

REG-POLY-2324-ASM-SET 2-MATH**Suggested solutions****Multiple Choice Questions**

1. A	2. D	3. D	4. D	5. C
6. D	7. B	8. C	9. A	10. D
11. D	12. C	13. A	14. A	15. C
16. C	17. A	18. D	19. C	20. A
21. A	22. C	23. C	24. B	25. D
26. A	27. B	28. A	29. D	30. C

1. ☐ A

$$\begin{aligned}\text{Remainder} &= (-1)^3 - 7(-1)^2 + 2(-1) - 1 \\ &= -11\end{aligned}$$

2. ☐ D

$$\begin{aligned}\text{Remainder} &= (-2 + 1)(-4 - 1) - 6(-2) + 3 \\ &= 20\end{aligned}$$

3. ☐ D

$$\begin{aligned}0 &= 2(8) - 4 + k \\ k &= -12 \\ \text{Remainder} &= 2(-1)^3 - (-1)^2 - 12 \\ &= -15\end{aligned}$$

4. ☐ D

$$\begin{aligned}\text{Remainder} &= f(-3) \\ &= g(-3)(-3 - 3) + 2 \\ &= (-1)(-6) + 2 \\ &= 8\end{aligned}$$

5. ☐ C

$$\begin{aligned}\text{Remainder} &= 1 - 1^3 - 1^5 - \dots - 1^{2013} \\ &= 1 - 1006 \\ &= -1005\end{aligned}$$

6. ☐ D

$$\begin{aligned}\text{Remainder} &= (-1)^4 - 2(-1)^3 + 3(-1)^2 - 4(-1) + 5 \\ &= 15\end{aligned}$$

7. B

$$\text{Remainder} = 2\left(-\frac{1}{2}\right)^3 - 5\left(-\frac{1}{2}\right)^2 + 7\left(-\frac{1}{2}\right) + 3 = -2$$

8. C

$$10 = (-2)^3 + k(-2)^2 - 3(-2) + 4$$

$$k = 2$$

9. A

$$(-3)^3 + (p+4)(-3)^2 - 17(-3) - 11 = (-p)^3 + (p+4)(-p)^2 - 17(-p) - 11$$

$$9p + 49 = 4p^2 + 17p - 11$$

$$0 = 4p^2 + 8p - 60$$

$$p = -5 \quad \text{or} \quad 3 \text{ (rejected)}$$

10. D

$$3(-2)^3 + a(-2)^2 + 2(-2) + 14 = (-2)^3 + 5(-2)^2 + a(-2) + 4$$

$$4a - 14 = -2a + 16$$

$$a = 5$$

11. D

$$k + 2 = (k + 2)(k^2 - 2k + 1)$$

$$0 = (k + 2)(k^2 - 2k)$$

$$0 = k(k + 2)(k - 2)$$

$$k = 0 \quad \text{or} \quad \pm 2$$

12. C

$$2(3)^3 - a(3)^2 - 4(3) + 10 = 7$$

$$-9a + 52 = 7$$

$$a = 5$$

13. A

$$(-k)^3 + k(-k)^2 + 3k(-k) - 4k = 2k$$

$$-3k^2 - 6k = 0$$

$$k = 0 \text{ (rejected)} \quad \text{or} \quad -2$$

14. A

$$7 = (-2)^3 - 3a(-2)^2 + a(-2) + a$$

$$a = -\frac{15}{13}$$

15. C

$$0 = f(-3) = 2(-3)^3 + 5(-3)^2 + k$$

$$k = 9$$

$$\text{Remainder} = f(-2) = 2(-2)^3 + 5(-2)^2 + 9 = 13$$

16. C

Let $3x^3 + 2x^2 - 27x - 15 = (3x^2 + kx + 6)(Ax + B) + 3$, where A and B are constants.

$$3x^3 + 2x^2 - 27x - 18 = (3x^2 + kx + 6)(Ax + B)$$

Compare the coefficients of x^3 , coefficient of x and constant term.

$$\begin{cases} 3A = 3 \\ kB + 6A = -27 \\ 6B = -18 \end{cases}$$

Solving, we have $A = 1$, $B = -3$ and $k = 11$.

17. A

$$4(-k)^3 + (4k - 3)(-k)^2 - 3(-k) + 5 = 5k$$

$$-3k^2 - 2k + 5 = 0$$

$$k = 1 \quad \text{or} \quad -\frac{5}{3} \text{ (rejected)}$$

18. D

$$f(-4) = 6 = 7(-4)^{2018} + 16a - 20 + c$$

$$26 = 7(4^{2018}) + 16a + c$$

$$\text{Remainder} = 7(4^{2018}) + 16a + 20 + c$$

$$= 26 + 20$$

$$= 46$$

19. C

$$(-2)^2 + p(-2) + q = -1$$

$$-2p + q = -5$$

$$4p - 2q + 5 = -2(-2p + q) + 5$$

$$= -2(-5) + 5$$

$$= 15$$

20. A

$$3^3 + a(3)^2 - 3b = 6$$

$$3a - b = -7$$

$$3a - b + 7 = (-7) + 7 = 0$$

21. A

We have $f(1) = R$.

$$\text{Remainder} = f[2(1) - 1]$$

$$= f(1)$$

$$= R$$

22. C

$$\text{Remainder} = (-1 + 2)^{2n} + (-1)^{2n-1} = 1 - 1 = 0$$

23. C

$$\text{Remainder} = k(-1)^{2k+2} - (-1)^{2k+1} + k - 1$$

$$= k - (-1) + k - 1$$

$$= 2k$$

24. B

$$(-1)^{2015} - 5(-1)^2 + k^2 = k$$

$$k^2 - k - 6 = 0$$

$$k = 3 \quad \text{or} \quad -2$$

25. D

$$f(-1) = 1 - 2 + k = 0$$

$$k = 1$$

$$\text{Remainder} = f(1) = 1 + 2 + k = 4$$

26. A

$$\text{Remainder} = (-1)^{2k-1} + (k+2)(-1)^2 - k$$

$$= -1 + k + 2 - k$$

$$= 1$$

27. B

$$\text{Remainder} = (-1)^{2014} + (-1)^{2013} + (-1)^{2012} + \dots + (-1)$$

$$= (1 - 1) + (1 - 1) + \dots + (1 - 1)$$

$$= 0$$

28. A

We have $f(2) = R$.

$$\text{Required remainder} = f(2) = R$$

29. D

Let the remainder be $Ax + B$, where A and B are constants.

Let $f(x) = x^2 + 6x + 7$.

$$\begin{cases} f(-2) = -2A + B = -1 \\ f(-3) = -3A + B = -2 \end{cases}$$

Solving, $A = B = 1$ and the remainder is $x + 1$.

Alternative method

$$x^2 + 6x + 7 = (x^2 + 5x + 6) + x + 1 = (x + 2)(x + 3) + x + 1.$$

The remainder is $x + 1$.

30. C

I. ✓. $P(2) = (0)(3)Q(2) + R = R$

II. ✓. $P(-1) = (-3)(0)Q(-1) + R = R$

III. ✗. Take $Q(x) = x$.

$$P(-2) = (-4)(-1)(-2) + R$$

$$= R - 8$$

$$\neq R$$