

**MID-YEAR EXAMINATION  
MATHEMATICS – PART 1**

Specimen Paper A

**Marks: /50**

**Time: 1 hour**

Name: .....

Date: .....

**INSTRUCTIONS TO CANDIDATES**

1. Answer **all** the questions.
2. Answers are to be written in the spaces provided on the question paper.
3. All necessary working must be clearly shown in the space below the particular question.  
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.

**ELECTRONIC CALCULATORS ARE NOT ALLOWED TO BE USED IN THIS PAPER.**

- 
- 1 Find the value of
    - (a)  $26.62 - 8.857$ ,
    - (b)  $15\frac{1}{3} - 8\frac{3}{5}$ .

Answer (a) ..... [1]

(b) ..... [1]

- 
- 2 Express 0.005845 correct to
    - (a) 3 significant figures,
    - (b) 2 decimal places.

Answer (a) ..... [1]

(b) ..... [1]

- 3 Given that  $15.6 \times 8.5 = 132.6$ , write down the values of
- (a)  $1.56 \times 0.85$ ,
  - (b)  $1.326 \div 156$ .

Answer (a) ..... [1]

(b) ..... [1]

- 
- 4 (a) Simplify  $\frac{\sqrt[3]{216} + 3^2}{6 \times \sqrt{81}}$ , expressing your answer as a fraction in its lowest term.
- (b) Evaluate  $\{(25 - 31) \times (-24) \div 8\} - (-5 - 12) \div 7$ .

Answer (a) ..... [2]

(b) ..... [2]

- 5 (a) Find the fraction which is exactly halfway between  $\frac{1}{9}$  and  $\frac{4}{9}$ .  
 (b) (i) Express 2744 as a product of prime numbers.  
 (ii) Hence find the cube root of 2744.

Answer (a) ..... [1]

(b) (i) 2744 = ..... [1]

(ii) ..... [1]

- 6 (a) Express  $\frac{7}{22}$  as a recurring decimal.  
 (b) State which of the following numbers are irrational.

$$\frac{22}{7}, \sqrt{2} \times \sqrt{8}, \pi, 2\sqrt{3}$$

Answer (a) ..... [2]

(b) ..... [1]

7 Evaluate  $\sqrt{\frac{1}{10} \times \left(\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81}\right)}$  giving your answer as a fraction.

Answer ..... [2]

- 8 (a) Write down the next two terms of the sequence 11, 10, 8, 5, .....
- (b) Each box in the row below consists of a single digit number such that the sum of any three numbers in succession in the row is 15. Fill in the missing numbers in the boxes.

Answer (b)

6								4		
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[2]

Answer (a) ..... [1]

- 9 (a) Find the lowest common multiple of 18, 60 and 66.  
 (b) Three lighthouses flashed simultaneously at 11 00. The first lighthouse flashes every 18 seconds, the second lighthouse flashes every 60 seconds and the third lighthouse flashes every 66 seconds. Find the next time the three lighthouses flash together again.

Answer (a) ..... [2]

(b) ..... [2]

10 (a) Simplify  $\frac{2x - 5}{3} - \frac{x - 9}{7}$ .

(b) Given that  $a = \frac{1}{2}$ ,  $b = \frac{1}{5}$  and  $c = -3$ , find the values of

(i)  $\frac{c}{a - 5b}$ ,

(ii)  $\frac{a^2c}{b}$ .

Answer (a) ..... [2]

(b) (i) ..... [2]

(ii) ..... [2]

- 11 (a) Express, correct to 2 significant figures  
(i) 348.638, (ii) 0.03985.  
(b) Hence estimate correct to 1 significant figure, the value of  $348.638 \times 0.03985$ .

Answer (a) (i) ..... [1]  
(ii) ..... [1]  
(b) ..... [1]

12 Solve the following equations.

(a)  $2(5 - x) = 3x - 5$

(b)  $1\frac{1}{3}y = -8$

Answer (a)  $x =$  ..... [2]  
(b)  $y =$  ..... [1]

- 13 Lisa bought  $x$  brooches. She also bought three more bangles than brooches.
- (a) Write down in terms of  $x$ , an expression for the number of bangles she bought.
  - (b) Each brooch cost \$3 and each bangle cost \$5. Find as simple as possible, an expression in terms of  $x$ , for the total amount of money she spent on the brooches and bangles.

Answer (a) ..... bangles [1]

(b) \$ ..... [2]

- 14 In a laboratory experiment, the highest temperature recorded was  $69.5^{\circ}\text{C}$  and the lowest temperature recorded was  $-78.5^{\circ}\text{C}$ .
- (a) Find the difference between these two temperatures.
  - (b) In another particular experiment, the temperature recorded was  $59^{\circ}\text{C}$  higher than  $-78.5^{\circ}\text{C}$ . Find this temperature.

Answer (a) .....  $^{\circ}\text{C}$  [1]

(b) .....  $^{\circ}\text{C}$  [1]

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- 15 Raymond withdrew all his money from his savings account. He spent \$50 on a watch and  $\frac{3}{5}$  of the remainder on comics. He gave half of what was left to his sister and donated the remaining \$35 to charity. How much money did Raymond originally have in his savings account?

Answer \$..... [3]

- 16 Consider the number pattern which is made up of odd numbers.

$$\begin{array}{l}
 101 + 103 + 105 = 3(103) = 309 \\
 107 + 109 + 111 = 3(109) = 327 \\
 113 + 115 + 117 = 3(115) = 345 \\
 \vdots \\
 a + b + c = 3(d) = 453
 \end{array}$$

- (a) Write down the next line of the pattern.  
 (b) Find the values of  $a$ ,  $b$ ,  $c$  and  $d$ .

Answer (a) ..... [1]

(b)  $a =$  .....

$b =$  .....

$c =$  .....

$d =$  ..... [4]



(b) When  $A = 228.90$

$$228.90 = 120 + \frac{15n}{100}$$

$$\frac{15n}{100} = 108.90$$

$$n = \frac{108.90 \times 100}{15}$$

$$= 726$$

$\therefore$  he sold **726** toys.

(c)  $A = 105 + \frac{18n}{100}$

### Teacher's Tip

The original equation  $A = 120 + \frac{15n}{100}$

$$= \text{basic wage in \$} + \frac{\left(\begin{array}{l} \text{pay per} \\ \text{toy sold in c} \end{array}\right) n}{100}$$

$\therefore$  substitute basic wage with \$105 and pay per toy sold with 18 cents to get the new formula.

(d) For him to receive the same amount,

$$\therefore 105 + \frac{18n}{100} = 120 + \frac{15n}{100}$$

$$\frac{18n}{100} - \frac{15n}{100} = 120 - 105$$

$$\frac{3n}{100} = 15$$

$$n = \frac{15 \times 100}{3}$$

$$= 500$$

$\therefore$  he needs to sell **500** toys in order to receive the same amount of money from using either formula.

Check answer:

$$105 + \frac{18(500)}{100} = 195$$

$$120 + \frac{15(500)}{100} = 195$$

### Mid-Year Examination Specimen Paper A: Part 1

1. (a)  $26.62 - 8.857 = 17.763$

(b)  $15\frac{1}{3} - 8\frac{3}{5}$

$$= 15\frac{5}{15} - 8\frac{9}{15}$$

$$= 14\frac{20}{15} - 8\frac{9}{15}$$

$$= 6\frac{11}{15}$$

The LCM of 3 and 5 is 15.

2. (a)  $0.005845 \approx 0.00585$  (correct to 3 sig. fig.)



### Teacher's Tip

Zeros preceding the first non-zero digit are not significant.

(b)  $0.005845 \approx 0.01$  (correct to 2 d.p.)

3. (a)  $1.56 \times 0.85$

$$= \frac{15.6}{10} \times \frac{8.5}{10}$$

$$= \frac{(15.6 \times 8.5)}{100}$$

$$15.6 \times 8.5 = 132.6 \text{ (Given)}$$

$$= \frac{132.6}{100}$$

$$= 1.326$$

(b)  $15.6 \times 8.5 = 132.6$  (Given)

$$\frac{132.6}{15.6} = 8.5$$

$$1.326 \div 156$$

$$= \frac{132.6}{100} \div 15.6 \times 10$$

$$= \frac{132.6}{100} \times \frac{1}{15.6 \times 10}$$

$$= \frac{(132.6)}{(15.6)} \times \frac{1}{1000}$$

$$\frac{132.6}{15.6} = 8.5 \text{ (Given)}$$

$$= \frac{8.5}{1000}$$

$$= 0.0085$$

4. (a)  $\frac{\sqrt[3]{216} + 3^2}{6 \times \sqrt{81}}$

$$\sqrt[3]{216} = \sqrt[3]{6 \times 6 \times 6} = 6$$

$$= \frac{6 + 9}{6 \times 9}$$

$$= \frac{15^2}{26 \times 9}$$

$$= \frac{5}{18}$$

(b)  $\{[(25 - 31) \times (-24) + 8] - (-5 - 12)\} \div 7$

$$= \{[(-6) \times (-24) + 8] - (-17)\} \div 7$$

$$= (18 + 17) \div 7$$

$$= 35 \div 7$$

$$= 5$$

5. (a) Required fraction =  $\frac{1}{2} \left( \frac{1}{9} + \frac{4}{9} \right)$

$$= \frac{1}{2} \left( \frac{5}{9} \right)$$

$$= \frac{5}{18}$$



$$\begin{aligned}
 \text{(ii)} \quad \frac{a^2c}{b} &= \frac{\left(\frac{1}{2}\right)^2(-3)}{\frac{1}{5}} \\
 &= \left(\frac{1}{4}\right)(-3) \times \frac{5}{1} \\
 &= \frac{-15}{4} \\
 &= -3\frac{3}{4}
 \end{aligned}$$

11. (a) (i)  $348.638 \approx 350$  (correct to 2 sig. fig.)  
(ii)  $0.03985 \approx 0.040$  (correct to 2 sig. fig.)

$$\begin{aligned}
 \text{(b)} \quad &348.638 \times 0.03985 \\
 &\approx 350 \times 0.040 \\
 &\approx 14 \\
 &\approx 10 \text{ (correct to 1 sig. fig.)}
 \end{aligned}$$

$$\begin{aligned}
 \text{12. (a)} \quad &2(5-x) = 3x-5 \\
 &10-2x = 3x-5 \\
 &10+5 = 3x+2x \\
 &15 = 5x
 \end{aligned}$$

$$x = \frac{15}{5} = 3$$

$$\text{(b)} \quad 1\frac{1}{3}y = -8$$

$$\begin{aligned}
 y &= \frac{-8}{1\frac{1}{3}} \\
 &= -8 \div \frac{4}{3} \\
 &= -8^2 \times \frac{3}{4} \\
 &= -6
 \end{aligned}$$

13. (a) No. of bangles bought  
 $= x + 3$   
(b) Total amount of money spent  
 $= \$[3x + 5(x+3)]$   
 $= \$[3x + 5x + 15]$   
 $= \$[8x + 15]$

$$\begin{aligned}
 \text{14. (a)} \quad &\text{Difference in temperatures} \\
 &= 69.5^\circ\text{C} - (-78.5^\circ\text{C}) \\
 &= 69.5^\circ\text{C} + 78.5^\circ\text{C} \\
 &= 148^\circ\text{C}
 \end{aligned}$$



### Teacher's Tip

Subtract the lowest temperature recorded from the highest temperature recorded.

$$\begin{aligned}
 \text{(b)} \quad &\text{Required temperature} \\
 &= -78.5^\circ\text{C} + 59^\circ\text{C} \\
 &= -19.5^\circ\text{C}
 \end{aligned}$$

15. Fraction of money donated to charity

$$= \left(1 - \frac{3}{5}\right) \div 2$$

$$= \frac{2}{5} \div 2$$

$$= \frac{2}{5} \times \frac{1}{2}$$

$$= \frac{1}{5}$$

$$\therefore \frac{1}{5} \text{ of remainder} = \$35$$

$$\text{Remainder} = 5 \times \$35 = \$175$$

$$\text{Original amount of money}$$

$$= \$50 + \$175 = \$225$$

16. (a) Next line of pattern  
 $= 119 + 121 + 123 = 3(121) = 363$

$$\text{(b)} \quad d = 453 \div 3 = 151$$

$$\therefore b = d = 151$$

$$a = 151 - 2 = 149$$

$$c = 151 + 2 = 153$$

$$\therefore a = 149, b = 151, c = 153 \text{ and } d = 151.$$

## Mid-Year Examination Specimen Paper A: Part 2

### Section A

1. (a)  $\frac{\sqrt{2048} - \sqrt[3]{7655} + 27^3}{(-25)^2 - (-12)^3}$   
 $\approx 0.0192$  (correct to 3 sig. fig.)  
(b)  $3.628 \times \left(36.8 - \frac{2.8}{5.6} + 6.75\right) \div 9.38$   
 $\approx 16.7$  (correct to 3 sig. fig.)

$$\begin{aligned}
 \text{(c)} \quad &\frac{5\frac{1}{2} - 2\frac{1}{3}}{\left(-4\frac{2}{3}\right)^2 + \left(-3\frac{1}{2}\right)^3} \\
 &\approx -6.23 \text{ (correct to 3 sig. fig.)}
 \end{aligned}$$

2. (a) The watch gains  $x$  seconds in one hour. (Given)  
The watch gains  $\frac{x}{60}$  minutes in one hour.  
In one day, the watch gains  $\frac{24x}{60} = \frac{2}{5}x$  minutes  
In  $y$  days, the watch gains  $\frac{2}{5}xy$  minutes

$$\text{(b)} \quad 2x^2 - 5x - 3p = 0$$

$$\text{When } x = -3,$$

$$2(-3)^2 - 5(-3) - 3p = 0$$

$$18 + 15 - 3p = 0$$

$$33 = 3p$$

$$p = \frac{33}{3} = 11$$