IX Elitework-7 (Polynomials) MCQs (RDS)

1) If $x-2$ is a factor of $x^2+3ax-2a$, then $a=$ ___

(a) 2 (b) -2 (c) 1 (d) -1

2) If x^3+6x^2+4x+k is exactly divisible by $x+2$, then $k=$ ___

(a) -6 (b) -7 (c) -8 (d) -10

3) If $(x-a)$ is a factor of $x^3-3x^2a+2a^2x+b$, then the value of b is ___

(a) 0 (b) 2 (c) 1 (d) 3

4) If $x^{140}+2x^{151}+k$ is divisible by $(x+1)$, then the value of k is ___

(a) 1 (b) -3 (c) 2 (d) -2

5) If $x+2$ is a factor of $x^2+mx+14$, then $m=$ ___

(a) 7 (b) 2 (c) 9 (d) 14

6) If $x-3$ is a factor of $x^2-ax-15$, then $a=$ ___

(a) -2 (b) 5 (c) -5 (d) 3

7) If $x^{51}+51$ is divided by $(x+1)$, the remainder is ___

(a) 0 (b) 1 (c) 49 (d) 50

8) If $x+1$ is a factor of the polynomial $2x^2+kx$, then $k=$ ___

(a) -2 (b) -3 (c) 4 (d) 2

9) If $x+a$ is a factor of $x^4-a^2x^2+3x-6a$, then $a=$ ___

(a) 0 (b) -1 (c) 1 (d) 2

10) The value of k for which $x-1$ is a factor of $4x^3+3x^2-4x+k$ is

(a) 3 (b) 1 (c) -2 (d) -3

11) If $x+2$ and $x-1$ are the factors of x^3+10x^2+mx+n, then the values of m and n are respectively

(a) 5 and -3 (b) 17 and -8 (c) 7 and -18 (d) 23 and -19

12) Let $f(x)$ be a polynomial such that $f(-\frac{1}{2})=0$, then a factor of $f(x)$ is

(a) $2x-1$ (b) $2x+1$ (c) $x-1$ (d) $x+1$

13) When x^3-2x^2+ax-b is divided by x^2-2x-3, the remainder is $x-6$. The values of a and b are respectively

(a) $-2, -6$ (b) $2, -6$ (c) $-2, 6$ (d) $2, 6$

14) One factor of x^4+x^2-20 is x^2+5. The other factor is

(a) x^2-4 (b) $x-4$ (c) x^2-5 (d) $x+4$

15) If $x-1$ is a factor of polynomial $f(x)$ but not of $g(x)$, then it must be a factor of:
(a) $f(x).g(x)$ (b) $-f(x)+g(x)$ (c) $f(x)-g(x)$ (d) $f(x)+g(x)$

16) $x+1$ is a factor of x^n+1 only if
(a) n is an odd integer (b) n is an even integer
(c) n is a negative integer (d) n is a positive integer

17) If x^2+x+1 is a factor of the polynomial $3x^3+8x^2+8x+3+5k$, then the value of k is
(a) 0 (b) 2/5 (c) 5/2 (d) -1

18) If $(3x-1)^7 = a_7x^7+a_6x^6+a_5x^5+\dots+a_1x^1+a_0$, then $a_7+a_6+a_5+\dots+a_1+a_0 =$ ____
(a) 0 (b) 1 (c) 128 (d) 64

19) If both $x-2$ and $x-\frac{1}{2}$ are factors of px^2+5x+r, then (a) $p=r$ (b) $p+r=0$ (c) $2p+r=0$ (d) $p+2r=0$

20) If x^2-1 is a factor of $ax^4+bx^3+cx^2+dx+e$, then
(a) $a+c+e=b+d$ (b) $a+b+e=c+d$
(c) $a+b+c=d+e$ (d) $b+c+d=a+e$

IX Elite work – 7 POLYNOMIALS – MCQs

1) Since $x-2$ is a factor of $p(x) = x^2 + 3ax - 2a$,
then $p(2) = 0$

$\Rightarrow (2)^2 + 3a \times 2 - 2a = 0$

$\Rightarrow 4 + 6a - 2a = 0$

$\Rightarrow 4a = -4$

$\therefore a = \underline{\underline{-1}}$ (d)

2) Since $p(x) = x^3 + 6x^2 + 4x + k$ is exactly divisible by $(x+2)$,
then $p(-2) = 0$

$\Rightarrow (-2)^3 + 6(-2)^2 + 4(-2) + k = 0$

$\Rightarrow -8 + 24 - 8 + k = 0$

$\Rightarrow 24 - 16 + k = 0$

$\therefore k = \underline{\underline{-8}}$ (c)

3) Since $(x-a)$ is a factor of $p(x) = x^3 - 3x^2a + 2a^2x + b$,
then $p(a) = 0$

$\Rightarrow a^3 - 3(a)^2 \times a + 2a^2 \times a + b = 0$

$\Rightarrow a^3 - 3a^3 + 2a^3 + b = 0$

$\Rightarrow \cancel{3a^3} - \cancel{3a^3} + b = 0$

$\therefore b = \underline{\underline{0}}$ (a)

4) Since $(x+1)$ is a factor of $f(x) = x^{140} + 2x^{151} + k$, then
$f(-1) = 0$

$\Rightarrow (-1)^{140} + 2(-1)^{151} + k = 0$

$\Rightarrow 1 - 2 + k = 0$

$\Rightarrow -1 + k = 0$

$\therefore k = \underline{\underline{1}}$ (a)

5) Since $(x+2)$ is a factor of $p(x) = x^2 + mx + 14$, then
$p(-2) = 0$

$\Rightarrow (-2)^2 + m(-2) + 14 = 0$

$\Rightarrow 4 - 2m + 14 = 0$

$-2m = -18$

$m = \underline{\underline{9}}$ (c)

6) Since $(x-3)$ is a factor of $p(x) = x^2 - ax - 15$, then
$p(3) = 0$

$\Rightarrow (3)^2 - a \times 3 - 15 = 0$

$\Rightarrow 9 - 3a - 15 = 0$

$-3a = 6$

$a = \frac{6}{-3} = \underline{\underline{-2}}$ (a)

7) When $p(x) = x^{51} + 51$ is divided by $(x+1)$, then the remainder $= p(-1)$

$= (-1)^{51} + 51$

$= -1 + 51$

$= \underline{50}$ (d)

8) Since $(x+1)$ is a factor of $p(x) = 2x^2 + kx$, then

$p(-1) = 0$

$\Rightarrow 2(-1)^2 + k \times -1 = 0$

$\Rightarrow 2 - k = 0$

$\Rightarrow -k = -2$

$\therefore k = \underline{\underline{2}}$ (d)

9) Since $(x+a)$ is a factor of $p(x) = x^4 - a^2x^2 + 3x - 6a$, then

$p(-a) = 0$

$\Rightarrow (-a)^4 - a^2(-a)^2 + 3x - a - 6a = 0$

$\Rightarrow \cancel{a^4} - \cancel{a^4} - 3a - 6a = 0$

$-9a = 0$

$a = \underline{0}$ (a)

10) Since $(x-1)$ is a factor of $p(x) = 4x^3 + 3x^2 - 4x + k$, then

$p(1) = 0$

$\Rightarrow 4(1)^3 + 3(1)^2 - 4 \times 1 + k = 0$

$\Rightarrow \cancel{4} + 3 - \cancel{4} + k = 0$

$\therefore k = \underline{\underline{-3}}$ (d)

11) Let $p(x) = x^3 + 10x^2 + mx + n$

Since $(x+2)$ is a factor of $p(x)$, then $p(-2) = 0$

$\Rightarrow (-2)^3 + 10(-2)^2 + m \times -2 + n = 0$

$\Rightarrow -8 + 40 - 2m + n = 0$

$\Rightarrow -2m + n = -32$

$n = -32 + 2m \longrightarrow (1)$

Since $(x-1)$ is a factor of $p(x)$, then $p(1) = 0$

$\Rightarrow 1 + 10 + m + n = 0$

$\Rightarrow m + n = -11$

$\Rightarrow m - 32 + 2m = -11$ [from eq: (1)]

$3m = -11 + 32 = 21 \Rightarrow m = \frac{21}{3} = \underline{7}$

Scanned with CamScanner

From eq: (1), $n = -32 + 14$

$n = -18$

Hence $m = 7$, $n = -18$ (c)

12) $x + \frac{1}{2} = \frac{2x+1}{2}$ or $2x+1$ is a factor of $f(x)$ (b)

13) On dividing $x^3 - 2x^2 + ax - b$ by $x^2 - 2x - 3$,

$$
\begin{array}{r|l}
 & x \\
\hline
x^2-2x-3 & x^3 - 2x^2 + ax - b \\
 & \underline{\cancel{x^3} - \cancel{2x^2} - 3x} \\
 & x(a+3) - b
\end{array}
$$

On comparing the remainder with $x - 6$,

$a + 3 = 1 \Rightarrow a = -2$

$b = 6$ (c)

14) On dividing $x^4 + x^2 - 20$ by $x^2 + 5$,

$$
\begin{array}{r|l}
 & x^2 - 4 \\
\hline
x^2+5 & x^4 + x^2 - 20 \\
 & \underline{\cancel{x^4} + 5x^2} \\
 & -4x^2 - 20 \\
 & \underline{-\cancel{4x^2} - \cancel{20}} \\
 & 0
\end{array}
$$

quotient $= x^2 - 4$

remainder $= 0$

Using division algorithm,

$p(x) = (x^2+5)(x^2-4)$ (a)

15) $f(x) \cdot g(x)$ (a)

16) Since $x+1$ is a factor of $f(x) = x^n + 1$, then

$f(-1) = 0$

$\Rightarrow (-1)^n + 1 = 0$

$\Rightarrow (-1)^n = -1$

Thus, n should be an odd integer (a)

17) On dividing $3x^3 + 8x^2 + 8x + 3 + 5k$ by $x^2 + x + 1$, then

$$
\begin{array}{r|l}
 & 3x + 5 \\
\hline
x^2+x+1 & 3x^3 + 8x^2 + 8x + 3 + 5k \\
 & \underline{\cancel{3x^3} + 3x^2 + 3x} \\
 & 5x^2 + 5x + 3 + 5k \\
 & \underline{\cancel{5x^2} + \cancel{5x} + 5} \\
 & 5k - 2
\end{array}
$$

On equating the remainder, $5k-2=0$

$5k=2$

$\therefore k=\frac{2}{5}$ (b)

18) Put $x=1$

$(3-1)^7 = a_7+a_6+a_5+\cdots+a_1+a_0$

$\therefore a_7+a_6+a_5+\cdots+a_1+a_0 = 2^7 = 128$ (c)

19) Let $p(x) = px^2+5x+r$; since $x-2$ and $x-\frac{1}{2}$ are factors of $p(x)$, then

$p(2)=0$

$\Rightarrow 4p+10+r=0$

$\Rightarrow 4p+r=-10 \rightarrow (1)$

$p(\frac{1}{2})=0$

$\Rightarrow \frac{p}{4}+\frac{5^{\times 2}}{2_{\times 2}}+r^{\times 4}=0$

$\Rightarrow p+10+4r=0$

$\Rightarrow p+4r=-10 \rightarrow (2)$

From (1) and (2), $4p+r=p+4r$

$\Rightarrow 4p-p=4r-r$

$\Rightarrow 3p=3r$

$\therefore p=r$ (a)

20) $x^2-1=(x+1)(x-1)$

Let $p(x)=ax^4+bx^3+cx^2+dx+e$

$p(-1)=0$

$\Rightarrow a-b+c-d+e=0$

$\Rightarrow a+c+e=b+d$ (a)