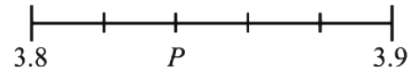# Unit 1: Number

1. **O/N 17/P12/Q6/a**
   (a) The diagram shows a scale from 3.8 to 3.9, divided into five equal parts.

   What is the value at the mark labelled P?   [1]

2. **M/J 17/P12/Q1/b**
   (a) Evaluate 0.2×0.006.   **[1]**

3. **M/J 17/P11/Q1/b**
   (a) Add one pair of brackets to make the statement below true.
   $$2 \times 3 + 4 \times 5 = 70$$ **[1]**

4. **M/J 17/P11/Q14**
   (a) Write 0.000 186 in standard form.   **[1]**

   (b) $\qquad\qquad s = 1.3 \times 10^7 \qquad\qquad t = 8 \times 10^8$

   Giving each answer in standard form, find

   (i) t^2,   **[1]**

   (ii) $t - s$.   **[2]**

5. **O/N 16/P12/Q1/a**
   (a) Evaluate $9.03 - (4.273 + 2.3)$.   **[1]**

6. **O/N 16/P11/Q2**
   The paper on a roll is 4.5 metres long.
   Mary cuts as many pieces as possible, each of length 60 cm, from the roll.
   (a) Calculate the number of pieces.   **[1]**

   (b) Calculate the length of paper that remains on the roll.   [1]

7. **M/J 16/P12/Q6**
   (a) Express 96 as a product of its prime factors.   **[1]**

   (b) 24 is a common factor of 96 and the integer n.
   Given that n is less than 96, find the largest possible value of n.   **[1]**

8. **M/J 16/P11/Q1/a**
   (a) Evaluate $12 - 6 \div 3 + 4$.   **[1]**

   (b) $\qquad\qquad M = 2 \times 3^2 \qquad\qquad N = 2^4 \times 3^2$

   Find the values of p and q when
   (i) $M \times N = 2^P \times 3^q$,   **[1]**

9. **M/J 16/P11/Q21**
   (a) Express 500 as the product of its prime factors.   **[1]**

   (b) $\qquad\qquad M = 2 \times 3^2 \qquad\qquad N = 2^4 \times 3^2$

   Find the values of p and q when
   (i) $M \times N = 2^P \times 3^q$,   **[1]**

   (ii) $M \div N = 2^p \times 3^q$,   **[1]**

   (iii) $N^2 = 2^P \times 3^q$.   **[1]**

10. O/N 15/P12/Q1

    (a) Evaluate 0.03×0.3.   **[1]**

    (b) Evaluate $5 - 2(3 - 1.4)$.   **[1]**

11. O/N 15/P11/Q1

    (a) Work out $12 + 6 \div 3 + 1 \times 5$.   **[1]**

    (b) Work out $\dfrac{7}{9} - \dfrac{3}{5}$.   **[1]**

12. O/N 15/P11/Q10/a,b

Here is a list of numbers.

$$-8 \quad -5 \quad -3 \quad -2 \quad 0 \quad 2 \quad 4 \quad 9$$

    (a) Write down two numbers from the list that have a difference of 10.   **[1]**

    (b) Find the sum of the numbers in the list.   **[1]**

13. M/J 15/P12/Q1

    (a) Evaluate $\dfrac{1.3 + 2.9}{0.2}$.   **[1]**

    (b) Evaluate $2\dfrac{1}{4} \times \dfrac{1}{5}$.   **[1]**

14. M/J 15/P11/Q1

    (a) Evaluate $\dfrac{3}{8} + 1\dfrac{1}{3}$.   **[1]**

    (b) Evaluate $5 - 3(2 - 1.4)$.   **[1]**

15. O/N 14/P11/Q1/a

    (a) Write the number forty one thousand and six in figures.   **[1]**

16. O/N 14/P11/Q2/b

    (a) Evaluate 0.4×0.2.   **[1]**

17. O/N 14/P11/Q4/b

x is an integer between 50 and 70 .
Write down the value of x when
    (a) x is a prime factor of 268.   **[1]**

18. M/J 14/P12/Q1/b

    (a) Evaluate $0.018 \div 0.06$.   **[1]**

19. M/J 14/P11/Q2

    (a) Evaluate $5 + 1 \times 0.3$.   [1]

    (b) Evaluate $18 \div 0.2$.   [1]

20. M/J 14/P11/Q8/b

    (a) Write $\dfrac{8}{25}$ as a decimal.   **[1]**

21. M/J 14/P11/Q15

    (a) Find an integer r such that $r > 5$ and $5r - 1$ is a square number.   **[1]**

    (b) Find the value of s which makes $8s + 2$ a prime number.   **[1]**

    (c) Write down an irrational number between 7 and 8.   **[1]**

22. O/N 13/P12/Q2

    (a) Evaluate $3\frac{1}{4} - 1\frac{4}{5}$.   **[1]**

    (b) Evaluate 3.01×0.02 .   **[1]**

23. O/N 13/P11/Q1/a

    (a) Evaluate $2\frac{3}{4} - 1\frac{13}{16}$.   **[1]**

24. O/N 13/P11/Q2/a

    (a) Evaluate 0.02×1.2 .   **[1]**

25. M/J 13/P12/Q3/a

    (a) Write these lengths in order of size, starting with the shortest.   **[1]**

              500m   5cm   50km   500mm

26. M/J 13/P12/Q8/b,c

    (a) Omar thinks of a **two-digit** number.
        It is a factor of 78.
        It is a prime number.
        What is his number?   **[1]**

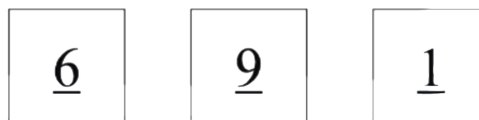   (b) Write down an irrational number between 1 and 2   **[1]**

27. M/J 13/P12/Q9/b,c

    (a) $\sqrt{131}$ lies between two consecutive integers.
        Complete the inequality below with these integers.   **[1]**

    (b) Add brackets to the statement below to make it correct.   **[1]**

        $3 \times 2 + 1^2 = 49$

28. M/J 13/P11/Q12/a,b

The three cards above can be rearranged to make

three-digit numbers, for example 916.

Arrange the three cards to make

                                              | $\underline{6}$ | | $\underline{9}$ | | $\underline{1}$ |

    (a) the three-digit number that is closest to 650,   **[1]**

    (b) the three-digit number that is a multiple of 7,   **[1]**

29. O/N 12/P12/Q1/a

    (a) Evaluate $8 + 2 \times 1.3$.   [1]

30. O/N 12/P12/Q10

    (a) Express 180 as the product of its prime factors.   [1]

    (b) $\sqrt{180}$ can be expressed in the form $p\sqrt{q}$, where p and q are integers.   [1]
        Find the smallest value of $p + q$.

31. O/N 12/P11/Q2/a

    (a) Evaluate $0.7 + 0.2 \times 0.3$.   [1]

32. M/J 12/P11/Q9

Buses following route A leave the bus station every five minutes.
Buses following route B leave the bus station every six minutes.
Buses following route C leave the bus station every nine minutes.
Three buses, following routes A, B and C, leave together at 13 00.

What is the next time when buses following all three routes leave the bus station together?　　[2]

33. M/J 12/P11/Q12

From the numbers listed above, write down

$$\boxed{0.2 \qquad 2 \qquad \sqrt{2} \qquad \frac{1}{3} \qquad 0.83 \qquad 8 \qquad 81}$$

(a) a prime number,　　[1]

(b) a cube number,　　[1]

(c) an irrational number.　　[1]

34. O/N 11/P12/Q1

(a) Evaluate $2\frac{3}{4} - 1\frac{7}{9}$.　　[1]

(b) Evaluate $0.7 - 0.1 \times 3$.　　[1]

35. M/J 11/P12/Q14

(a) Express 108 as a product of its prime factors.　　[1]

(b) Written as products of their prime factors, $N = 2^p \times 5^q \times 7^r$ and $500 = 2^2 \times 5^3$.

The highest common factor of N and 500 is $2^2 \times 5^2$.

The lowest common multiple of N and 500 is $2^3 \times 5^3 \times 7$.

Find p, q and r.　　[2]

36. M/J 11/P11/Q2/b

(a) Write down an irrational number between 3 and 4.　　[1]

37. M/J 11/P11/Q4

Write down

(a) a square number that is a factor of 75,　　[1]

(b) a cube number that is a multiple of 24.　　[1]

38. O/N 10/P12/Q1, O/N 10/P13/Q1

(a) Evaluate $3\frac{1}{7} - 2\frac{1}{3}$.　　[1]

(b) Evaluate $\frac{2}{9} \times 1\frac{7}{8}$, giving your answer as a fraction in its lowest terms.　　[1]

39. O/N 10/P12/Q2, O/N 10/P13/Q2

(a) Evaluate $6.3 \div 0.09$.　　[1]

(b) Find the decimal number that is exactly halfway between 3.8 and 4.3 .　　[1]

40. M/J 10/P12/Q1, M/J 10/P13/Q1

Evaluate

(a) $1.5 - 0.2 \times 4$,　　[1]

(b) $4.2 \div 0.07$.　　[1]

41. M/J 10/P12/Q9, M/J 10/P13/Q9

Written as a product of prime factors, $168 = 2^3 \times 3 \times 7$.

(a) Express 140 as a product of its prime factors.　　[1]

(b) Find the highest common factor of 168 and 140.　　[1]

(c) Find the smallest positive integer, n, such that $168n$ is a square number.　　[1]

42. M/J 10/P11/Q2

   (a) Evaluate $10 - 8 \div 2 + 3$.   **[1]**

   (b) Find 20% of 60 cm.   **[1]**

43. O/N 09/P01/Q4

The numbers 294 and 784, written as the product of their prime factors, are

$$294 = 2 \times 3 \times 7^2 , \qquad\qquad 784 = 2^4 \times 7^2 .$$

Find

   (a) the largest integer which is a factor of both 294 and 784,   **[1]**

   (b) $\sqrt{784}$.   **[1]**

44. M/J 09/P01/Q1/a

   (a) Evaluate $17 - 5 \times 3 + 1$.   **[1]**

45. M/J 09/P01/Q3/b

   (a) Write down the two prime numbers between 30 and 40.   **[1]**

46. M/J 09/P01/Q5/a

   (a) Evaluate 0.5×0.007.   **[1]**

47. M/J 09/P01/Q6

   (a) Write down all the factors of 18.   **[1]**

   (b) Write 392 as the product of its prime factors.   **[1]**

48. M/J 09/P01/Q17/b

   (a) Given that y is an integer and $-3 < 2y - 6 < 4$, list the possible values of y.   **[2]**

49. O/N 08/P01/Q1

Evaluate

   (a) 0.3×0.06,   **[1]**

   (b) $0.4 + 0.3 \times 5$.   **[1]**

50. M/J 08/P01/Q1

   (a) $\dfrac{1}{2} - \dfrac{3}{7}$,   **[1]**

   (b) $2\dfrac{2}{3} \times 1\dfrac{3}{4}$.   **[1]**

51. M/J 08/P01/Q2

Evaluate

   (a) $25 - 18.3$,   **[1]**

   (b) 1.7×0.03.   **[1]**

52. M/J 08/P01/Q5

It is given that $68.2 \times 0.235 = 16.027$.

Hence evaluate

   (a) 0.0682×2350,   **[1]**

   (b) $160.27 \div 0.0235$.   **[1]**

Answers Section

1. **O/N 17/P12/Q6/a**
   (a) 3.84   1

2. **M/J 17/P12/Q1/b**
   (a) 0.0012 oe   1

3. **M/J 17/P11/Q1/b**
   (a) $2 \times (3 + 4) \times 5$ cao   1

4. **M/J 17/P11/Q14**
   (a) 1.86×10^{-4} 1
   (b) (i) 6.4×10^{17} 1
        (ii) 7.87×10^{8} 2

5. **O/N 16/P12/Q1/a**
   (a) 2.457   1

6. **O/N 16/P11/Q2**
   (a) 7   1
   (b) 30   1

7. **M/J 16/P12/Q6**
   (a) $2^{5} \times 3$ 1*
   (b) 72   1

8. **M/J 16/P11/Q1/a**
   (a) 14   1

9. **M/J 16/P11/Q21**
   (a) $2^{2} \times 5^{3}$ 1
   (b) (i) $p = 5$ and $q = 4$ 1
        (ii) $p = -3$ and $q = 0$ 1
        (iii) $p = 8$ and $q = 4$ 1

10. **O/N 15/P12/Q1**
    (a) 0.009(0...)   1
    (b) 1.8   1

11. **O/N 15/P11/Q1**
    (a) 19   1
    (b) $\frac{8}{45}$ oe   1

12. **O/N 15/P11/Q10/a,b**
    (a) −8 and 2   1
    (b) −3   1

13. **M/J 15/P12/Q1**
    (a) 21   1
    (b) $\frac{9}{20}$ oe   1

14. **M/J 15/P11/Q1**
    (a) $1\frac{17}{24}, \frac{41}{24}$ oe   1
    (b) 3.2 oe   1

15. **O/N 14/P11/Q1/a**
    (a) 41 006   1

16. **O/N 14/P11/Q2/b**
    (a) (0).08   1

17. **O/N 14/P11/Q4/b**
    (a) 67

18. **M/J 14/P12/Q1/b**
    (a) 0.3oe

19. **M/J 14/P11/Q2**
    (a) 5.3
    (b) 90

20. **M/J 14/P11/Q8/b**
    (a) (0).32

21. **M/J 14/P11/Q15**
    (a) 10 etc.
    (b) 0
    (c) $\sqrt{50}$ etc.

22. **O/N 13/P12/Q2**
    (a) $1\frac{9}{20}$
    (b) 0.0602

23. **O/N 13/P11/Q1/a**
    (a) $\frac{15}{16}$ oe

24. **O/N 13/P11/Q2/a**
    (a) 0.024

25. M/J 13/P12/Q3/a

   (a) 5 cm, 500 mm, 500 m, 50 km   **1**

26. M/J 13/P12/Q8/b,c

   (a) 13   **1**

   (b) Any irrational number in range   **1**
     $1 < n < 2$

27. M/J 13/P12/Q9/b,c

   (a) $11 \;(< \sqrt{131} <)\; 12$ **1**

   (b) $(3 \times 2 + 1\;)^2 = 49$ **1**

28. M/J 13/P11/Q12/a,b

   (a) 619   **1**

   (b) 196   **1**

29. O/N 12/P12/Q1/a

   (a) 10.6   **1**

30. O/N 12/P12/Q10

   (a) $2^2 \times 3^2 \times 5$ oe   **1**

   (b) 11 www   **1**

31. O/N 12/P11/Q2/a

   (a) 0.76 oe   **1**

32. M/J 12/P11/Q9

   14 30   **2**

33. M/J 12/P11/Q12

   (a) 2   **1**

   (b) 8   **1**

   (c) $\sqrt{2}$ **1**

34. O/N 11/P12/Q1

   (a) $\dfrac{35}{36}$ **1**

   (b) 0.4   **1**

35. M/J 11/P12/Q14

   (a) $2^2 \times 3^3$ **1**

   (b) $(p =)\,3,\,(q =)\,2,\,(r =)\,1$ **2**

36. M/J 11/P11/Q2/b

   (a) $\pi,\,\sqrt{10}\,,\,........$ **1**

37. M/J 11/P11/Q4

   (a) 1 or 25   **1**

   (b) 216   **1**

38. O/N 10/P12/Q1, O/N 10/P13/Q1

   (a) $\dfrac{17}{21}$ oe   **1**

   (b) $\dfrac{5}{12}$ cao   **1**

39. O/N 10/P12/Q2, O/N 10/P13/Q2

   (a) 70   **1**   **(b)** 4.05   **1**

40. M/J 10/P12/Q1, M/J 10/P13/Q1

   (a) 0.7   **1**   **(b)** 60   **1**

41. M/J 10/P12/Q9, M/J 10/P13/Q9

   (a) $2^2 \times 5 \times 7$ **1**

   (b) 28   **1**

   (c) 42   **1**

42. M/J 10/P11/Q2

   (a) 9   **1**   **(b)** 12   **1**

43. O/N 09/P01/Q4

   (a) $98, 2 \times 7^2 , 2 \times 7 \times 7$ **1**

   (b) 28   **1**

44. M/J 09/P01/Q1/a

   (a) 3   **1**

45. M/J 09/P01/Q3/b

   (a) 31, 37   **1**

46. M/J 09/P01/Q5/a

   (a) (0).0035

47. M/J 09/P01/Q6

   (a) 1,2,3,6,9,18   **1**

   (b) $2^3 \times 7^2$ **1**

48. M/J 09/P01/Q17/b

   (a) 2,3,4   **2**

49. O/N 08/P01/Q1

   (a) 0.018 or equiv.   **1**

   (b) 1.9 or equiv.   **1**

50. M/J 08/P01/Q1

   (a) $\dfrac{1}{14}$ **1**   **(b)** $4\dfrac{2k}{3k}$ **1**

51. M/J 08/P01/Q2

   (a) 6.7 oe   **1**   **(b)** (0).051 oe   **1**

52. M/J 08/P01/Q5

   (a) 160.27   **1**   **(b)** 6820   **1**