THE RESULT WILL BE LARGER THAN 13; ON THE OTHER HAND, IF WE OVERESTIMATED IT, THE QUOTIENT WILL BE SMALLER THAN THE DESIRED SIDE. DIVIDING 175 BY 13 WE OBTAIN 13.4615. BY AVERAGING 13.4615 AND 13, WE OBTAIN A CLOSER ESTIMATE OF THE LENGTH SIDE, NAMELY $(13+13.4615)/2$ OR 13.231. TO SHARPEN OUR APPROXIMATION, WE REPEAT THE PROCESS USING 13.231 AS OUR DIVISOR, THUS: 175 DIVIDED BY 13.231 GIVES 13.2265. AGAIN AVERAGING THE DIVISOR AND QUOTIENT: $(13.231+13.2265)/2 = 13.2287$. THIS RESULT IS ACCURATE TO FOUR SIGNIFICANT FIGURES. IF GREATER ACCURACY IS DESIRED, THE PROCESS MAY BE REPEATED.

33. SIMPLIFYING RADICALS.

MANY RADICALS CAN BE SIMPLIFIED AS SMALL NUMBERS SUCH 2 OR 3 OR 5. THEN, BY LEARNING THE APPROXIMATE VALUES OF $\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$ WE CAN QUICKLY ARRIVE AT DESIRED RESULTS. FOR EXAMPLE, SINCE $8 = 4\times 2$, $\sqrt{8} = \sqrt{4\times 2} = \sqrt{4}\times\sqrt{2} = 2\sqrt{2}$. IN LIKE MANNER, $\sqrt{12} = 2\sqrt{3}$, SINCE $12 = 4\times 3$.

· IN AN EXPRESSION SUCH AS $(6+4\sqrt{3})/2$, THE 2 CAN BE CANCELLED INTO BOTH THE 6 AND 4, GIVING $3+2\sqrt{3}$ AS RESULT. THAT IS, $(6+4\sqrt{3})/2 = (2(3+2\sqrt{3}))/2 = 3+2\sqrt{3}$.

· SIMILAR RADICALS SUCH AS $2\sqrt{3}$ AND $5\sqrt{3}$, CAN BE ADDED OR SUBTRACTED. THAT IS, $2\sqrt{3}+5\sqrt{3} = (2+5)\sqrt{3} = 7\sqrt{3}$, JUST AS WE HAVE $2x+5x = 7x$.

· RADICALS FROM THE SAME ORDER CAN BE MULTIPLIED OR DIVIDED. FOR EXAMPLE: $\sqrt{9}\times\sqrt{4} = \sqrt{9\times 4} = \sqrt{36} = 6$, OR TAKING THE SQUARE ROOTS SEPARATELY, AS A CHECK, $\sqrt{9}\times\sqrt{4} = 3\times 2 = 6$.

FURTHER ILLUSTRATIONS:

1) $\sqrt{8}\times\sqrt{2} = \sqrt{8\times 2} = \sqrt{16} = 4$

2) $\sqrt{12}\div\sqrt{3} = \dfrac{\sqrt{12}}{\sqrt{3}} = \sqrt{\dfrac{12}{3}} = \sqrt{4} = 2$

34. LAWS OF EXPONENTS. — 26/11/2018

$A^2 = A\times A$ AND $a^3 = a\times a\times a$

THE RULES FOR CARRYING OUT MULTIPLICATION AND DIVISION OF QUANTITIES WITH INDICE EXPONENTS ARE QUITE SIMPLY DEDUCED FROM AN EXAMINATION OF THE NOTATION THUS:

2020/6/14