

## Part I: Multiple Choice Questions

Circle the most appropriate answer on the answer sheet provided.

**DO NOT** write anything on the question paper.

1. The average of four numbers is  $n$ . If  $m$  is subtracted from each number, the average of the four new numbers is

(a)  $4(n - m)$

(b)  $\frac{n - m}{2}$

(c)  $n - m$

(d)  $n - \frac{m}{4}$

(e)  $\frac{n}{4} - m$

2. If  $x > y$ , which of the following is always true?

(a)  $xy^2 > 0$

(b)  $x + y > 0$

(c)  $xy > 0$

(d)  $x^2 - y^2 > 0$

(e) None of the above

3. If  $x = x_1$  and  $y = y_1$  is a solution of  $x + 3y = 0$ , which of the following is also a solution?

(a)  $x = 3x_1, \quad y = y_1$

(b)  $x = x_1, \quad y = 3y_1$

(c)  $x = 2x_1, \quad y = 2y_1$

(d)  $x = -x_1, \quad y = y_1$

(e) None of the above

4. A man drove from Town A to Town B at an average speed of 60 km/h, and then from Town B to Town C at an average speed of 70 km/h. What is the average speed of his entire journey from Town A to Town C?
- (a) Exactly 65 km/h
  - (b) Less than 65 km/h
  - (c) More than 65 km/h
  - (d) Approximately 65 km/h
  - (e) Impossible to calculate (insufficient information given)
5. A lily pad grows so that each day, it doubles its size. On the 9<sup>th</sup> day of its life, it completely covers a pond. On which day was the pond half covered?
- (a) 4<sup>th</sup>
  - (b) 5<sup>th</sup>
  - (c) 6<sup>th</sup>
  - (d) 7<sup>th</sup>
  - (e) 8<sup>th</sup>

## Part II: Short Answer Questions

Answer all questions in the space provided. All working must be clearly shown.

1. Given that  $\sum_{r=1}^n r = \frac{n(n+1)}{2}$ , find

(a)  $\sum_{r=1}^{20} r$

(b)  $\sum_{r=11}^{20} r$

**Answer**

2. Find the first derivatives,  $f'(x)$  of the following:

(a)  $f(x) = x^3 \sin x$

(b)  $f(x) = \cos(x^3)$

**Answer**

3. Evaluate

(a)  $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos x \, dx$

(b)  $\int_2^3 \left( \frac{1}{x^2} - x^3 \right) dx$

**Answer**