Paper Reference(s)

5384H/14H

Edexcel GCSE

Mathematics (Modular) – 2381

Paper 14 (Calculator)

Higher Tier

Unit 3

Tuesday 10 November 2009 – Morning

Time: 1 hour 10 minutes

Materials required for examination
Ruler graduated in centimetres and
millimetres, protractor, compasses,
pen, HB pencil, eraser, calculator.
Tracing paper may be used.

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
You must NOT write on the formulae page.
Anything you write on the formulae page will gain NO credit.
If you need more space to complete your answer to any question, use additional answer sheets.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 18 questions in this question paper. The total mark for this paper is 60.
There are 16 pages in this question paper. Any blank pages are indicated.
Calculators may be used.
If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Advice to Candidates

Show all stages in any calculations.
Work steadily through the paper. Do not spend too long on one question.
If you cannot answer a question, leave it and attempt the next one.
Return at the end to those you have left out.

Turn over

N 3 5 5 2 5 A 0 1 1 6
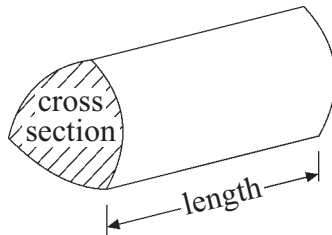
edexcel
advancing learning, changing lives
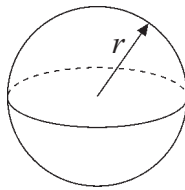
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

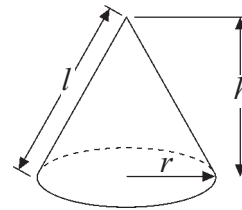**Volume of a prism** = area of cross section × length

Volume of sphere $= \frac{4}{3}\pi r^3$
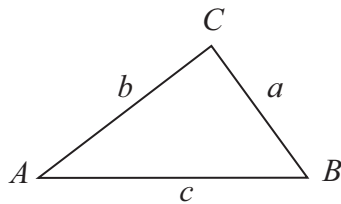
Surface area of sphere $= 4\pi r^2$

Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi r l$

In any triangle ABC

Sine Rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $= \frac{1}{2}ab \sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$
where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Answer ALL EIGHTEEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1. Use your calculator to work out the value of $\dfrac{8.7 \times 12.3}{9.5 - 5.73}$

    Write down all the digits from your calculator.
    Give your answer as a decimal.

    ....

    (Total 2 marks)

    Q1

2. (a) $p = 2$
       $q = -4$

    Work out the value of $3p + 5q$

    ....
    (2)

    (b) Solve $8x + 11 = 39$

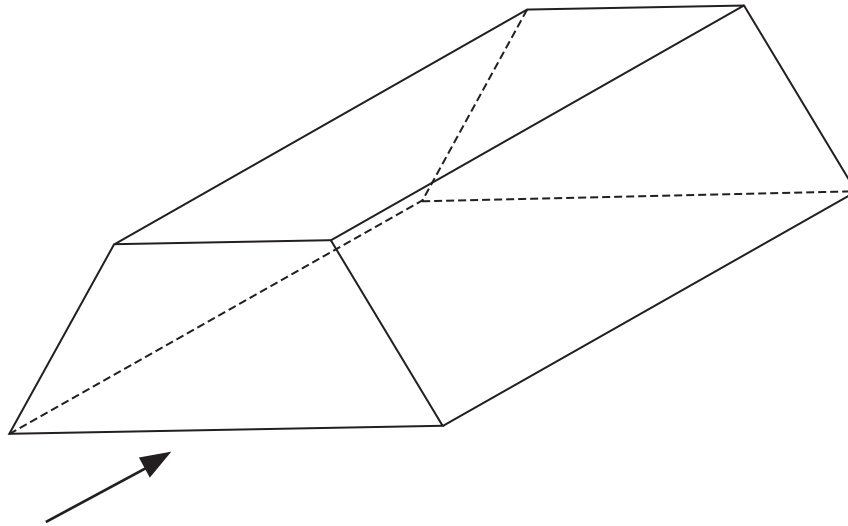 $x = $ ....
    (2)

    (Total 4 marks)

    Q2

3.

The diagram shows a prism.

(a) On the diagram, draw in **one** plane of symmetry for the prism.

(2)

(b) In the space below, sketch the front elevation from the direction marked with an arrow.

(2) Q3

(Total 4 marks)
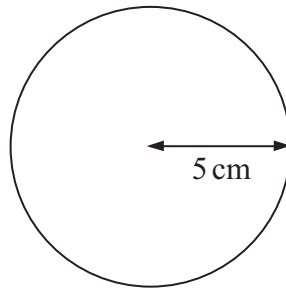
4. A circle has a radius of 5 cm.

Diagram **NOT** accurately drawn

5 cm

Work out the area of the circle.
Give your answer correct to 3 significant figures.

.... cm^2

(Total 2 marks)

5. A regular polygon has 12 sides.

Work out the size of an exterior angle of this regular polygon.

°
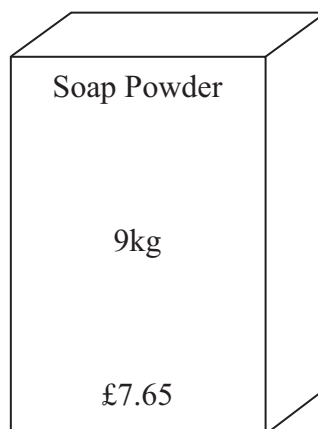.......................................

(Total 2 marks)

6. Soap powder is sold in two sizes of box.

Soap Powder

2kg

£1.72

Small box

Soap Powder

9kg

£7.65

Large box

A small box contains 2 kg of soap powder and costs £1.72
A large box contains 9 kg of soap powder and costs £7.65

Which size of box gives the better value for money?

....
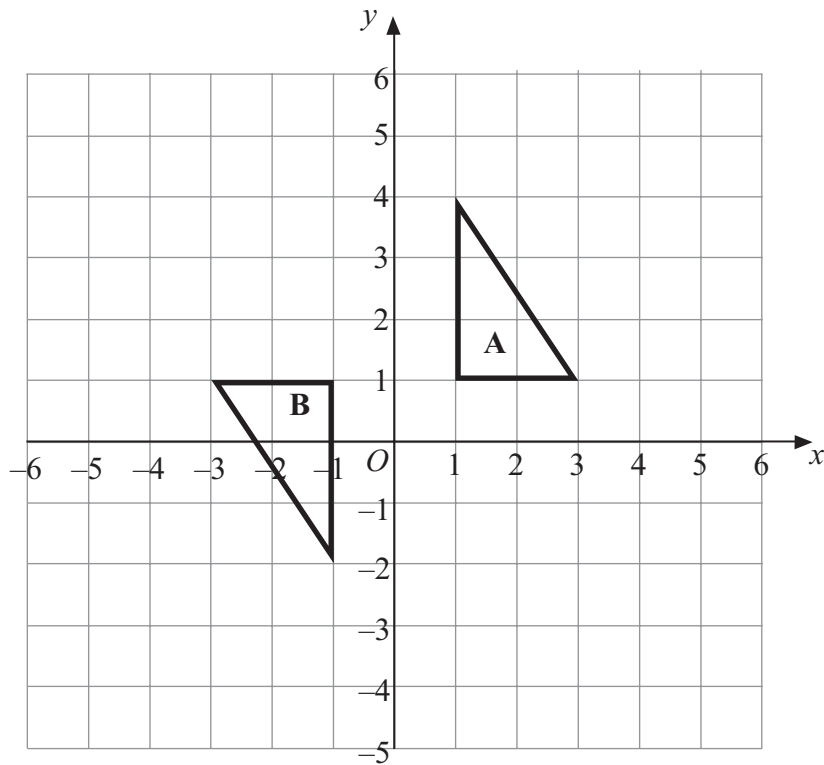
Explain your answer.
You must show all your working.

Q6

(Total 3 marks)

7.

Describe fully the single transformation that maps triangle **A** onto triangle **B**.

....

....

(Total 3 marks)

8. A computer costs £360 plus $17\frac{1}{2}$ % VAT.

Calculate the total cost of the computer.

£360

plus

$17\frac{1}{2}$ % VAT

£ ....

(Total 3 marks)

9. A piece of wood is 180 cm long.
Tom cuts it into three pieces in the ratio 2 : 3 : 4

Work out the length of the longest piece.

.... cm

(Total 3 marks)

10. The equation

$$x^3 + 2x = 60$$

has a solution between 3 and 4

Use a trial and improvement method to find this solution.
Give your answer correct to 1 decimal place.
You must show all your working.

$x =$ ....

(Total 4 marks)

11. (a) Simplify $m^3 \times m^4$

....
(1)

(b) Simplify $p^7 \div p^3$

....
(1)

(c) Simplify $4x^2y^3 \times 3xy^2$

....
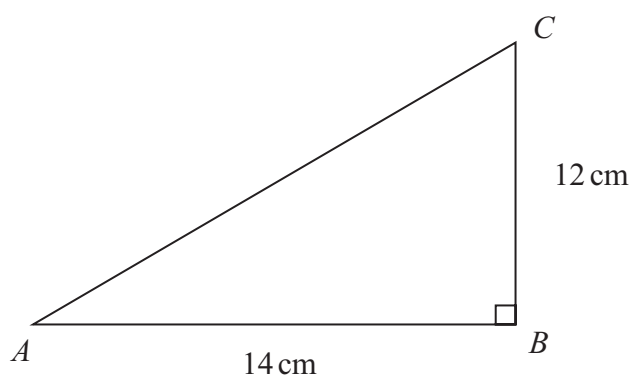**(2)**

(Total 4 marks)

Q11

12.

Diagram **NOT**
accurately drawn

ABC is a right-angled triangle.
AB = 14 cm.
BC = 12 cm.

Calculate the length of *AC*.
Give your answer correct to 3 significant figures.

.... cm
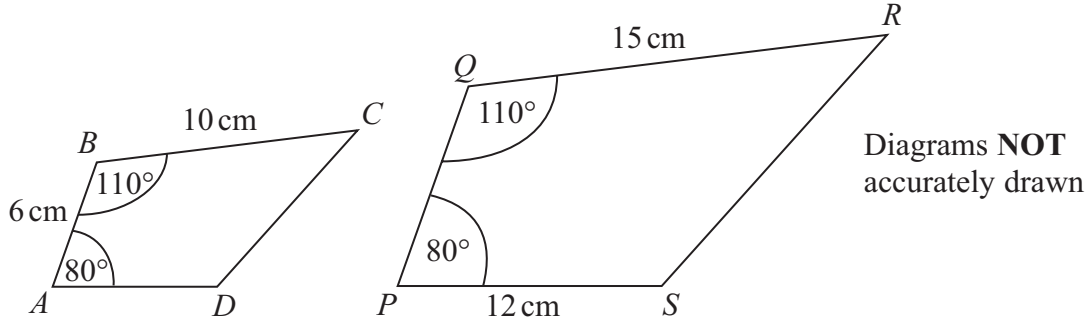
(Total 3 marks)

Q12

13. Solve $\dfrac{29-x}{4} = x+5$

$x = $ ....

(Total 3 marks)

14.

15 cm

10 cm

110°

110°

6 cm

80°

80°

12 cm

Diagrams **NOT** accurately drawn

ABCD and *PQRS* are mathematically similar.

(a) Find the length of *PQ*.

.... cm

(2)

(b) Find the length of *AD*.

.... cm

(2)

(Total 4 marks)

15. y is directly proportional to x.

When $x = 500$, $y = 10$

Find a formula for y in terms of x.

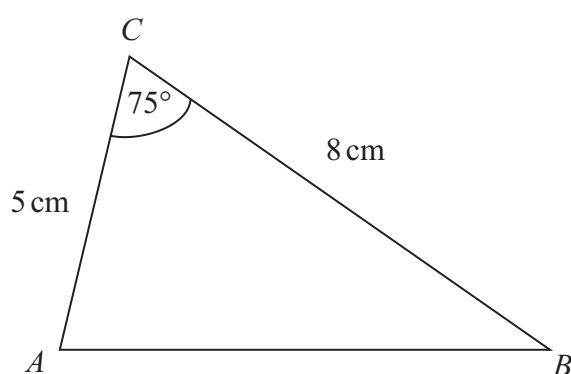$y =$ ....

(Total 3 marks)

16.

Diagram **NOT** accurately drawn

In triangle ABC,

$AC = 5$ cm.
$BC = 8$ cm.
Angle $ACB = 75°$.

Calculate the length of AB.
Give your answer correct to 3 significant figures.

.... cm

(Total 3 marks)

17.

$$v = \sqrt{\dfrac{a}{b}}$$

$a = 6.43$ correct to 2 decimal places.
$b = 5.514$ correct to 3 decimal places.

By considering bounds, work out the value of v to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

$v = $ ....

Q17

(Total 5 marks)

18. Solve $\dfrac{4}{x+3} + \dfrac{3}{2x-1} = 1$

....

(Total 5 marks)

TOTAL FOR PAPER: 60 MARKS

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