QUESTION

List the positive divisors of 30, and hence calculate $d(30), \sigma(30)$ and $\sigma_2(30)$ directly. Now use the formula given in theorem 8.3 to check your answers.

ANSWER

The positive divisors of 30 are 1, 2, 3, 5, 6, 10, 15 and 30. Thus $d(30) =$ number of such divisors=8, $\sigma(30) =$ sum of such divisors=72 and $\sigma_2(30) =$ sum of squares of such divisors$= 1 + 4 + 9 + 25 + 100 + 225 + 900 = 1300$. From the formula, since 30=2.3.5, we have $d(30 = (1 + 1)(1 + 1)(1 + 1) = 8$, $\sigma(30 = \frac{2^2-1}{2-1}.\frac{3^2-1}{3-1}.\frac{5^2-1}{5-1} = \frac{3}{1}.\frac{8}{2}.\frac{24}{4} = 72$ and $\sigma_2(30) = \frac{2^4-1}{2^2-1}.\frac{3^4-1}{3^2-1}.\frac{5^4-1}{5^2-1} = \frac{15}{3}.\frac{80}{8}.\frac{624}{24} = 5.10.26 = 1300$.