








# Remainder Theorem

## Level 1

- 1 Find the remainder when  $2x^3 - x^2 + 3x - 1$  is divided by  $(2x - 1)$ .  
 A  $-\frac{1}{2}$       B 0        $\frac{1}{4}$       D  $\frac{1}{2}$       E 1
- 2 When  $x^4 - kx^2 + 2$  is divided by  $(x + 1)$ , the remainder is 4.  $k =$   
 A -7      B -3      C -1      D 3      E 7
- 3 Find the remainder when  $x^m + x^n - 2$  is divided by  $x - 1$ .   
 A 0      B 1      C 2      D  $m + n$       E Cannot be determined.
- 4 When  $x^2 + ax + 6$  is divided by  $(x - a)$ , the remainder is  $7a$ . Find  $a$ .   
 A  $\frac{3}{2}$       B 2      C 2 or  $\frac{3}{2}$       D 2 or  $\frac{5}{2}$       E  $\frac{3}{2}$  or  $-2$
- 5 Which of the following is a factor of  $x^3 + 2x^2 - x - 2$ ?  
 A  $x^2 + 2$       B  $x^2 - 2$       C  $x^2 + 1$       D  $x - 2$       E  $x$  
- 6 If  $(2x + 1)$  is a factor of  $x^3 - 4x^2 + kx - 1$ ,  $k =$    
 A  $-\frac{17}{8}$       B  $-\frac{17}{4}$       C  $-\frac{15}{4}$       D  $-\frac{9}{4}$       E  $-\frac{5}{4}$
- 7 When  $ax^3 - 4x^2 + bx + 1$  is divided by  $x + 1$  and  $x - 2$  respectively, the remainders are both 2. Find the values of  $a$  and  $b$ .   
 A  $a = 1, b = -6$       D  $a = \frac{9}{2}, b = -\frac{19}{2}$   
 B  $a = \frac{3}{2}, b = \frac{3}{2}$       E  $a =$    $b = -19$   
 C  $a = 4, b = -1$

- 8 When  $f(x)$  is divided by  $x - k$ , the remainder is  $R$ . When  $f(x)$  is divided by  $2k - 2x$ , the remainder is
- A  $R$                       B  $-R$                       C  $2R$                       D  $-2R$                       E  $2k - R$

Level 2



- 9 Factorize  $2x^3 + 5x^2 + 8x + 3$ .
- A  $(2x - 1)(x - 1)(x - 2)$                       D  $(2x + 1)(x^2 + 5x + 3)$   
 B  $(2x - 1)(x^2 - 2x - 3)$                       E  $(2x + 1)(x^2 + 2x + 3)$   
 C  $(2x + 1)(x + 1)(x + 2)$



- 10  $(mx - 2)$  is a common factor of  $3x^2 + x + n$  and  $3x^2 - 8x + 4$ . Find  $n$ .
- A 1 or 3                      D  $-14$  or  $-2$   
 B 1 or  $-2$                       E  $-14$  or  $-\frac{10}{9}$   
 C  $-14$  or 3



- 11 Which of the following is not a factor of  $x^5 - x^4 - 13x^3 + 13x^2 + 36x - 36$ ?
- A  $x + 1$                       B  $x - 2$                       C  $x + 2$                       D  $x - 3$                       E  $x + 3$

- 12 Which of the following has/have  $(x + a)$  as its factors?

- (1)  $x^2 + a^2$   
 (2)  $x^3 + a^3$   
 (3)  $x^2 + (a^2 + a)x + a^3$



- A (1) only                      D (2) and (3) only  
 B (3) only                      E (1), (2) and (3)  
 C (1) and (2) only

- 13 If  $x^3 + 2kx - 3k$  is divisible by  $x - k$ , find the values of  $k$ .

- A 1                      D 0, 1, 3  
 B  $-3$                       E  $-3, 0, 1$   
 C  $-3, 1$



14 Let  $f(x) = x^3 + x^2 - 5x + k$ . If  $f(1) = 0$ , factorize  $f(x)$ .

A  $(x+1)^2(x+3)$

D  $(x+1)(x-1)(x+3)$

B  $(x-1)^2(x+3)$

E  $(x+1)(x-1)(x-3)$

C  $(x-1)^2(x-3)$



15  $2x^3 + ax^2 - 6x + b$  is divisible by  $x^2 - 3x - 4$ . Find  $a$  and  $b$ .

A  $a = -\frac{7}{2}, b = -\frac{1}{2}$

D  $a = -\frac{20}{3}, b = -\frac{8}{3}$

B  $a = -\frac{36}{5}, b = -\frac{16}{5}$

E  $a = -\frac{20}{3}, b = \frac{8}{3}$

C  $a = -\frac{36}{5}, b = \frac{16}{5}$



16 When  $kx^3 + 2x^2 - 4x + 1$  is divided by  $(x-1)$ , the remainder is twice that when it is divided by  $(x-2)$ .  $k =$

A  $-\frac{1}{15}$

B  $-\frac{1}{5}$

C  $-\frac{1}{3}$

D  $\frac{1}{5}$

E  $\frac{1}{15}$



17 When  $x^2 + ax + b$  is divided by  $x+1$ , the remainder is 3.  $2a - 2b + 3 =$

A -4

B -2

C -1

D 1

E 3



By considering  $f(x) = x^{99}$  divided by  $x-1$ , find the remainder when  $10^{99}$  is divided by 9.

A 0

B 1

C 2

D 3

E 4

