

## Quiz 5

Name: Solution Key

1. Find:

(a)  $18 \bmod 7 = 4$

$$18 = 7 \cdot 2 + 4$$

$$0 \leq 4 < 7$$

(b)  $-88 \bmod 13 = 3$

$$-88 = 13 \cdot (-7) + 3$$

$$0 \leq 3 < 13$$

(c)  $\gcd(2^{27}3^55^4, 2^{13}5^9) = 2^{\min(27,13)} 3^{\min(5,0)} 5^{\min(4,9)} = 2^{13} 5^4$

(d)  $\text{lcm}(2^{27}3^55^4, 2^{13}5^9) = 2^{\max(27,13)} 3^{\max(5,0)} 5^{\max(4,9)} = 2^{27} 3^5 5^9$

(e) Prime factorization of 276.

$$276 = 2 \cdot 2 \cdot 3 \cdot 23$$

$$\frac{276}{2} = 138$$

$$\frac{69}{3} = 23$$

$$\frac{138}{2} = 69$$

(f) Using the Euclidean algorithm,  $\gcd(128, 729)$ 

$$\begin{aligned} \gcd(729, 128) &= \gcd(128, 89) = \gcd(89, 39) = \gcd(39, 11) = \gcd(11, 6) \\ &= \gcd(6, 5) = \gcd(5, 1) = 1. \end{aligned}$$