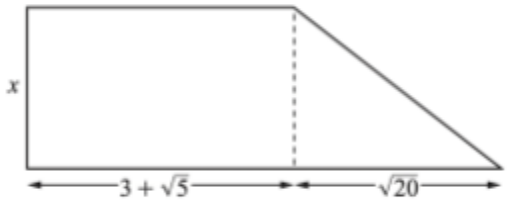
Chapter (3) Indices

0606/22/F/M/17

1. The diagram shows a trapezium made from a rectangle and a right-angled triangle. The dimensions, in centimetres, of the rectangle and triangle are shown. The area, in square centimetres, of the trapezium is $13 + 5\sqrt{5}$. **Without using a calculator,** find the value of x in the form $p + q\sqrt{5}$, where p and q are integers. [5]



2. (a) Express $(\sqrt[3]{-8x^9})(\sqrt[6]{x^{-3}})$ in the form ax^b, where a and b are constant to be found. [2]

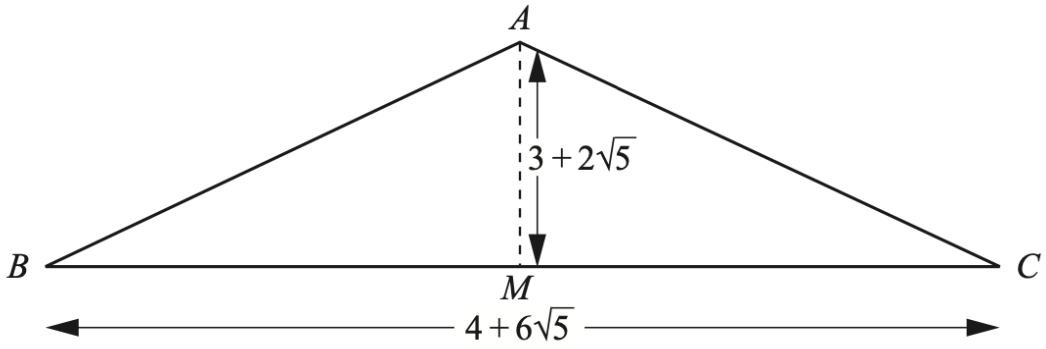
(b) Hence solve the equation $(\sqrt[3]{-8x^9})(\sqrt[6]{x^{-3}}) = -6250$. [2]

0606/11/M/J/17

3. Simplify $\sqrt{x^8y^{10}} \div \sqrt[3]{x^3y^{-6}}$, giving your answer in the form x^ay^b, where a and b are integers. [2]

0606/13/M/J/17

4. In this question, all dimensions are in centimetres.



The diagram show an isosceles triangle ABC, where $AB = AC$. The point M is the midpoint of BC. Given that $AM = 3 + 2\sqrt{5}$ and $BC = 4 + 6\sqrt{5}$, find, **without using a calculator,**

(i) the area of triangle ABC, [2]

(ii) tan ABC, giving your answer in the form $\frac{a+b\sqrt{5}}{c}$, where a, b and c are positive integers. [3]

0606/21/M/J/17

5. **Do not use a calculator in this question.**

(a) Show that $\sqrt{24} \times \sqrt{27} + \frac{9\sqrt{30}}{\sqrt{15}}$ can be written in the form $a\sqrt{2}$, where a is an integer. [3]

(b) Solve the equation $\sqrt{3}(1 + x) = 2(x - 3)$, giving your answer in the form $b + c\sqrt{3}$, where b and c are integers. [3]

0606/22/M/J/17

6. **Without using a calculator**, express $\left(\frac{1+\sqrt{5}}{3-\sqrt{5}}\right)^{-2}$ in the form $a + b\sqrt{5}$, where a and b are integers. [5]

0606/23/M/J/17

7. Express $\frac{\left(5\sqrt{q}\right)^3}{(625p^{12}q)^{\frac{1}{4}}}$ in the form $5^a p^b q^c$, where a, b and c are constants. [3]