

# Mid-Year Examination Specimen Paper 1

**PART I** (50 marks)

Duration: 1 hour

Marks Obtained
100

**1** Simplify

(a)  $5\frac{2}{3} - 2\frac{1}{4} \div 5\frac{2}{5} \times 6$ , [1]

(b)  $\frac{1.2 \times 0.025}{0.4 \times 50}$ , [1]

(c)  $\frac{2.3^2 + 23 \times \sqrt{0.49}}{9.2 \div 4}$ . [1]

**2** Express  $24 \times 27 \times 50$  as a product of prime factors.

Hence, find  $\sqrt{24 \times 27 \times 50}$ . [3]

**3** It is given that  $-4 \leq x < 2$  and  $3 < y \leq 7$ , where  $x$  and  $y$  are integers. Find

(a) the least possible value of  $(y - x)$ , [1]

(b) the greatest possible value of  $\frac{x^2}{2y}$ . [2]

**4** Given that  $2p + r = \frac{q - 2}{p + 1}$ , calculate the value of  $q$  when  $p = 9$  and  $r = -17.5$ . [3]

- 
- 5** (a) Evaluate  $2.31 \times 0.00465$ , correct to 2 significant figures.  
Hence, state the value of  $0.0231 \times 4.65$ . [2]
- (b) Round off  $425\,011 \text{ m}^2$  to the nearest hectar. [1]

---

**6** Evaluate  $25 - [1.2 - (-5) \div 20 - 6] \times 2$ . [3]

- 7** (a) Subtract  $(4x^3 - 7x - 2)$  from  $(3x^3 - 5x^2 + x + 13)$ . [2]
- (b) Simplify  $\frac{2xy - 1}{x} - \frac{3 - 7y}{4}$ . [3]
- 

- 8** Complete the following number sequences:
- (a) 19, 23, 27, 31, \_\_\_\_\_, \_\_\_\_\_ [1]
- (b) 2, 6, 18, 54, \_\_\_\_\_, \_\_\_\_\_ [1]
- 

- 9** (a) Given that  $\sqrt[3]{64} = x$ , find the value of  $x^2$ . [2]
- (b) The numerator of a fraction is 4 less than its denominator. Subtracting 1 from both its numerator and denominator gives  $\frac{1}{2}$ . Find the fraction. [3]
- 

- 10** Solve the following equations:
- (a)  $3(x - 2) - 4(1 - x) = 8$  [2]
- (b)  $\frac{y + 2}{5} + 1 = \frac{y + 1}{2}$  [3]

**11** Jane is  $n$  years old and Jason will be twice as old as Jane in 5 years' time.

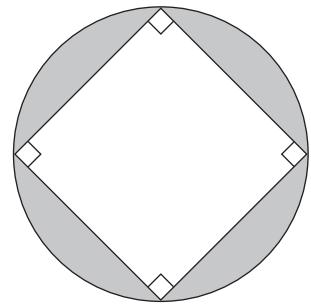
- (a) Write an expression for the difference in their ages. [2]  
(b) If Jason is 13 years older than Jane, find Jason's present age. [3]

---

**12** The figure below shows a square inscribed in a circle. The perimeter of the figure is 83.6 cm and the diameter of the circle is 14 cm. Find the area of the shaded region.

(Take  $\pi = \frac{22}{7}$ )

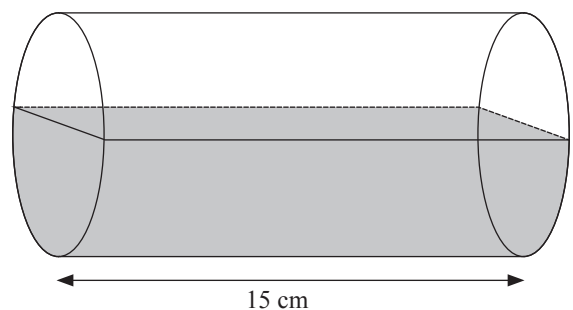
[5]



---

**13** A cylindrical bottle is half-filled with 0.75 l of water. Taking  $\pi = 3.142$  and giving your answers correct to two decimal places, calculate

- (a) the radius of the bottle, [2]  
(b) the surface area of the bottle that is in contact with water. [3]



---

**1** Estimate each of the following, giving your answer correct to 1 significant figure.

(a)  $79.1 \div \sqrt{15.9} - 3.01^3$  [2]

(b)  $\frac{\sqrt{0.04 \times (-0.81)^2}}{5.1}$  [2]

---

**2** (a) Simplify  $\frac{3b}{10} \times \left(-\frac{7}{8}\right) \div \frac{2a^3}{5}$ . [2]

(b) If  $u - v^2 = \frac{3 - w}{u + 1}$ , calculate the value of  $w$  when  $u = 4.5$  and  $v = -2$ . [2]

---

**3** (a) Find the HCF and LCM of 18 and 34. [4]

(b) (i) Express 1224 as a product of prime factors. [1]

(ii) Hence, find the least value of  $k$  such that  $1224k$  is a perfect square. [3]

- 4 (a) Calculate the exact value of  $\sqrt[3]{\frac{0.008 \times 125}{0.027}}$ . [2]
- (b) Factorise  $2c - 6d - 12ad + 4ac$ . [3]

- 
- 5 (a) Simplify  $\frac{y-1}{2} - \frac{3-2y}{8} + \frac{y}{12}$ . [3]
- (b) Solve the equation  $\frac{1}{x} - \frac{2}{5x} = \frac{1}{2x-1}$ . [4]

**6** Consider the following pattern:

$$\begin{array}{rcccc} \frac{1}{1} & - & \frac{1}{3} & = & \frac{2}{1 \times 3} \\ \frac{1}{2} & - & \frac{1}{4} & = & \frac{2}{2 \times 4} \\ \frac{1}{3} & - & \frac{1}{5} & = & \frac{2}{3 \times 5} \\ & & \vdots & & \vdots \end{array}$$

- (a) Write down the 10<sup>th</sup> line in the pattern. [1]
- (b) Hence, find the values of  $p$  and  $q$  if  $\frac{1}{p} - \frac{1}{q} = \frac{1}{180}$ . [3]
- (c) Evaluate  $\frac{2}{1 \times 3} + \frac{2}{2 \times 4} + \frac{2}{3 \times 5} + \dots + \frac{2}{21 \times 23} + \frac{2}{22 \times 24}$ . [3]

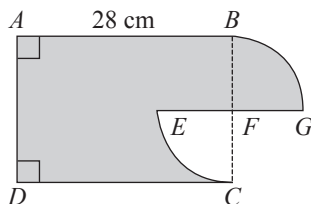
---

**7** At 08 40, a car left Town  $P$  for Town  $Q$  at an average speed of 75 km/h. The car can travel 45 km further if it increases its average speed by 15 km/h for the same period of time. Find

- (a) the time of arrival to Town  $Q$  of the car, [3]
- (b) the distance between Town  $P$  and Town  $Q$ . [2]

8

In the figure,  $BFG$  and  $CEF$  are two identical quadrants and  $EFG$  is a straight line. It is given that  $AB = 2AD$ .

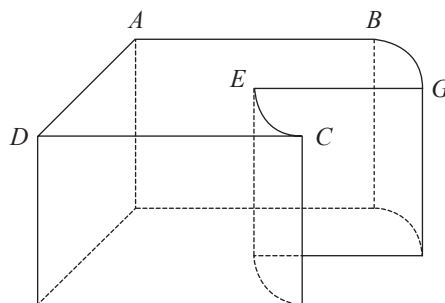


Taking  $\pi = \frac{22}{7}$ , calculate

- (a) the perimeter of the shaded region, [3]  
 (b) the area of the shaded region. [2]

A container with a cross-sectional base  $ABGFEC$  is shown in the figure below. The capacity of the tank is 19.6 litres. It is  $\frac{3}{10}$  filled with water. Calculate

- (c) the height of the container, [2]  
 (d) the water level if 4.9 litres of water is removed from the container. [3]





# Mid-Year Examination Specimen Paper 2

**PART I** (50 marks)

Duration: 1 hour

Marks Obtained
100

- 1** Evaluate
- (a)  $(45 - 18 \div 3) \div [8 - (-4) + 1]$ , [2]
- (b)  $3^2 \times 3 - 3^2 + (-3)^3$ . [2]

- 2** Given that  $d = 4$ ,  $e = -2$  and  $f = -1$ , calculate the value of
- (a)  $de - f$ , [1]
- (b)  $e^2 + 2d - f^3$ , [2]
- (c)  $\sqrt{\frac{5 + 7e}{4f - 2d^2}}$ . [2]

- 3**
- (a) Express 98 and 210 as the product of prime factors. [2]
- (b) Hence, find the least possible integer  $k$  such that  $98k$  is a multiple of 210. [2]

**4** Find the exact value of

(a)  $1\frac{7}{9} + \frac{5}{6} \times (-1\frac{3}{5})^2$ , [2]

(b)  $4.5 + 3.\dot{2}\dot{3} - 2.\dot{1}$ . [2]

---

**5** Solve the following inequalities:

(a)  $3a < 27$  [1]

(b)  $5 - 2b > \frac{1}{3}$  [1]

(c)  $\frac{2}{9}c + 4 < -6$  [2]

---

**6** (a) Simplify  $3x + \frac{x}{2} - \frac{4 - 5x}{7}$ . [2]

(b) Factorise  $4ay - 2a + 4b(5 - 10y)$ . [2]

**7** Write down the next two terms in the following number sequences:

(a) 32, 34, 30, 32, 28, ... [2]

(b)  $\frac{1}{2}, \frac{2}{3}, \frac{3}{5}, \frac{5}{8}, \dots$  [2]

---

**8** Solve (a)  $1 - \frac{2}{3}x = 0$ , [1]

(b)  $3.2x - 8.1 = 1.6(1 - x)$ , [2]

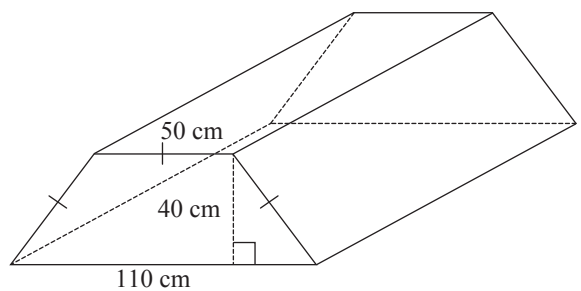
(c)  $\frac{x-1}{2} + 5 = \frac{1}{2} - \frac{3-12x}{6}$ . [3]

---

**9** There are 8 more boys than girls in a class. There will be 8 more girls than boys after  $\frac{1}{4}$  of the boys walk out from the class. How many children are there in the class at first? [4]

- 10** A cubic tank of length 6 cm was 0.4 filled with water. An empty cylindrical beaker, of equal radius and height, can hold half of the water in the tank. Calculate
- (a) the capacity of the cylindrical beaker, [2]
- (b) the radius of the cylindrical beaker, correct to the nearest mm. [3]

- 11** The figure below shows a prism. The volume of the prism is 80 litres. Calculate
- (a) the cross-sectional area of the prism, [2]
- (b) the length of the prism. [1]
- (c) Given that the cost of painting is \$1 per 500 cm<sup>2</sup>, find the total cost of painting 12 such similar prisms. [3]



- 
- 1** Mr Wong gives  $\frac{2}{5}$  of his monthly income to his wife, saves  $\frac{1}{6}$  of the remaining money and gives twice as much as his savings to his 3 children equally. He has \$450 left. Calculate
- (a) the fraction of his monthly income that he has left, [3]
  - (b) his monthly income, [1]
  - (c) the difference between the amounts received by his wife and each of his child. [2]

- 
- 2**
- (a) Simplify the algebraic expression  $2xy - 6x(1 + \frac{3}{2}x - 7y)$ . [2]
  - (b) Factorise  $4a(2b - 6) - (3 - b)$ . [2]
  - (c) Solve the algebraic equation  $2 - \frac{4}{z^2} = -0.25$ . [3]

- 
- 3** Given that  $T = 4\pi\sqrt{\frac{L}{R-r}}$ , find the value of R when  $T = 44$ ,  $\pi = 3\frac{1}{7}$ ,  $L = 49$  and  $r = 5$ . [3]

**4** Evaluate each of the following using a calculator, giving your answer correct to 2 decimal places:

(a)  $\sqrt{2.034^3} - \frac{540.8}{14.9 \times 5.1^2}$  [2]

(b)  $\frac{2}{1 - \frac{3}{1 + \frac{5}{9}}}$  [2]

---

**5** Given that  $0.052 \times 84.5 = 4.394$ , find the value of

(a)  $5.2 \times 0.00845$ , [1]

(b)  $\frac{0.04394}{8.45}$ . [2]

---

**6** The total mass of 2 similar boxes is 550 g heavier than the total mass of 5 similar parcels. If the total mass of 5 boxes and 2 parcels is 6 kg 15 g, how much heavier is a box than a parcel? [4]

---

**7** The arc length of a semicircle is 40 cm longer than the perimeter of a square of length 1.55 m.

(a) Calculate the diameter of the semicircle. [3]

(b) Hence, find the area of the semicircle. [1]

(Take  $\pi = \frac{22}{7}$ )

**8** Study the figures below:

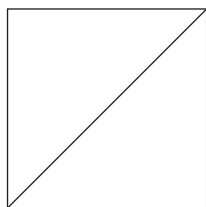


Figure 1

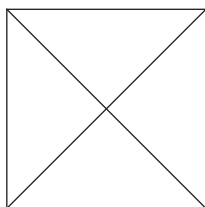


Figure 2

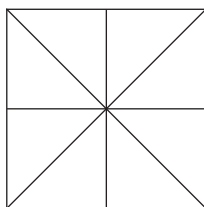


Figure 3

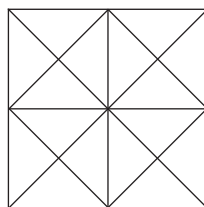


Figure 4

(a) Copy and complete the table below: [2]

Figure $n$	Number of diagonals, $d$	Number of identical triangles, $T$
1	1	2
2	2	4
3	4	
4	8	
...	...	...
9		

(b) Express (i)  $d$  in terms of  $n$ ,  
(ii)  $T$  in terms of  $n$ . [2]

(c) Hence, find the number of triangles in Figure 21. [1]

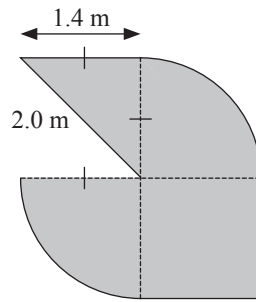
**9** (a) Find the LCM of 30, 36 and 40. [2]

(b) A car manufacturer will launch a new series of cars, models  $X$ ,  $Y$  and  $Z$ , every 30 months, 3 years and 3 years 4 months respectively. It launched these 3 models of cars at the same time in January 2007. When will the three models of cars be launched together again? [4]

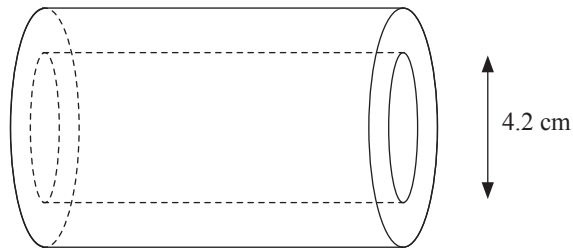
**10** (Take  $\pi = \frac{22}{7}$ )

(a) Find the perimeter of the shaded region.

[3]



(b) A hollow bamboo of thickness 7 mm has a volume of  $161.7 \text{ cm}^3$ . The internal diameter of the bamboo is 4.2 cm. Calculate



(i) its length,

[2]

(ii) its surface area.

[3]