SHREWSBURY SCHOOL.

MATHEMATICS.

Do some questions out of each section, about 3 from each. You will not be expected to do them all.

[N.B.—*In each section questions 4, 5 and 6 are worth more than questions 1, 2 and 3.*]

A. 1.　Multiply ·078 by ·0603.　　·0047034

　　　　Divide ·3087 by ·0049.　　63

A. 2.　Multiply £22 4s. 7d. by $\frac{5}{11}$.　　£10 – 2 – 1

A. 3.　Find, by factors, the L.C.M. and H.C.F. of 48, 66, 78, 90.　$2 \times 3 = 6$
　　　　$2^4 . 3^2 . 5 . 11 . 13 = 102960$

A. 4.　Find the area of the floor of a room 5·5 metres long and 4·5 metres wide.　24.75

　　　　If the room were one-fifth as long again what would its width have to be to keep the area the same?　3.75

　　　　What is the cost of varnishing the floor at 1·2 francs per 50 sq. dms. ?　sq. u fr.

A. 5.　What is 17 per cent. of £85 ?　　£14 – 5

　　　　How much per cent. of £85 is £17 ?　　20 %

A. 6.　Find the area of a circle whose diameter is $10\frac{1}{2}$ inches.　$86\frac{5}{8}$

　　　　What is the radius of a circle of four times this area ?　$10\frac{1}{2}''$

　　　　[Take $\pi = \frac{22}{7}$].

B. 1.　Add together $\frac{1}{2}a + \frac{1}{3}b + \frac{1}{4}c$, $\frac{1}{3}a - \frac{1}{4}b + \frac{2}{3}c$, $\frac{1}{4}a + \frac{1}{2}b - \frac{1}{3}c$.　$\frac{13}{12} + \frac{7}{12} + \frac{7}{12}$

B. 2.　If $a=6$ and $b=3$, find the values of :—

　　　(i) $a^2 - b^2$,　(ii) $2a^2 + ab - 10b^2$.　27　　0

B. 3.　Solve the equation $3(x+1) - 4(2x-3) = 5$.　2

B. 4.　Solve the equations :—

　　　(i) $6x^2 - x - 12 = 0$.　(ii) $x^2 - 6x - 12 = 0$.　$\frac{3}{2}$ or $-\frac{4}{3}$

　　　　$3 \pm \sqrt{21} = 7.58$ or -1.58

B. 5.　Simplify　$\dfrac{1}{x - x^2} - \dfrac{1}{x + x^2} - \dfrac{2}{1 + x^2}$　$\dfrac{4x^2}{1 - x^4}$

B. 6.　A man walks a certain distance at 4 m.p.h. and then twice that distance at $3\frac{1}{2}$ m.p.h. and finds that altogether he has taken $11\frac{1}{2}$ hours. What is the total distance he has gone ?　42 miles

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[*Draw figures, freehand, as neat as you can and not too small.*]

C. 1.　Two straight lines cross one another. Prove that the two lines which bisect the four angles formed by them are at right angles to one another.

C. 2.　AB and CD are two parallel straight lines, and O is any point between them. OX is drawn making an angle 25° with AB, and OY making an angle 39° with CD. What is the size of the angle XOY ? Give your reasons.　64°　　14°

　　　N.B.—*There can be two different answers. Give both if you can.*

　　　[Suggested construction :—　Produce XO to meet CD, *or* Draw a certain line through O.]

C. 3.　Prove that the angles at the base of an isosceles triangle are equal.

C. 4.　In a quadrilateral ABCD the diagonals AC and BD bisect each other at X. Name two pairs of triangles in the figure which are equal in all respects, and *prove* one of those pairs equal.

　　　What facts can you now state about the opposite sides of the quadrilateral ?

C. 5.　In a triangle ABC, AB=16″, AC=12″, BAC=90°. Calculate (i) the length of BC, (ii) the area of the triangle, (iii) the length of the perpendicular from A on to BC.　20″　96　9.6″

C. 6.　Prove that equal chords of a circle are equidistant from the centre.

　　　Write down the enunciation of one Theorem about angles in connection with a circle.