KIDSLEARN MATH · PRACTICE ASSIGNMENT

Number Theory

Name: Date: Score: / 50

Write whole-number answers. For multiple-choice questions, circle the letter of the correct answer. Remember: 1 is neither prime nor composite. Answers are at the end.

Part A — Warm-up

1. Which of the numbers 13, 35, 39 or 55 is prime?

(A) 13 (B) 35 (C) 39 (D) 55

2. Which of the numbers 9, 43, 77 or 93 is prime?

(A) 9 (B) 43 (C) 77 (D) 93

3. Which of the numbers 9, 49, 79 or 87 is prime?

(A) 9 (B) 49 (C) 79 (D) 87

4. Which of the numbers 15, 27, 65 or 73 is prime?

(A) 15 (B) 27 (C) 65 (D) 73

5. Which list shows **all** the factors of 24?

(A) 1, 2, 4, 6, 8, 12, 24

(B) 1, 2, 3, 4, 6, 8, 12, 24

(C) 1, 2, 3, 4, 6, 8, 12, 18, 24

(D) 2, 3, 4, 6, 8, 12

6. Which list shows **all** the factors of 32?

(A) 1, 2, 4, 8, 16, 30, 32 (B) 2, 4, 8, 16

(C) 1, 2, 4, 8, 32 (D) 1, 2, 4, 8, 16, 32

7. Which list shows **all** the factors of 100?

(A) 1, 2, 5, 10, 20, 25, 50, 100

(B) 1, 2, 4, 5, 10, 20, 25, 50, 100

(C) 2, 4, 5, 10, 20, 25, 50

(D) 1, 2, 4, 5, 10, 20, 25, 50, 92, 100

8. How many factors does 76 have?

9. What is the 10th multiple of 11?

10. How many multiples of 6 are there from 1 to 151?

11. How many multiples of 3 are there from 1 to 178?

12. What is the smallest multiple of 7 that is greater than 86?

13. Which of the numbers 3409, 3468, 4643 or 9961 is divisible by 3?

(A) 3409 (B) 3468 (C) 4643 (D) 9961

14. Which of the numbers 2648, 3526, 6074 or 8414 is divisible by 4?

(A) 2648 (B) 3526 (C) 6074 (D) 8414

15. Which of the numbers 1155, 1434, 2493 or 8232 is divisible by 9?

(A) 1155 (B) 1434 (C) 2493 (D) 8232

Part B — Core practice

16. Find the GCF of 4, 10 and 14.

17. What is the greatest common factor of 40 and 72?

18. Find the GCF of 15 and 18.

19. Find the GCF of 56 and 42.

20. Find the GCF of 27 and 36.

21. Find the LCM of 6, 8 and 10.

22. What is the least common multiple of 10 and 26?

23. What is the least common multiple of 14 and 10?

24. Find the LCM of 2, 3 and 15.

25. Find the LCM of 4, 8 and 15.

26. Which is the prime factorisation of 360?

(A) $2^2 \times 3 \times 5^3$ (B) $2^4 \times 3^2 \times 5$

(C) $2^3 \times 3^2 \times 5$ (D) $2^2 \times 3 \times 5 \times 6$

27. Which is the prime factorisation of 392?

(A) $2^2 \times 7 \times 14$ (B) $2^2 \times 7^3$

(C) $2^4 \times 7^2$ (D) $2^3 \times 7^2$

28. Which is the prime factorisation of 120?

(A) $2 \times 3 \times 5^3$ (B) $2^3 \times 3 \times 5$

(C) $2^4 \times 3 \times 5$ (D) $2^2 \times 5 \times 6$

29. Which is the prime factorisation of 336?

(A) $2^3 \times 6 \times 7$ (B) $2 \times 3 \times 7^4$

(C) $2^4 \times 3^2 \times 7$ (D) $2^4 \times 3 \times 7$

30. Which number has the prime factorisation $2^4 \times 3 \times 11$?

31. What is the smallest digit that can go in the box to make $1\square 8$ divisible by 6?

32. How many of the numbers 2, 3, 4, 5, 6, 9 and 10 divide 218 exactly?

33. The number $89\square$ is divisible by 9. What digit is in the box?

34. What is the largest digit that can go in the box to make $43\square 6$ divisible by 4?

35. What is the sum of all the prime numbers between 40 and 50?

36. How many prime numbers are there between 70 and 80?

37. What is the smallest prime number greater than 23?

38. What is the largest prime number less than 31?

Part C — Challenge

39. One bus leaves the station every 15 minutes and another every 9 minutes. Both leave together at 8:00. How many minutes later do they next leave together?

40. Two ribbons, 16 cm and 72 cm long, are cut into equal pieces that are as long as possible, with nothing left over. How many pieces are there altogether?

41. Kai has two ribbons, 20 cm and 50 cm long. Kai cuts both into pieces that are all the same length, with nothing left over. What is the longest the pieces can be?

42. Sausages come in packs of 6 and rolls come in packs of 8. Kai wants exactly the same number of each. What is the smallest number of packs of sausages Kai must buy?

43. The product of two numbers is 126 and their GCF is 3. What is their LCM?

44. Two numbers have a GCF of 12 and an LCM of 288. One of the numbers is 36. What is the other number?

45. The product of two numbers is 3630 and their GCF is 11. What is their LCM?

46. How many factors does 450 have?

47. How many factors does 600 have?

48. How many factors does $2^3 \times 3 \times 5$ have?

49. What is the smallest whole number that is divisible by every whole number from 1 to 5?

50. What is the smallest whole number greater than 2 that leaves a remainder of 2 when divided by 4, 5 and 10?

Answer Key — Number Theory

1. **(A) 13**
   13 has only the factors 1 and 13. 55 = 5 × 11; 39 = 3 × 13; 35 = 5 × 7.

2. **(B) 43**
   43 has only the factors 1 and 43. 77 = 7 × 11; 93 = 3 × 31; 9 = 3 × 3.

3. **(C) 79**
   79 has only the factors 1 and 79. 49 = 7 × 7; 87 = 3 × 29; 9 = 3 × 3.

4. **(D) 73**
   73 has only the factors 1 and 73. 15 = 3 × 5; 65 = 5 × 13; 27 = 3 × 3 × 3.

5. **(B) 1, 2, 3, 4, 6, 8, 12, 24**
   Pair them up: 1 × 24, 2 × 12, 3 × 8, 4 × 6. So the factors are 1, 2, 3, 4, 6, 8, 12, 24.

6. **(D) 1, 2, 4, 8, 16, 32**
   Pair them up: 1 × 32, 2 × 16, 4 × 8. So the factors are 1, 2, 4, 8, 16, 32.

7. **(B) 1, 2, 4, 5, 10, 20, 25, 50, 100**
   Pair them up: 1 × 100, 2 × 50, 4 × 25, 5 × 20, 10 × 10. So the factors are 1, 2, 4, 5, 10, 20, 25, 50, 100.

8. 6
   Find them in pairs: 1 × 76, 2 × 38, 4 × 19. That is 6 factors: 1, 2, 4, 19, 38, 76.

9. 110
   $10 \times 11 = 110$.

10. 25
    $151 \div 6 = 25$ remainder 1, so 25 multiples (6, 12, ..., 150).

11. 59
    $178 \div 3 = 59$ remainder 1, so 59 multiples (3, 6, ..., 177).

12. 91
    $86 \div 7 = 12$ remainder 2, so the next multiple is $13 \times 7 = 91$.

13. **(B) 3468**
    A number is divisible by 3 if its digit sum is divisible by 3. 3468 has digit sum 21, so 3468 ÷ 3 = 1156.

14. **(A) 2648**
    A number is divisible by 4 if its last two digits make a number divisible by 4. 2648 ÷ 4 = 662.

15. **(C) 2493**
    A number is divisible by 9 if its digit sum is divisible by 9. 2493 has digit sum 18, so 2493 ÷ 9 = 277.

16. 2
    $4 = 2 \times 2, \quad 10 = 2 \times 5, \quad 14 = 2 \times 7$, and 2, 5 and 7 have no common factor, so the GCF is 2.

17. 8
    $40 = 2^3 \times 5, 72 = 2^3 \times 3^2$. Shared primes: $2^3 = 8$.

18. 3
    $15 = 3 \times 5, 18 = 2 \times 3^2$. Shared primes: $3 = 3$.

19. 14
    $56 = 2^3 \times 7, 42 = 2 \times 3 \times 7$. Shared primes: $2 \times 7 = 14$.

20. 9
    $27 = 3^3, 36 = 2^2 \times 3^2$. Shared primes: $3^2 = 9$.

21. 120
    Take each prime to its highest power: $6 = 2 \times 3, \quad 8 = 2^3, \quad 10 = 2 \times 5$, so the LCM is $2^3 \times 3 \times 5 = 120$.

22. 130
    GCF is 2, so LCM $= 10 \times 26 \div 2 = 130$.

23. 70
    GCF is 2, so LCM $= 14 \times 10 \div 2 = 70$.

24. 30
    Take each prime to its highest power: $2 = 2, \quad 3 = 3, \quad 15 = 3 \times 5$, so the LCM is $2 \times 3 \times 5 = 30$.

25. 120
    Take each prime to its highest power: $4 = 2^2, \quad 8 = 2^3, \quad 15 = 3 \times 5$, so the LCM is $2^3 \times 3 \times 5 = 120$.

26. **(C)** $2^3 \times 3^2 \times 5$
    Keep dividing by primes: 2 goes in 3 times, 3 goes in 2 times, 5 goes in 1 time. So $360 = 2^3 \times 3^2 \times 5$.

27. **(D)** $2^3 \times 7^2$
    Keep dividing by primes: 2 goes in 3 times, 7 goes in 2 times. So $392 = 2^3 \times 7^2$.

28. **(B)** $2^3 \times 3 \times 5$
    Keep dividing by primes: 2 goes in 3 times, 3 goes in 1 time, 5 goes in 1 time. So $120 = 2^3 \times 3 \times 5$.

29. **(D)** $2^4 \times 3 \times 7$

Keep dividing by primes: 2 goes in 4 times, 3 goes in 1 time, 7 goes in 1 time. So $336 = 2^4 \times 3 \times 7$.

30. 528

$2 \times 2 \times 2 \times 2 \times 3 \times 11 = 528$.

31. 0

It is already even, so it needs a digit sum divisible by 3. The other digits add to 9; adding 0 gives 9, a multiple of 3.

32. 1

Use the rules (digit sum 11, last two digits 18, last digit 8). Only 2 divides it, so the answer is 1.

33. 1

The other digits add to 17. The next multiple of 9 is 18, so the digit is 1.

34. 9

Only the last two digits matter: $96 \div 4 = 24$, and no larger tens digit works (16, 36, 56, 76, 96 are the multiples of 4 ending in 6).

35. 131

The primes are 41, 43 and 47:
$41 + 43 + 47 = 131$.

36. 3

They are 71, 73 and 79, so 3.

37. 29

Every number from 24 to 28 has a factor other than 1 and itself; 29 is prime.

38. 29

Every number from 30 to 30 is composite; 29 is prime.

39. 45 **minutes**

They meet again at the first common multiple: LCM(15, 9) = 45 minutes.

40. 11 **pieces**

Piece length = GCF(16, 72) = 8 cm. Pieces:
$16 \div 8 + 72 \div 8 = 2 + 9 = 11$.

41. 10 **cm**

The length must divide both 20 and 50; the largest is GCF(20, 50) = 10 cm.

42. 4 **packs**

Smallest equal amount: LCM(6, 8) = 24. That is $24 \div 6 = 4$ packs of sausages.

43. 42

GCF × LCM = product, so LCM $= 126 \div 3 = 42$.

44. 96

GCF × LCM = product of the numbers:
$12 \times 288 = 3456$, and $3456 \div 36 = 96$.

45. 330

GCF × LCM = product, so LCM
$= 3630 \div 11 = 330$.

46. 18

$450 = 2 \times 3^2 \times 5^2$. Add 1 to each power and multiply: $(1 + 1) \times (2 + 1) \times (2 + 1) = 18$.

47. 24

$600 = 2^3 \times 3 \times 5^2$. Add 1 to each power and multiply: $(3 + 1) \times (1 + 1) \times (2 + 1) = 24$.

48. 16

Add 1 to each power and multiply:
$(3 + 1) \times (1 + 1) \times (1 + 1) = 16$.

49. 60

Take the highest prime powers up to 5:
$2^2 \times 3 \times 5 = 60$.

50. 22

It is 2 more than a common multiple: LCM(4, 5, 10) = 20, so 20 + 2 = 22.