Handout for 30 Sep 2025 - Factors

Solutions

1) The prime factorization of 2025 is $3^4 * 5^2$. What is the prime factorization of 20250?

$20250 = 2025 \cdot 10 = 3^4 \cdot 5^2 \cdot 10 = 3^4 \cdot 5^2 \cdot 2 \cdot 5 = 2 \cdot 3^4 \cdot 5^3$

2) The prime factorization of 360 is $2^3 * 3^2 * 5$. How many positive divisors does 360 have?

$360 = 2^3 \cdot 3^2 \cdot 5^1$

# of factors $= (3+1) \cdot (2+1) \cdot (1+1)$

$= 4 \cdot 3 \cdot 2 = 24$

3) The prime factorization of 360 is $2^3 * 3^2 * 5$. The prime factorization of 3150 is $2 * 3^2 * 5^2 * 7$.

3a) What is the Least Common Multiple of 360 and 3150?

Least Common Multiple includes prime factors that occur in either number (or)

360: $2^3 \cdot 3^2 \cdot 5$ 3150: $2^1 \cdot 3^2 \cdot 5^2 \cdot 7$

LCM: $2^3 \cdot 3^2 \cdot 5^2 \cdot 7 = 12,600$

3b) What is the Greatest Common Divisor of 360 and 3150?

Greatest Common Divisor includes prime factors that occur in both numbers (and)

360: $2^3 \cdot 3^2 \cdot 5$ 3150: $2^1 \cdot 3^2 \cdot 5^2 \cdot 7$

GCD: $2 \cdot 3^2 \cdot 5 = 90$

4) How many positive divisors does 270 have?

$270 = 2^1 \cdot 3^3 \cdot 5^1$

# of factors $= (1+1) \cdot (3+1) \cdot (1+1) = 16$

2 | 270
3 | 135
3 | 45
3 | 15
5

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1) The prime factorization of 2025 is $3^4 * 5^2$. What is the prime factorization of 20250?

$20250 = 2025 \cdot 10 = 3^4 \cdot 5^2 \cdot 10 = 3^4 \cdot 5^2 \cdot 2 \cdot 5 = \underline{2 \cdot 3^4 \cdot 5^3}$

2) The prime factorization of 360 is $2^3 * 3^2 * 5$. How many positive divisors does 180 have?

$360 = 2^3 \cdot 3^2 \cdot 5^1$

# of factors $= (3+1) \cdot (2+1) \cdot (1+1)$

$= 4 \cdot 3 \cdot 2 = \underline{24}$

3) The prime factorization of 360 is $2^3 * 3^2 * 5$. The prime factorization of 3150 is $2 * 3^2 * 5^2 * 7$.

3a) What is the Least Common Multiple of 360 and 3150?

Least Common Multiple includes prime factors that occur in either numb

360 (or) 3150

$2^3 \cdot 3^2 \cdot 5$ $2^1 \cdot 3^2 \cdot 5^2 \cdot 7$

LCM: $2^3 \cdot 3^2 \cdot 5^2 \cdot 7 = \underline{12,600}$

3b) What is the Greatest Common Divisor of 360 and 3150?

Greatest Common Divisor includes prime factors that occur in both numbers

360 (and) 3150

$2^3 \cdot 3^2 \cdot 5$ $2^1 \cdot 3^2 \cdot 5^2 \cdot 7$

GCD: $2 \cdot 3^2 \cdot 5 = \underline{90}$

4) How many positive divisors does 270 have?

$270 = 2^1 \cdot 3^3 \cdot 5^1$

# of factors $= (1+1) \cdot (3+1) \cdot (1+1) = \underline{16}$

2 | 270
3 | 135
3 | 45
3 | 15
5