



Math Olympiad and Problem Solving Programs
E220 - Intermediate Math Competitions
Problem Set 12.1 - Number Theory

Name:

Date:

1. $LCM(12, 18) = 36$, $GCD(12, 18) = 6$. Their sum is $36 + 6 = \boxed{42}$
2. $\boxed{160}$
3. $\boxed{\frac{1}{88}}$
4. $\boxed{59}$
5. $\boxed{123}$
6. $\boxed{715}$
7. $\boxed{24}$
8. $\boxed{6}$
9. If a number x has 3 natural number factors, then it must be a square number whose base is prime. Let p , q and r be prime numbers. Then we can write $x = p^2$, $y = q^2$, and $z = r^2$. Then we can write the expression: $x^2y^3z^4 = (p^2)^2(q^2)^3(r^2)^4 = p^4q^6r^8$. Now do the factor counting: $(4 + 1)(6 + 1)(8 + 1) = 5 \times 7 \times 9 = \boxed{315}$
10. $\lfloor \frac{1000}{5} \rfloor = 200$. $\lfloor \frac{200}{5} \rfloor = 40$. $\lfloor \frac{40}{5} \rfloor = 8$. $\lfloor \frac{8}{5} \rfloor = 1$. So there are $200 + 40 + 8 + 1 = \boxed{249}$ factors of 5.