

1. (ungraded) – §4.2 – 2.
2. (ungraded) – §4.3 – 1.
3. (ungraded) – §5.1 – 4abc.
4. (graded) – §4.3 – 5.
5. (graded) – §5.3 – 2.
6. (graded) – §5.3 –12. (Don't get confused; read carefully, and solve for (r, s) in terms of (y, z) .)
7. (graded) – (E) Find all solutions to the equation $4x + 10y = 42$...
 - a. ... In integers (x, y) .
 - b. ... In *positive* integers (x, y) .
8. (graded) – (E) Prove that there does not exist an integer n for which $\sigma(n) = \frac{11}{8}n$.
9. (graded) – (E) Find primitive solutions to the Pythagorean equation $x^2 + y^2 = z^2$ for which (a) $x = 453$, (b) $x = 2006$. (You do not have to multiply out your expressions, but make sure they are primitive.)
10. (graded) – (E) Suppose p and q are odd primes and $q \mid 5^p - 1$. Prove that $q \equiv 1 \pmod{p}$. Hint 1: think about the question: “Can $\text{ord}_q(5) = 1$?” Hint 2: This result is false with “5” replaced by “7” – consider $p = q = 3$ and note that $3 \mid 7^3 - 1$.
11. (bonus) – §4.2 – 25.
12. (bonus) – §4.3 – 19.
13. (bonus) – §5.3. – 17. (Or any correct method.)