

# Remainder Theorem

## PRACTICE QUESTIONS (EXAM TYPE)

### MEMORANDUM

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i) Given  $f(x) = 2x^3 - 8x^2 + 4$   
Determine the remainder if  $f(x)$  is divided  
by  $(x-2)$

Solution:

$$x-2=0$$

$$x=2$$

$$f(2) = 2(2)^3 - 8(2)^2 + 4$$

$$f(2) = 16 - 32 + 4$$

$$f(2) = -12$$

$$\therefore \text{Remainder} = -12$$

2) The expression  $2x^3 - 17x^2 + ax + b$  has a remainder of  $-9$  when it is divided by  $x-1$  and ~~when it is divided~~ the remainder of  $15$  when it is divided by  $x-5$ . Use the remainder theorem to determine the values of  $a$  and  $b$ .

SOLUTION:

$$x-1=0$$

$$x=1$$

$$2(1)^3 - 17(1)^2 + a(1) + b = -9$$

$$2 - 17 + a + b = -9$$

$$a + b = 6$$

$$a = 6 - b \quad \dots \text{eq. (1)}$$

$$x-5=0$$

$$x=5$$

$$2(5)^3 - 17(5)^2 + a(5) + b = 15$$

$$250 - 425 + 5a + b = 15$$

$$5a + b = 190 \quad \dots \text{eq. (2)}$$

3 Substitute eq. (1) into eq. (2)

$$5(6-b) + b = 190$$

$$30 - 5b + b = 190$$

$$-\frac{4b}{-4} = \frac{160}{-4}$$

$$b = -40$$

4 Substitute  $b$   
into eq. (1)

$$a = 6 - (-40)$$

$$a = 46$$