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Let  $R$  be a commutative ring, and let  $f = f(x)$  be a polynomial ring in one variable over  $R$ .  $c(f)$ , the so called content of  $f$ , is the ideal of  $R$  generated by the coefficients of  $f$ .  $R$  is called a Gaussian ring if  $c(fg) = c(f)c(g)$  for any two polynomials  $f$  and  $g$  over  $R$ . Gaussian rings were defined by Tsang in 1965, who also proved that a Gaussian integral domain is a Prufer domain. In case the Gaussian ring contains zero-divisors its structure and properties are harder to describe. This talk will review the known results in that directions, and also provide several new homological characterizations of Gaussian rings. (Received September 29, 2000)