SPRING 2017 - ALGEBRA 2 - TEST #1A

No references. T/F two points each, scaled to 50 total

True or false:

F 1) A commutative ring with no zero divisors is an integral domain - need unity
2) An ideal is an absorbing subring
3) $\mathbb{Q}[x]$ is an integral domain
F 4) Every subring of an integral domain is an ideal – $\langle 2 \rangle \subset \mathbb{Z}[x]$
5) Every proper ideal of a ring has no units
6) An integral domain must have at least two elements
7) Cancellation holds in a Bézout domain
8) If u is a unit, so is $-u$
9) A noncommutative ring can have a commutative subring
F 10) $\mathbb{Z}_4$ is an integral domain $2 \cdot 2 = 0$
11) If D is an integral domain, so is $D[x]$
12) If D is an integral domain, $D[x][y] = D[x,y]$
13) If I is an ideal of a commutative unital ring R, then R/I is a factor ring
F 14) If I is a prime ideal of a ring R, then R/I is an integral domain R needs comm, unity
F 15) If I is a maximal ideal of a commutative ring R, then R/I is a field ditto
F 16) If I is a prime ideal of R, then R/I is an integral domain same as 14
F 17) If I is a prime ideal of a commutative unital ring R, then R/I is a field – need maximal
18) A field always has a maximal ideal
F 19) If I is a maximal ideal of a commutative unital ring, then $1 \notin R$ nonsense
+1 20) Every prime ideal of a commutative unital ring is maximal
F 21) An integral domain can have characteristic 6 – 0 or prime
22) $8\mathbb{Z}$ has no zero divisors
F 23) $\mathbb{Z}_8$ has no zero divisors – $4 \cdot 2 = 0$
F 24) A prime ideal can be the whole ring – proper
F 25) The smallest ring is $\mathbb{Z}_2$ $\{0\}$
26) Fields always have at least two ideals
27) If $ab \in M$, an ideal, implies $a \in M$ or $b \in M$, then M is prime
28) If A, B, and P are ideals and $AB \subset P$ implies $A \subset P$ or $B \subset P$, then P is prime
29) $\{0\}$ is always an ideal for any ring
30) A domain may have no non-trivial proper ideals