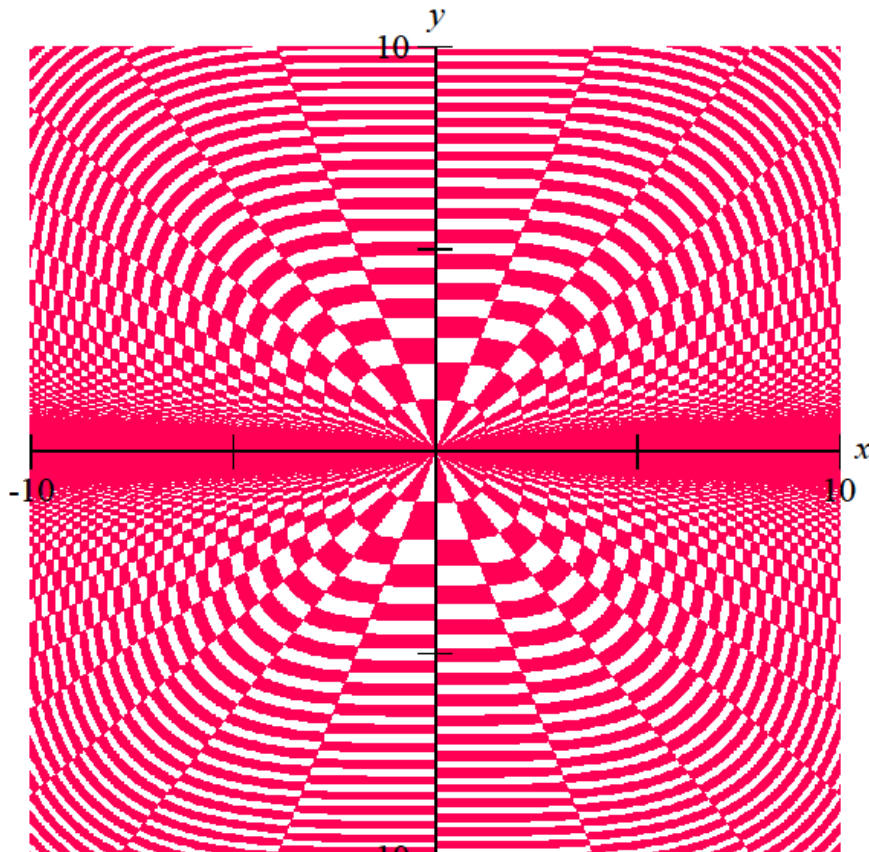




WELLINGTON COLLEGE  
MATHEMATICS DEPARTMENT

## Sixth Form Preparation Booklet Answers



$$\cos\left(\sqrt{x^4 + y^4}\right) \sin\left(\frac{8x}{y}\right) < 0$$

## **Introduction**

These answers are supposed to help you see where you went wrong in the preparation work you have completed. Remember that if you have made mistakes this is not the end of the story. You need to work out where you have gone wrong, and revisit the appropriate questions. Only if you do this will you gain the degree of competence you need to be successful in sixth form.

Remember that you can ask your teacher for help at the start of the year if you need to. You will be expected to be able to complete the tasks in the booklet under exam conditions before long.

Good luck

Mr Sproat

## Contents

Introduction .....	2
Contents .....	3
Pre-requisite knowledge for sixth form study .....	4
Number .....	6
Fractions .....	6
The Laws of Indices.....	7
Surds .....	7
Solving linear equations .....	8
Solving quadratic equations .....	8
Simple trigonometric equations .....	9
Linear simultaneous equations .....	9
Non-linear simultaneous equations.....	9
Solving linear inequalities .....	10
Polynomials.....	10
Algebraic Fractions.....	11
Point geometry.....	11
Straight-line graphs .....	12
Sketching quadratic and factorised cubic functions .....	12
Trigonometry.....	13
Lengths, areas and volumes.....	13

## Pre-requisite knowledge for sixth form study

### 1. Number

- 1.1 Types of number
  - 1.1 (i) Identification of Natural Numbers, Integers, Rational Numbers, Irrational Numbers.
  - 1.1 (ii) Conversion of fractions to decimals without a calculator
  - 1.1 (iii) Conversion of decimals to fractions without a calculator
- 1.2 Fractions
  - 1.2 (i) Conversion of top-heavy fractions to mixed-numbers without a calculator
  - 1.2 (ii) Conversion of mixed numbers to top-heavy fractions without a calculator
  - 1.2 (iii) Addition of fractions without a calculator
  - 1.2 (iv) Subtraction of fractions without a calculator
  - 1.2 (v) Multiplication of fractions without a calculator
  - 1.2 (vi) Division of fractions without a calculator

### 2. Algebra

- 2.1 Key terms
  - 2.1 (i) Variables and constants
  - 2.1 (ii) Expressions
  - 2.1 (iii) Equations
  - 2.1 (iv) Inequalities
- 2.2 Laws of indices
  - 2.2 (i) Sum and product formulae.
  - 2.2 (ii) Negative indices without a calculator.
  - 2.2 (iii) Fractional indices without a calculator.
- 2.3 Use and manipulation of surds.
  - 2.3 (i) Converting surds to index form.
  - 2.3 (ii) Rationalising the denominator where it is of the form  $\sqrt{n}$ .
- 2.4 Algebraic manipulation of polynomials
  - 2.4 (i) Expanding brackets
  - 2.4 (ii) Collecting like terms
  - 2.4 (iii) Factorisation
  - 2.4 (iv) The difference of two squares
- 2.5 The solution of linear equations.
- 2.6 The solution of quadratic equations
  - 2.6 (i) by factorising;
  - 2.6 (ii) by using the quadratic formula.
- 2.7 The solution of simple trigonometric equations.
- 2.8 Linear simultaneous equations
  - 2.8 (i) Analytical solution by substitution.
  - 2.8 (ii) Analytical solution by elimination.
- 2.9 Non-linear simultaneous equations
  - 2.9 (i) Analytical solution by substitution.

**2.10 Solution of linear inequalities**

- 2.10 (i) Solving inequalities by rearranging.
- 2.10 (ii) Synthesising the solution of two or more linear inequalities.

**2.11 Algebraic fractions**

- 2.11 (i) Simplifying expressions
- 2.11 (ii) Solving equations involving algebraic fractions

**3. Coordinate geometry in the (x, y) plane****3.1 Point geometry**

- 3.1 (i) Finding the midpoint of two given points.
- 3.1 (ii) Finding the distance between two given points.
- 3.1 (iii) Finding the gradient of a line segment.

**3.2 Straight-line graphs.**

- 3.2 (i) Sketching equations of the form  $y = mx + c$ .
- 3.2 (ii) Find the equation of a line given a point and the gradient.
- 3.2 (iii) Perpendicular gradients have product  $-1$ .

**3.3 Sketching quadratic and factorised cubic functions.**

- 3.3 (i) Use of the word root to describe intersection with the x-axis and y-intercept to describe intersection with the y-axis.
- 3.3 (ii) Knowledge that the minimum point on a quadratic lies half-way between the roots.

**4. Geometry****4.1 Trigonometry**

- 4.1 (i) Right-angled triangle trigonometry to find sides and angles
- 4.1 (ii) The sine rule, including the ambiguous case
- 4.1 (iii) The cosine rule
- 4.1 (iv) The sine formula for the area of a triangle

**4.2 Lengths, areas and volumes**

- 4.2 (i) Formulating expressions for lengths, areas and volumes of compound shapes.
- 4.2 (ii) Solving equations based on these.

## Number

1. Task: For each of the following numbers, decide whether the given number is Rational or Irrational.
- |              |                |                |                |
|--------------|----------------|----------------|----------------|
| (a) Rational | (b) Irrational | (c) Irrational | (d) Rational   |
| (e) Rational | (f) Irrational | (g) Rational   | (h) Irrational |
2. Task: Write each of the following fractions as decimals without using a calculator.
- |              |                           |                       |                        |
|--------------|---------------------------|-----------------------|------------------------|
| (a) 0.75     | (b) $0.\overline{27}$     | (c) 0.5               | (d) $0.\overline{3}$   |
| (e) 0.222... | (f) $0.\overline{428571}$ | (g) $0.\overline{93}$ | (h) $0.\overline{135}$ |
| (i) 0.125    | (j) $1.\overline{4}$      | (k) 0.6               | (l) 0.1875             |
| (m) 1.2      | (n) 3.3                   | (o) $0.5\overline{3}$ | (p) $1.\overline{3}$   |
3. Task: Write each of the following decimals as fractions in their simplest form without using a calculator.
- |                     |                       |                       |                       |
|---------------------|-----------------------|-----------------------|-----------------------|
| (a) $\frac{3}{10}$  | (b) $\frac{57}{125}$  | (c) $\frac{7}{33}$    | (d) $\frac{7}{5}$     |
| (e) $\frac{1}{3}$   | (f) $\frac{104}{999}$ | (g) $\frac{5}{9}$     | (h) $\frac{1}{8}$     |
| (i) $\frac{13}{80}$ | (j) $\frac{10}{99}$   | (k) $\frac{121}{999}$ | (l) $\frac{13}{4000}$ |

## Fractions

4. Task: Convert the following mixed numbers to top-heavy fractions without using a calculator.
- |                     |                    |                      |
|---------------------|--------------------|----------------------|
| (a) $\frac{17}{5}$  | (b) $\frac{29}{4}$ | (c) $\frac{25}{4}$   |
| (d) $-\frac{17}{7}$ | (e) $\frac{53}{6}$ | (f) $\frac{161}{24}$ |
5. Task: Convert the following top-heavy fractions to mixed numbers without using a calculator.
- |                     |                       |                       |
|---------------------|-----------------------|-----------------------|
| (a) $2\frac{1}{5}$  | (b) $14\frac{14}{15}$ | (c) $5\frac{17}{23}$  |
| (d) $15\frac{2}{3}$ | (e) $5\frac{9}{11}$   | (f) $9\frac{84}{107}$ |
6. Task: Evaluate the following without using a calculator, giving your answer as top-heavy fractions in their lowest terms.
- |                     |                      |                      |
|---------------------|----------------------|----------------------|
| (a) 3               | (b) $\frac{15}{8}$   | (c) $\frac{23}{210}$ |
| (d) $\frac{35}{12}$ | (e) $\frac{97}{120}$ | (f) $\frac{23}{12}$  |
7. Task: Evaluate the following without using a calculator, giving your answer as top-heavy fractions in their lowest terms.
- |                     |                      |                      |
|---------------------|----------------------|----------------------|
| (a) $\frac{36}{25}$ | (b) $\frac{2}{3}$    | (c) $\frac{11}{105}$ |
| (d) $\frac{9}{2}$   | (e) $\frac{65}{192}$ | (f) $\frac{9}{16}$   |

## The Laws of Indices

8. Task: Write the following in the form  $2^n$ .
- |              |              |               |
|--------------|--------------|---------------|
| (a) $2^6$    | (b) $2^{-4}$ | (c) $2^0 = 1$ |
| (d) $2^{-6}$ | (e) $2^9$    | (f) $2^{-5}$  |
| (g) $2^3$    | (h) $2^{-4}$ |               |
9. Task: Evaluate without using a calculator
- |          |                   |         |
|----------|-------------------|---------|
| (a) 9    | (b) 8             | (c) 0.1 |
| (d) 0.25 | (e) $\frac{1}{9}$ | (f) 4   |
10. Task: Evaluate without using a calculator
- |                    |                   |         |
|--------------------|-------------------|---------|
| (a) 4              | (b) 8             | (c) 100 |
| (d) 125            | (e) $\frac{1}{9}$ | (f) 64  |
| (g) $\frac{1}{27}$ | (h) 16            | (i) 32  |
11. Task: Find the prime factorisations of the following.
- $2^5$
  - $2^3 \times 3^3$
  - $3^6$
  - $3^4$
  - $2^6$
12. Task: Using your answers to question 11, evaluate the following without using a calculator,
- |         |          |         |         |
|---------|----------|---------|---------|
| (a) 4   | (b) 16   | (c) 27  | (d) 243 |
| (e) 36  | (f) 1296 | (g) 16  | (h) 128 |
| (i) 512 | (j) 9    | (k) 243 | (l) 27  |

## Surds

13. Task: Simplify the following without using a calculator.
- $5 + 2\sqrt{5}$
  - $-2 + \sqrt{2}$
  - $\sqrt{3} + \sqrt{5}$
  - $4\sqrt{5} - \sqrt{3}$
  - $1 - \sqrt{2} + 6\sqrt{3}$
14. Task: Simplify the following without using a calculator.
- |                 |                                      |
|-----------------|--------------------------------------|
| (a) $2\sqrt{3}$ | (b) $\sqrt{2}\sqrt{3}$ or $\sqrt{6}$ |
| (c) $3\sqrt{3}$ | (d) 12                               |
| (e) $4\sqrt{5}$ | (f) 5                                |
15. Task: Expand and simplify without using a calculator.
- |  |                      |
|--|----------------------|
| (a) $2 + 2\sqrt{2}$                        | (b) $-2 - 4\sqrt{7}$ |
| (c) $\sqrt{10}$                            | (d) 7                |
| (e) $\sqrt{10} + \sqrt{15} - \sqrt{6} - 3$ | (f) $3 - \sqrt{3}$   |

16. Task: Write the following as a power of 2.

(a)  $2^{3.5}$

(b)  $2^{\frac{7}{3}}$

(c) 4

(d)  $2^{3.5}$

(e)  $2^{-\frac{5}{3}}$

(f)  $2^{\frac{5}{2}}$

## Solving linear equations

17. Task: Solve without using a calculator, leaving answers as top-heavy fractions where necessary.

(a)  $x = \frac{8}{3}$

(b)  $x = \frac{52}{11}$

(c)  $x = \frac{37}{15}$

(d)  $x = \frac{41}{7}$

(e)  $x = 26$

(f)  $x = 54$

(g)  $x = -\frac{6}{7}$

(h)  $x = \frac{119}{101}$

(i)  $x = -\frac{238}{25}$

## Solving quadratic equations

18. Task: Solve the following equations.

(a)  $x = -3, -4$

(b)  $x = -9, 3$

(c)  $x = -11, 2$

(d)  $x = 2, 5$

(e)  $x = -7, -\frac{1}{2}$

(f)  $x = -\frac{3}{2}, 6$

(g)  $x = \frac{8}{3}, 1$

(h)  $x = -\frac{1}{3}, 4$

(i)  $x = -\frac{3}{4}, 2$

19. Task: Solve the following equations using the quadratic equation formula, leaving your answers as surds in their simplest form where appropriate. Write out the formula in full each time.

(a)  $A = 1, \frac{5}{3}$

(b)  $\beta = \frac{1}{4}(-3 \pm \sqrt{41})$

(c)  $C = \frac{1}{5}(-3 \pm \sqrt{15})$

(d)  $d = \frac{1}{3}, 1$

(e)  $e = \frac{1}{5}(1 \pm \sqrt{31})$

(f)  $f = \frac{1}{2}(-3 \pm \sqrt{19})$

(g)  $g = \frac{1}{4}(-7 \pm \sqrt{105})$

(h)  $h = \frac{1}{2}(3 \pm \sqrt{17})$

20. Task: Solve these equations.



(a)  $x = -3, 2$

(b)  $x = -2, 3$

(c)  $x = -5, 2$

(d)  $x = \pm\sqrt{\frac{3}{2}}$

## Simple trigonometric equations

21. Task: Solve the following equations. Give your answers correct to one decimal place.

(a)  $x = 36.9$

(b)  $x = 107.5$

(c)  $x = -63.4$

(d)  $x = -26.7$

(e)  $x = 89.0$

22. Solve the following equations, giving your answers correct to the nearest degree.

(a)  $x = 81$

(b)  $x = 78$

(c) No solutions.

23. Solve the following equations, giving your answer correct to three decimal places.

(a)  $x = 64.963$

(b)  $x = 5.5$

(c)  $x = 51.102$

## Linear simultaneous equations

24. Task Solve the following pairs of simultaneous equations by substitution

(a)  $x = 2, y = 4$

(b)  $x = 2, y = 3$

(c)  $a = 5, b = 3$

(d)  $p = 3, q = -1$

(e)  $k = -2, j = 3$

(f)  $x = 5, y = -2$

25. Task: Solve the following pairs of simultaneous equations by elimination.

(a)  $x = 1, y = 2$

(b)  $x = 2, y = \frac{7}{2}$

(c)  $x = 1, y = 1$

(d)  $a = 4, b = 3$

(e)  $p = 1, q = 3$

(f)  $x = 2, y = 4$

(g)  $s = \frac{8}{51}, t = -\frac{30}{17}$

(h)  $u = \frac{75}{14}, v = \frac{2}{7}$

(i)  $x = 5, y = 0.2$

## Non-linear simultaneous equations

Task: Find the coordinates of all the points of intersection.

26.  $(4, 8)$  &  $(9, 13)$

27.  $(-5, 3)$  &  $(4, 12)$

28.  $(-5, -3)$  &  $(5, 7)$

29.  $(3 - \sqrt{2}, 3 + \sqrt{2})$  &  $(3 + \sqrt{2}, 3 - \sqrt{2})$

30.  $(\frac{2}{3}, \frac{7}{3})$  &  $(-1, -1)$

31.  $(2, 6)$  &  $(-2, -6)$

## Solving linear inequalities

32. Task: Solve

(a)  $x > -\frac{2}{9}$

(b)  $x < -\frac{21}{4}$

(c)  $x > \frac{20}{3}$

(d)  $x > \frac{16}{3}$

(e)  $x > 3$

(f)  $x > \frac{5}{2}$

(g)  $x > -1$

33. Task: Show that if  $2x - 5 < 9$  and  $3 + 2x > 9$  then  $3 < x < 7$ .

First show that the left inequality requires  $x < 7$ . Then show that the right inequality requires  $x > 3$ . If both of these must be true then  $3 < x < 7$ .

34. Task: Solve simultaneously

(a)  $-\frac{1}{3} < x < \frac{5}{2}$

(b)  $-\frac{7}{3} < x < 3$

(c)  $-\frac{1}{3} < x < 3$

(d)  $-\frac{1}{3} < x$

## Polynomials

35. Task: Multiply out the following quadratic expressions.

(a)  $a^2 + 5a + 6$

(b)  $b^2 - 7b + 12$

(c)  $c^2 - 3c - 10$

(d)  $d^2 - 4d$

(e)  $e^2 - 9$

36. Task: Multiply out these expressions by first multiplying together one pair of brackets.

(a)  $x^3 - 6x^2 - x + 30$

(b)  $x^3 - x^2 - 4x + 4$

(c)  $x^3 - 13x^2 + 56x - 80$

(d)  $x^3 + 7x^2 + 14x + 8$

37. Task: Factorise these quadratic expressions:

(a)  $(b - 5)(b + 3)$

(b)  $(r - 7)(r + 2)$

(c)  $(y - 5)(y - 3)$

(d)  $(k - 7)(k + 9)$

(e)  $t(t - 3)$

(f)  $(w - 4)(w + 4)$

(g)  $(a + 10)(a - 3)$

(h)  $(n + 14)(n - 1)$

- (i)  $r(r - 5)$   
 (j)  $(p - 5)(p - 1)$   
 (k)  $(t - 6)(t + 6)$

38. Task: Factorise these expressions.

- (a)  $5r(r - 3)$   
 (b)  $(2z - 3)(2z + 3)$   
 (c)  $x(x - 1)(x + 3)$   
 (d)  $(x^2 - 4)(x^2 - 9)$  is a good place to start.  $(x - 2)(x + 2)(x - 3)(x + 3)$  is the final answer.

## Algebraic Fractions

39. Task: Write as a single fraction

- (a)  $\frac{7}{x}$  (b)  $\frac{7x}{12}$  (c)  $\frac{x^2 + 12}{3x}$   
 (d)  $\frac{3 + 4x}{x^2}$  (e)  $\frac{7x + 3}{x(x + 1)}$  (f)  $\frac{7x - 1}{(x + 1)(x - 1)}$

40. Simplify

- (a)  $\frac{1}{x + 1}$  (b)  $\frac{2}{x + 2}$  (c)  $\frac{3}{x + 3}$   
 (d)  $\frac{-2}{x + 2}$  (e) Does not simplify further (f)  $\frac{x(x + 1)}{4(x - 2)}$

41. Simplify

- (a)  $\frac{x^2 + 8x + 12}{x^2 - 4} \times \frac{3x^2 - 18x}{x^2 - 36}$  (b)  $\frac{x^2 - 6x + 9}{x^2 - x - 3} \div \frac{x^2 - 9}{2x + 4}$

42. Solve for x.

- (a)  $x = -3, 2$  (b)  $x = -2, 3$   
 (c)  $x = -5, 2$  (d)  $\frac{x}{2x + 3} + 1 = x$   
 (e)  $x = -3, 2$

## Point geometry

43. Task: For each pair of points, find the gradient of the line segment they describe, the length of the line segment and the midpoint of the line segment.

- (a) Gradient  $-2$ , length  $5\sqrt{5}$ , midpoint  $(6.5, 3)$ .  
 (b) Gradient  $\frac{1}{2}$ , length  $4\sqrt{5}$ , midpoint  $(5, 3)$ .  
 (c) Gradient  $2$ , length  $7\sqrt{5}$ , midpoint  $(-0.5, -1)$ .  
 (d) Gradient  $-\frac{4}{21}$ , length  $16\sqrt{457}$ , midpoint  $(-63, 5)$ .

## Straight-line graphs

44. (a)  $-4$   
 (b)  $y = -4x + 18$

45.  $y = \frac{3}{2}x + 14$

46.  $y = 17x - 10$

47.  $y = -x + 5$

48.  $y = 7x - 27$

49. (a)  $(2.5, -0.5)$

(b)  $\sqrt{2}$

(c)  $y = x - 3$

50. (a)  $y = -\frac{1}{2}x + \frac{9}{2}$

(b)  $y = 2x - 5$

51. (a)  $y = -\frac{1}{4}x - 2$

(b)  $y = 4x - 19$

(c)  $(4, -3)$

(d)  $|AB| = \sqrt{280} = 2\sqrt{70}$ ,  $|CD| = \sqrt{68} = 2\sqrt{17}$

$$\text{Area ABC} = \frac{1}{2} 2\sqrt{70} \times 2\sqrt{17} = 2\sqrt{17}\sqrt{70} = 2\sqrt{1190}$$

## Sketching quadratic and factorised cubic functions

52. Task: Sketch the following quadratic equations, marking points of intersection with the axes and the minimum or maximum point of the curve.

(a) Parabola crossing x-axis at  $(-1, 0)$ ,  $(-3, 0)$  and y-axis at  $(0, 3)$ . Minimum point at  $(-2, -1)$ .

(b) Parabola crossing x-axis at  $(-\frac{3}{2}, 0)$ ,  $(4, 0)$  and y-axis at  $(0, -12)$ . Minimum point at  $(\frac{5}{4}, -\frac{121}{8})$ .

(c) Parabola crossing x-axis at  $(-7, 0)$ ,  $(1, 0)$  and y-axis at  $(0, -7)$ . Minimum point at  $(-3, -16)$ .

(d) Parabola crossing x-axis at  $(4 - \sqrt{31}, 0)$ ,  $(4 + \sqrt{31}, 0)$  and y-axis at  $(0, 15)$ . Minimum point at  $(4, -31)$ .

(e) Parabola crossing x-axis at  $(-1, 0)$ ,  $(5, 0)$  and y-axis at  $(0, 5)$ . Maximum point at  $(2, 9)$ .

(f) Parabola crossing x-axis at  $(-3, 0)$ ,  $(8, 0)$  and y-axis at  $(0, -24)$ . Minimum point at  $(\frac{5}{2}, -\frac{121}{4})$ .

53. Task: Sketch the following curves, marking the points of intersection with the axes.

(a) Cubic crossing the x-axis at  $(-3, 0)$ ,  $(0, 0)$ ,  $(2, 0)$

(b) Cubic crossing the x-axis at  $(-3, 0)$ ,  $(-2, 0)$ ,  $(-1, 0)$  and the y-axis at  $(0, 6)$

(c) Cubic crossing the x-axis at  $(-4, 0)$ ,  $(-\frac{1}{2}, 0)$ ,  $(1, 0)$  and the y-axis at  $(0, -4)$

## Trigonometry

54. Task: Find the marked lengths and angles correct to one decimal place.
- (a) Central length: 11.9 cm  
 $A = 131.4$
- (b) Central length: 7.3 cm  
 Error in question; 9 cm length should have read 6 cm, giving:  $c = 7.1, C = 63.5$
- (c) Left side of right-angled triangle: 3.9 cm  
 Base of right-angled triangle: 13.6 cm  
 $c = 14.1$
- (d) Central length: 4.4 cm  
 $A = 17.9$
55. 8.83km; 1.02km.
56. 052; 318.
57. Using the result  $\text{Area} = \frac{1}{2} ab \sin C$  find, to 3 significant figures, the area of each triangle:
- (a)  $41.6 \text{ cm}^2$ .
- (b)  $968 \text{ km}^2$ .
- (c)  $352 \text{ m}^2$ .

## Lengths, areas and volumes

58.  $\frac{1}{2} \times \frac{4}{3} \pi \times 3^3 + \frac{1}{3} \pi \times 3^2 \times 6 = 36\pi$
59.  $\frac{1}{3} w^2 h = 9; w = h$ . Therefore  $h = 3$ .
60. Length of sides of base: 6 cm. Using Pythagoras, distance from apex to base edge: 4 cm.  
 Total area  $36 + 4 \times \left(\frac{1}{2} \times 6 \times 4\right) = 84 \text{ cm}^2$ .
61. Let  $h$  be the height of the cylinder.  
 $V = \frac{1}{2} \times \frac{4}{3} \pi \times 3^3 + \pi \times 3^2 \times h = 99\pi$   
 $18\pi + 9\pi h = 99\pi$   
 $h = 9 \text{ mm}$ .
62. Task: A square based pyramid of volume  $98 \text{ cm}^3$  is pictured below. By calculating appropriate lengths find:
- (a) the volume of the pyramid;  
 $98 \text{ cm}^3$
- (b) the total surface area of the pyramid;  
 Since  $V = \frac{1}{3} \times 7^2 h = 98, h = 6$ .  
 $EM^2 = 6^2 + 3.5^2 + 3.5^2 = 60.5$   
 $EM = \sqrt{60.5} = \sqrt{\frac{121}{2}} = \frac{11\sqrt{2}}{2}$   
 $\text{Area} = 49 + 4 \times \frac{1}{2} \times 7 \times \frac{11\sqrt{2}}{2} = 49 + 77\sqrt{2} \approx 158 \text{ cm}^2$ .
- (c) the angle that the sides of the pyramid make with the base of the pyramid.  
 $\arctan\left(\frac{6}{3.5}\right) = 59.7^\circ$

63. Letting  $r$  be the radius,

$$360\pi = \frac{8}{5}\pi r^2$$

$$r^2 = 225$$

$$r = 15$$

Therefore the real volume is given by  $V = \frac{4}{3}\pi \times 15^3 = 4500\pi$ .

If both formulae had given the same answer, we would have  $\frac{8}{5}\pi r^2 = \frac{4}{3}\pi r^3$ . Therefore

$$24r^2 = 20r^3 \text{ and (provided } r \neq 0) \text{ } r = \frac{6}{5} = 1.2 \text{ cm}^2.$$