

Name:

Date:

INSTRUCTIONS TO CANDIDATES**Section A (30 marks)****Time: 45 minutes**

1. Answer **all** the questions in this section.
2. Calculators may **not** be used in this section.
3. All working must be clearly shown. Omission of essential working will result in loss of marks.
4. The marks for each question is shown in brackets [] at the end of each question.

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- 1 Draw a number line to represent the following sets of numbers.

- (a) Natural number < 5 .
(b) Odd numbers > 7 but ≤ 17 .

Answer

(a) [1]

(b) [1]

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- 2 Evaluate

- (a) $[79 + (265 + 135) + 20 - 15] + 12$,
(b) $3 \times \{63 + [21 - (5 + 7) \div 3]\}$.

Answer (a) [2]

(b) [2]

3 Evaluate without using long multiplication

(a) 86×999 ,

(b) $25 \times 88 \times 3$.

Answer (a) [2]

(b) [1]

4 Fill in the boxes with =, > or < .

Answer

(a) $2 \times 38 \times 5$ 360 [1]

(b) $170 + 40 \div 8 \times 2$ 190 [2]

(c) $25 \times 19 + 25 \times 21$ 1000 [2]

5 (a) Write down two 5-digit numbers using all the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9 such that their difference is the smallest.

(b) Find the product of the largest and smallest even number between 19 and 91.

Answer (a) [2]

(b) [1]

6 Find the sum of $101 + 102 + 103 + \dots + 198 + 199 + 200$.

Answer [3]

7 Given that $666 \times 91 = 60\,606$, write down the values of

(a) 222×91 ,

(b) 888×91 .

Answer (a) [1]

(b) [1]

8 Calculate the following mentally.

(a) $36 + 59 + 85 + 28 + 24 + 12 + 41$

(b) $89\,993 \times 89\,994 - 89\,993 \times 89\,993$

Answer (a) [1]

(b) [2]

INSTRUCTIONS TO CANDIDATES

Section B (30 marks)

Time: 45 minutes

1. Answer all the questions in this section.
 2. Calculators may be used in this section.
 3. All working must be clearly shown. Omission of essential working will result in loss of marks.
 4. The marks for each question is shown in brackets [] at the end of each question.
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- 11 (a) Insert the mathematical symbols (+, −, × and ÷) in the boxes to make the equation below true. Symbols may be used more than once.

Answer (a)

$$[(7 \square 7 \square 7 \square 7) \square 7] = 5 \quad [3]$$

- (b) Insert one pair of brackets [] to make the following number sentence true.

Answer (b)

$$50 - 7 \times 7 - 3 - 7 = 15 \quad [3]$$

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- 12 (a) Jack is 15 years old. His mother is three times as old as he is. How old will Jack be when his mother is 65 years old?
- (b) The sum of three consecutive whole numbers is 258. Find the product of the smallest and the largest number.

Answer (a) years old [3]

(b) [3]

13 (a) 5 pens and 4 pencils cost \$39. 4 pens and 5 pencils cost \$24. Find the total cost of 2 pens and 2 pencils.

(b) Cookies were sold in small and big tins. There are 24 cookies in a small tin and 50 cookies in a big tin. Mrs Lee bought 15 small tins and some big tins of cookies. If she bought 1210 pieces of cookies altogether, find the number of big tins of cookies she bought by completing and simplifying the expression below.

Answer (b)

$$(\square - 15 \times \square) \div \square \quad [1]$$

Answer (a) \$ [4]

(b) tins of cookies [2]

14 A shopkeeper bought 15 boxes of erasers for \$270. There were 60 erasers in each box. He also bought 20 boxes of sharpeners at \$300. There were 100 sharpeners in each box. He then packs the erasers into smaller packets and the sharpeners into smaller packets and sold each of these packets for \$1. The profit he received for selling all the items is given by

$$\$[15 \times (60 \div 3 - 18) + 20 \times (100 \div 5 - 15)]$$

Find

- (a) the number of erasers in each packet,
- (b) the number of sharpeners in each packet,
- (c) the profit he made.

Answer (a) erasers [1]

(b) sharpeners [1]

(c) \$ [2]

- 15 (a) A durian seller sold each durian for \$6. If a durian is either not ripe or rotten when opened, it will not be charged. The durian seller sold 39 durians on Saturday and 53 durians on Sunday. If he collected \$480 for both days, how many of the durians sold were not ripe or rotten?
- (b) A certain mathematics question required a student to divide a number by 6. Linda made a mistake and divided that number by 9. She obtained a quotient of 99 and a remainder of 5. What should the actual quotient and remainder have been?

Answer (a) durians [4]

(b) Quotient =

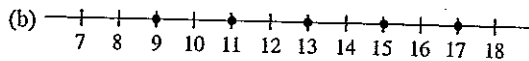
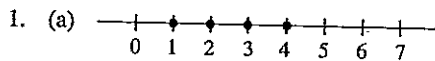
Remainder = [3]

Worked Solutions to Test Papers

(MATHEMATICS Topical Test Papers for Secondary 1)

Test 1: Whole Numbers

Section A



2. (a) $[79 + (265 + 135) \div 20 - 15] \div 12$
 $= [79 + 400 \div 20 - 15] \div 12$
 $= [79 + 20 - 15] \div 12$
 $= 84 \div 12$
 $= 7$

Simplify innermost brackets first.

Within brackets, do division before addition and subtraction.

(b) $3 \times \{63 + [21 - (5 + 7) \div 3]\}$
 $= 3 \times \{63 + [21 - 12 \div 3]\}$
 $= 3 \times \{63 + [21 - 4]\}$
 $= 3 \times \{63 + 17\}$
 $= 3 \times 80$
 $= 240$

Teacher's Tip

- Simplify the expressions within the brackets first.
- Start with innermost brackets.
- Perform multiplication and division before addition and subtraction, working from left to right.

3. (a) 86×999
 $= 86 \times (1000 - 1)$
 $= 86 \times 1000 - 86 \times 1$
 $= 86\,000 - 86$
 $= 85\,914$

Use the distributive law of multiplication over subtraction.
 $a \times (b - c) = a \times b - a \times c$

(b) $25 \times 88 \times 3$
 $= 25 \times 4 \times 22 \times 3$
 $= 100 \times 66$
 $= 6600$

4. (a) $2 \times 38 \times 5$
 $= 2 \times 5 \times 38$
 $= 10 \times 38$
 $= 380$
 $\therefore 2 \times 38 \times 5 \square 360$

(b) $170 + 40 \div 8 \times 2$
 $= 170 + 5 \times 2$
 $= 170 + 10$
 $= 180$
 $\therefore 170 + 40 \div 8 \times 2 \square 190$

(c) $25 \times 19 + 25 \times 21$
 $= 25 \times (19 + 21)$
 $= 25 \times 40$
 $= 1000$
 $\therefore 25 \times 19 + 25 \times 21 \square 1000$

Teacher's Tip

Use the distributive law of multiplication over addition.

$$a \times b + a \times c = a \times (b + c)$$

5. (a) $50\,123$
 $- 49\,876$
 $\hline 247$

\therefore the two numbers are 50 123 and 49 876.

(b) Largest even no. = 90
 Smallest even no. = 20
 Product of 90 and 20
 $= 90 \times 20$
 $= 1800$

6. $101 + 102 + 103 + \dots + 198 + 199 + 200$
 $= (100 + 1) + (100 + 2) + \dots + (100 + 98) +$
 $(100 + 99) + (100 + 100)$
 $= (100 \times 100) + (1 + 2 + 3 + \dots + 100)$
 $= 10\,000 + 5050$
 $= 15\,050$

Teacher's Tip

To find the sum of $1 + 2 + 3 + \dots + 98 + 99 + 100$,

$$\begin{array}{c} 101 \\ \swarrow \quad \searrow \\ 1 + 2 + 3 + \dots + 98 + 99 + 100 \\ \nwarrow \quad \swarrow \\ 101 \\ = 50 \times 101 \\ = 5050 \end{array}$$

7. (a) 222×91
 $= \frac{666}{3} \times 91$
 $= \frac{60\,606}{3}$
 $= 20\,202$

(b) 888×91
 $= 4 \times 222 \times 91$
 $= 4 \times 20\,202$
 $= 80\,808$

Teacher's Tip

Quotient: The result of dividing one quantity by another.

Divisor: The number by which we are dividing.

Dividend: A number which is being divided.

E.g.

$$\begin{array}{r} \text{quotient} \\ \downarrow \\ 2 \overline{) 14} \leftarrow \text{remainder} \\ \underline{-10} \\ 4 \\ \underline{-4} \\ 0 \end{array}$$

divisor \rightarrow 2, dividend \leftarrow 14

Test 2: Factors and Multiples**Section A**

1. (a) **Method 1: Using prime factors**

$$\begin{aligned} 36 &= 2 \times 2 \times 3 \times 3 \\ 90 &= 2 \times 3 \times 3 \times 5 \\ 108 &= 2 \times 2 \times 3 \times 3 \times 3 \\ \text{HCF} &= 2 \times 3 \times 3 = 18 \end{aligned}$$

$$\begin{array}{r|l} 2 & 36 \\ \hline 2 & 18 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 90 \\ \hline 3 & 45 \\ 3 & 15 \\ 3 & 5 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 108 \\ \hline 2 & 54 \\ 3 & 27 \\ 3 & 9 \\ 3 & 3 \\ \hline & 1 \end{array}$$

Teacher's Tip

The HCF is the product of the common factors.

- Method 2: Using prime division**

$$\begin{array}{r|l} 2 & 36, 90, 108 \\ \hline 3 & 18, 45, 54 \\ \hline 3 & 6, 15, 18 \\ \hline & 2, 5, 6 \end{array}$$

Teacher's Tip

Divide by the smallest common factor of the 3 numbers until there are no more common factors.

$$\therefore \text{HCF} = 2 \times 3 \times 3 = 18$$

Teacher's Tip

When a set of numbers has more than one common factor, the largest of these common factors is the HCF (Highest common factor).

- (b) **Method 1: Using prime factors**

$$\begin{aligned} 45 &= 3^2 \times 5 \\ 60 &= 2^2 \times 3 \times 5 \\ 150 &= 2 \times 3 \times 5^2 \\ \therefore \text{LCM} &= 2^2 \times 3^2 \times 5^2 \\ &= 900 \end{aligned}$$

Teacher's Tip

The LCM is the product of the different factors with the highest power.

- Method 2: Using prime division**

$$\begin{array}{r|l} 2 & 45, 60, 150 \\ \hline 2 & 45, 30, 75 \\ 3 & 45, 15, 75 \\ 3 & 15, 5, 25 \\ 5 & 5, 5, 25 \\ 5 & 1, 1, 5 \\ & 1, 1, 1 \end{array}$$

Teacher's Tip

Divide by the smallest factor. If a number is not divisible, carry it down to the next line as it is. Continue to divide until all the quotients are 1.

$$\therefore \text{the LCM} = 2^2 \times 3^2 \times 5^2 = 900.$$

Teacher's Tip

When a set of numbers has many common multiples, the smallest of these is the LCM (Lowest common multiple).

2. (a) **Teacher's Tip**

A prime number is a number which is divisible by itself and 1.

$$\begin{aligned} \text{Largest prime number} &= 79 \\ \text{Smallest prime number} &= 31 \\ \text{Sum of 31 and 79} &= 31 + 79 \\ &= 110 \end{aligned}$$

- (b) **Teacher's Tip**

Express 1368 as a product of prime factors first.

$$\begin{aligned} 1368 &= 2^3 \times 3^2 \times 19 \\ \therefore \text{largest prime factor} &= 19 \end{aligned}$$

$$\begin{array}{r|l} 2 & 1368 \\ \hline 2 & 684 \\ 2 & 342 \\ 3 & 171 \\ 3 & 57 \\ 19 & 19 \\ & 1 \end{array}$$