PROPERTIES OF INTEGERS

A NUMBERS 1 AND 0

A.1 APPLYING NUMBER PROPERTIES

Ex 1: Calculate the following expression without using a calculator:

$$(4 \times 22 + 3 + 22 \div 2) \times 0 = \square$$

Ex 2: Consider the following sequence of algebraic manipulations:

$$0 \times 2 = 0 \quad \text{Line 1}$$

$$2 = \frac{0}{0} \quad \text{Line 2} \quad \text{(dividing by 0)}$$

$$2 = \frac{1 \times \emptyset}{1 \times \emptyset} \quad \text{Line 3} \quad \text{(cancelling common factor)}$$

$$2 = 1 \quad \text{Line 4}$$

This sequence appears to show that $2 = 1$, which is a false result. Identify the line where an invalid mathematical operation is performed.

The error occurs in Line $\square$

Ex 3: Calculate the following expression without using a calculator:

$$2 + (120 - 45) \times (200 - 200) = \square$$

Ex 4: Calculate the following expression without using a calculator:

$$(15 + 3 \times 5 - 30) \times (100 \times 11) = \square$$

B DIVISION WITH REMAINDERS

B.1 CALCULATING THE DIVISION WITH REMAINDERS

Ex 5: Write the division with remainder of 21 by 5:

$$21 = 5 \times \square + \square$$

Ex 6: Write the division with remainder of 37 by 3:

$$37 = 3 \times \square + \square$$

Ex 7: Write the division with remainder of 63 by 4:

$$63 = 4 \times \square + \square$$

Ex 8: Write the division with remainder of 154 by 6:

$$154 = 6 \times \square + \square$$

Ex 9: Write the division with remainder of 632 by 5:

$$632 = 5 \times \square + \square$$

B.2 SOLVING REAL-WORLD PROBLEMS

Ex 10: A farmer shares 243 eggs into boxes such that each box contains 6 eggs.
How many boxes are needed?

$\square$ boxes

How many eggs remain without being placed in a box?

$\square$ eggs

Ex 11: A farmer's inheritance of 123 sheep is to be divided equally among 4 children.
How many sheep does each child receive?

$\square$ sheep

How many sheep remain undistributed?

$\square$ sheep

Ex 12: A gardener arranges 200 roses into bouquets such that each bouquet contains 12 roses.
How many bouquets are needed?

$\square$ bouquets

How many roses remain without being placed in a bouquet?

$\square$ roses

Ex 13: A child entering middle school decides to give his 300 marbles to his 7 cousins.
How many marbles does each cousin receive?

$\square$ marbles

How many marbles remain undistributed?

$\square$ marbles

Ex 14: A coach organizes 37 soccer players into teams such that each team contains 5 players. The remaining players are substitutes.
How many full teams can be formed?

$\square$ teams

How many players are substitutes?

$\square$ players

C DIVISIBILITY

C.1 DETERMINING DIVISIBILITY

MCQ 15: Is 10 divisible by 5?

☐ Yes

☐ No

MCQ 16: Is 82 divisible by 4?

☐ Yes

☐ No

MCQ 17: Is 72 divisible by 5?

☐ Yes

☐ No

MCQ 18: Is 234 divisible by 3?

☐ Yes

☐ No

C.2 DETERMINING MULTIPLES

MCQ 19: Is 73 a multiple of 9?

☐ Yes

☐ No

MCQ 20: Is 77 a multiple of 11?

☐ Yes

☐ No

MCQ 21: Is 50 a multiple of 4?

☐ Yes

☐ No

MCQ 22: Is 100 a multiple of 12?

☐ Yes

☐ No

C.3 DETERMINING FACTORS

MCQ 23: Is 10 a factor of 60?

☐ Yes

☐ No

MCQ 24: Which of the following numbers are factors of 64?
Choose all answers that apply:

☐ 2

☐ 4

☐ 8

☐ 32

MCQ 25: Which equation shows that 5 is a factor of 45?
Choose 1 answer:

☐ $45 = 5 + 40$

☐ $45 = 50 - 5$

☐ $45 = 225 \div 5$

☐ $45 = 5 \times 9$

MCQ 26: List all the factors of 6.
Choose 1 answer:

☐ $1, 2, 3, 4, 6$

☐ $1, 2, 3, 6$

☐ $1, 2, 3, 6, 12$

MCQ 27: List all the factors of 24.
Choose 1 answer:

☐ $1, 2, 3, 4, 6, 8, 12, 24$

☐ $1, 2, 3, 4, 6, 8$

☐ $1, 2, 3, 4, 5, 6, 8, 12, 24$

MCQ 28: List all the factors of 40.
Choose 1 answer:

☐ $1, 2, 4, 5, 8, 10, 40$

☐ $1, 2, 4, 5, 8, 10, 12, 20, 40$

☐ $1, 2, 4, 5, 8, 10, 20, 40$

D DIVISIBILITY CRITERIA

D.1 DETERMINING DIVISIBILITY FOR 2 AND 5

MCQ 29: Is 98 divisible by 2?

☐ Yes

☐ No

MCQ 30: Is 315 divisible by 2?

☐ Yes

☐ No

MCQ 31: Is 462 divisible by 2?

☐ Yes

☐ No

MCQ 32: Is 799 divisible by 2?

☐ Yes

☐ No

MCQ 33: Is 45 divisible by 5?

☐ Yes

☐ No

MCQ 34: Is 80 divisible by 5?

☐ Yes

☐ No

MCQ 35: Is 126 divisible by 5?

☐ Yes

☐ No

MCQ 36: Is 301 divisible by 5?

☐ Yes

☐ No

D.2 DETERMINING DIVISIBILITY FOR 3 AND 9

MCQ 37: Is 162 divisible by 3?

☐ Yes

☐ No

MCQ 38: Is 305 divisible by 3?

☐ Yes

☐ No

MCQ 39: Is 888 divisible by 3?

☐ Yes

☐ No

MCQ 40: Is 504 divisible by 3?

☐ Yes

☐ No

MCQ 41: Is 126 divisible by 9?

☐ Yes

☐ No

MCQ 42: Is 235 divisible by 9?

☐ Yes

☐ No

MCQ 43: Is 369 divisible by 9?

☐ Yes

☐ No

MCQ 44: Is 441 divisible by 9?

☐ Yes

☐ No

D.3 DETERMINING DIVISIBILITY FOR 4

MCQ 45: Is 188 divisible by 4?

☐ Yes

☐ No

MCQ 46: Is 373 divisible by 4?

☐ Yes

☐ No

MCQ 47: Is 412 divisible by 4?

☐ Yes

☐ No

MCQ 48: Is 256 divisible by 4?

☐ Yes

☐ No

MCQ 49: Is 179 divisible by 4?

☐ Yes

☐ No

MCQ 50: Is 520 divisible by 4?

☐ Yes

☐ No

MCQ 51: Is 567 divisible by 4?

☐ Yes

☐ No

E PRIME NUMBER

E.1 CHECKING IF PRIME

MCQ 52: State whether 6 is a prime number.

☐ Yes

☐ No

MCQ 53: State whether 5 is a prime number.

☐ Yes

☐ No

MCQ 54: State whether 9 is a prime number.

☐ Yes

☐ No

MCQ 55: State whether 7 is a prime number.

☐ Yes

☐ No

MCQ 56: State whether 12 is a prime number.

☐ Yes

☐ No

MCQ 57: State whether 10 is a prime number.

☐ Yes

☐ No

MCQ 58: State whether 13 is a prime number.

☐ Yes

☐ No

MCQ 59: State whether 11 is a prime number.

☐ Yes

☐ No

F PRIME FACTORIZATION

F.1 WRITING IN PRIME FACTORS: LEVEL 1

Ex 60: Write the number as a product of prime factors :

$$6 = \square$$

Ex 61: Write the number as a product of prime factors :

$$14 = \square$$

Ex 62: Write the number as a product of prime factors :

$$25 = \square$$

Ex 63: Write the number as a product of prime factors :

$$22 = \square$$

F.2 WRITING IN PRIME FACTORS: LEVEL 2

Ex 64: Write the number as a product of prime factors :

$$12 = \square$$

Ex 65: Write the number as a product of prime factors :

$$18 = \square$$

Ex 66: Write the number as a product of prime factors :

$$30 = \square$$

Ex 67: Write the number as a product of prime factors :

$$75 = \square$$

F.3 WRITING IN PRIME FACTORS: LEVEL 3

Ex 68: Write the number as a product of prime factors :

$$16 = \square$$

Ex 69: Write the number as a product of prime factors :

$$36 = \square$$

Ex 70: Write the number as a product of prime factors :

$$100 = \square$$

Ex 71: Write the number as a product of prime factors :

$$200 = \square$$

G GREATEST COMMON DIVISOR (GCD)

G.1 FINDING GCD

Ex 72: Find the GCD of 12 and 18:

$$\gcd(12, 18) = \square$$

Ex 73: Find the GCD of 30 and 45:

$$\gcd(30, 45) = \square$$

Ex 74: Find the GCD of 50 and 15.

$$\gcd(50, 15) = \square$$

Ex 75: Find the GCD of 36 and 60:

$$\gcd(36, 60) = \square$$

G.2 EXPRESSING FRACTIONS IN SIMPLEST FORM

Ex 76: Simplify:

$$\frac{12}{18} = \frac{\square}{\square}$$

Ex 77: Simplify:

$$\frac{30}{45} = \frac{\square}{\square}$$

Ex 78: Simplify:

$$\frac{50}{15} = \frac{\square}{\square}$$

Ex 79: Simplify:

$$\frac{36}{60} = \frac{\square}{\square}$$

G.3 REAL-LIFE PROBLEMS WITH THE GREATEST COMMON DIVISOR (GCD)

Ex 80: A baker has 48 chocolate muffins and 36 blueberry muffins. She wants to arrange them in boxes so that each box has the same number of each type of muffin, and all muffins are used. What is the largest number of boxes she can prepare?

$\square$ boxes

Ex 81: Maria and Jamal are organizing a community garden and need to divide their rectangular plot into square sections for planting. The garden measures 50 meters by 60 meters. They want the squares to be as large as possible while ensuring the entire area is used without any leftover space. What should be the side length of each square section?

$\square$ meters

Ex 82: A gym teacher has 40 basketballs and 28 soccer balls. She wants to divide them into sports kits so that each kit has the same number of each type of ball, and all balls are used. What is the largest number of kits she can prepare?

$\square$ kits

H LEAST COMMON MULTIPLE (LCM)

H.1 FINDING LCM

Ex 83:  Find the LCM of 20 and 12.

$$LCM(20, 12) = \square$$

Ex 84:  Find the LCM of 8 and 12.

$$LCM(8, 12) = \square$$

Ex 85:  Find the LCM of 36 and 30.

$$LCM(36, 30) = \square$$

H.2 REAL-LIFE PROBLEMS WITH THE LEAST COMMON MULTIPLE (LCM)

Ex 86: A lighthouse emits a white light every 32 seconds and a green light every 24 seconds. At midnight, both lights flash together. After how many seconds will both lights flash together again?

$\square$ seconds

Ex 87: A ferry departs every 35 minutes from Port A and every 10 minutes from Port B. If both ferries leave their respective ports together at 6:00 AM, after how many minutes will they next leave at the same time?

$\square$ minutes

Ex 88: Two digital billboards in a city display their special animations at different intervals: one every 18 minutes, the other every 30 minutes. If both animations start at the same time at 9:00 AM, after how many minutes will both billboards display their animations together again?

$\square$ minutes