3. 12, 2, 2, 10, 1, 0, 4, 5.

4. $s = -3$, $t = 2$; $s = 8$, $t = -5$

8. Write $as + bt = d$. Then $a's + b't = (a/d)s + (b/d)t = 1$.

19. If $\gcd(a, bc) = 1$, then there is no prime that divides both a and bc. By Euclid's Lemma and unique factorization, this means that there is no prime that divides both a and b or both a and c. Conversely, if no prime divides both a and b or both a and c, then by Euclid's Lemma, no prime divides both a and bc.

33. Suppose that S is a set that contains a and whenever $n \geq a$ belongs to S, then $n + 1 \in S$. We must prove that S contains all integers greater than or equal to a. Let T be the set of all integers greater than a that are not in S and suppose that T is not empty. Let b be the smallest integer in T (if T has no negative integers, b exists because of the Well Ordering Principle; if T has negative integers, it can have only a finite number of them so that there is a smallest one). Then $b - 1 \in S$, and therefore $b = (b - 1) + 1 \in S$. This contradicts our assumption that b is not in S.