#### 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?

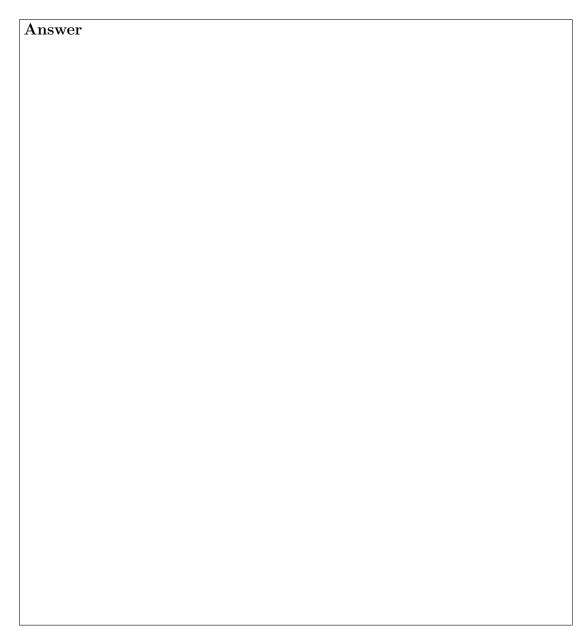
- (a)  $xy^2 > 0$
- (b) x + y > 0
- (c) xy > 0
- (d)  $x^2 y^2 > 0$
- (e) None of the above
- 3. If  $x = x_1$  and  $y = y_1$  is a solution of x + 3y = 0, which of the following is also a solution?
  - (a)  $x = 3x_1, \quad y = y_1$
  - (b)  $x = x_1, \quad y = 3y_1$
  - (c)  $x = 2x_1, \quad y = 2y_1$
  - (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  $9^{th}$  day of its life, it completely covers a pond. On which day was the pond half covered?
  - (a)  $4^{th}$
  - (b)  $5^{th}$
  - (c)  $6^{th}$
  - (d)  $7^{th}$
  - (e)  $8^{th}$

## 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)  $\sum_{r=11}^{20} r$ 



- 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