Practice Paper 1

Number skills | Prime factors | HCF and LCM | Approximation

Name: _____ Class: _____ Date: _____

30 questions | Answer all questions and show your working.

Give exact answers unless a level of accuracy is stated.

A calculator may be used except where a question states otherwise.

1. Express 756 as a product of prime factors in index notation. Hence find its number of positive factors.

2. Find the HCF and LCM of 504 and 756.

3. The positive integers A and B are given below. Leave your answers in index notation.

$A=2^3\times3^2\times5^2$

$B=2^2\times3^4\times5\times7$

(a) Find the HCF of A and B.

(b) Find the LCM of A and B.

4. Find the smallest positive integer k such that 432k is a perfect square. Find the square root of 432k for this value of k.

5. Find the smallest positive integer m such that 360m is a perfect cube. Give the value of this cube.

6. Use prime factorisation to find $\sqrt{1764}$. Show your working. Also find the largest positive integer t for which $\frac{1764}{t}$ is a perfect square.

7. Consider the numbers below. Write all the numbers in each requested category.

$$-3,\ \sqrt{9},\ 17,\ \sqrt{7},\ \frac{5}{8},\ 0,\ 51$$

(a) Integers

(b) Prime numbers

(c) Irrational numbers

8. Arrange these numbers in ascending order.

$\frac{3}{5}, \frac{9}{4}, \frac{-7}{4}, \sqrt{3}, -2$

9. Evaluate without a calculator.

$4-(-2)-3\times(2+1)^2$

10. Evaluate without a calculator. Give a fraction in its simplest form.

$$\left(\frac{7}{3}-\frac{2}{5}\right)\div\frac{7}{6}+\frac{3}{4}$$

11. Evaluate each expression. Explain briefly why the answers are different.

(a) -3^2

(b) $(-3)^2$

12. Evaluate without a calculator.

$$2-\frac{\frac{5}{6}}{\frac{7}{4}-\frac{1}{2}}$$

13. Round 4086.275 to each stated accuracy.

(a) 2 decimal places

(b) 2 significant figures

(c) 4 significant figures

14. Round 0.006837 to each stated accuracy.

(a) 2 significant figures

(b) 4 decimal places

(c) 3 significant figures

15. A length rounds to 74.4 cm correct to 1 decimal place. State the lower bound and upper bound of the original length, and say whether each bound is included.

16. Round each number to 1 significant figure to estimate the expression. State whether this is an overestimate or an underestimate.

$$\frac{19.6\times4.82}{2.04}$$

17. Use a calculator to evaluate the expression. Give your answer to (a) 3 significant figures and (b) 4 decimal places.

$$\frac{\sqrt{39}+2.31}{(7.2)^2}$$

18. A teacher has 168 pencils, 252 erasers and 420 rulers. She makes the greatest possible number of identical packs, using every item.

(a) How many packs can she make?

(b) What does each pack contain?

19. A rectangular board measures 252 cm by 378 cm. It is cut into equal square pieces with no waste.

(a) Find the largest possible side length of a square.

(b) How many such squares are obtained?

20. Three lights flash every 18, 24 and 30 seconds. They flash together at 10:00:00.

(a) After how many seconds will they next flash together?

(b) State the next time.

(c) How many further simultaneous flashes occur up to and including 11:00:00?

21. A number is greater than 200. When divided by 12 or by 18, it leaves a remainder of 5 in each case. Find the smallest possible number.

22. Two positive integers have HCF 6 and LCM 210. One integer is 30. Find the other integer.

23. Find the smallest positive integer k such that 72k is a multiple of 150.

24. List every common multiple of 18 and 24 that is strictly between 200 and 500.

25. The integer N = 180. Find (a) the total number of its positive factors and (b) the number of these factors that are perfect squares.

26. A student claims that 864 is a perfect square because it has a square factor, 144. Is the claim correct? State the smallest positive integer by which 864 must be divided to obtain a perfect square.

27. At dawn the temperature was -8°C. It rose by 17°C, then fell by 6°C. The final temperature was 4°C higher than the previous evening.

(a) Find the final temperature.

(b) Find the temperature the previous evening.

28. A container is initially full. A quarter of its water is removed. Then $\frac{2}{5}$ of the remaining water is removed. There are 36 litres left.

(a) What fraction of the original amount remains?

(b) Find the original amount of water.

29. Consider the integers strictly between 20 and 220.

(a) List the perfect squares.

(b) List the perfect cubes.

(c) Which of these integers are both a perfect square and a perfect cube?

30. Two positive integers have HCF 8, LCM 240, and sum 88. Find both integers. Explain why they satisfy all three conditions.

Final Answers

1. $2^2 \times 3^3 \times 7$

24

2. HCF = 252; LCM = 1512.

3. (a) $2^2 \times 3^2 \times 5$

(b) $2^3 \times 3^4 \times 5^2 \times 7$

4. k = 3

36

5. m = 75

27000

6. 42

t = 1764

Final Answers

7. (a) $-3, \sqrt{9}$, 17, 0, 51

(b) 17 and $\sqrt{9}$

(c) $\sqrt{7}$

8. $-2, \frac{-7}{4}, \frac{3}{5}, \sqrt{3}, \frac{9}{4}$

9. -21

10. $\frac{337}{140}$

11. (a) -9

(b) 9

The brackets make the negative number the base in (b).

12. $\frac{4}{3}$

Final Answers

13. (a) 4086.28

(b) 4100

(c) 4086

14. (a) 0.0068

(b) 0.0068

(c) 0.00684

15. Lower bound 74.35 cm, included; upper bound 74.45 cm, excluded.

16. 50

Overestimate.

17. (a) 0.165

(b) 0.1650

18. (a) 84 packs

(b) 2 pencils, 3 erasers and 5 rulers per pack.

Final Answers

19. (a) 126 cm

(b) 6 pieces

20. (a) 360 seconds

(b) 10:06:00

(c) 10

21. 221

22. 42

23. 25

24. 216, 288, 360, 432

Final Answers

25. (a) 18

(b) 4

26. No; divide by 6.

27. (a) 3°C

(b) -1°C

28. (a) $\frac{9}{20}$

(b) 80 litres

29. (a) 25, 36, 49, 64, 81, 100, 121, 144, 169, 196

(b) 27, 64, 125, 216

(c) 64

30. 40 and 48; their HCF is 8, LCM is 240, and sum is 88.