|  |  |  | INDIAN SCHOOL AL WADI AL KABIR  <br> Department: Mathematics  <br> Class IX Worksheet - POLYNOMIALS |  |  |  |  |  |
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| Questions of 1 mark each |  |  |  |  |  |  |  |  |
| Q.1. | The degree of the polynomial $\sqrt{3}$ is |  |  |  |  |  |  |  |
|  | A | 3 | B | 1 | C | 0 | D | 3 |
| Q.2. | The value of the polynomial $x^{2}-3 x+6$ at $x=\sqrt{2}$ is |  |  |  |  |  |  |  |
|  | A | $8-3 \sqrt{2}$ | B | $8+3 \sqrt{2}$ | C | $-8+2 \sqrt{3}$ | D | $8-2 \sqrt{3}$ |
| Q.3. | The value of ${ }^{\prime} k^{\prime}$, if $x-2$ is a factor of $p(x)=2 x^{2}+3 x-k$. |  |  |  |  |  |  |  |
|  | A | -14 | B | 14 | C | 12 | D | -12 |
| Q.4. | Which among the following expressions is not a polynomial? |  |  |  |  |  |  |  |
|  | A | $x^{10}+y^{3}+t^{50}$ | B | $3 \sqrt{t}+t \sqrt{2}$ | C | $7 x^{5}-\sqrt{5} x+2 x$ | D | $\frac{x^{3}+2 x^{2}+5 x}{6}$ |
| Q.5. | The remainder when $4 x^{3}-12 x^{2}+14 x-3$ is divided by $x-\frac{1}{2}$ is |  |  |  |  |  |  |  |
|  | A | $\frac{-2}{3}$ | B | $\frac{2}{3}$ | C | $\frac{-3}{2}$ | D | $\frac{3}{2}$ |
| Q.6. | If $x-\frac{1}{x}=\frac{1}{2}$, then $4 x^{2}+\frac{4}{x^{2}}=$ |  |  |  |  |  |  |  |
|  | A | 9 | B | 16 | C | 25 | D | 64 |
| Q.7. | If $a^{2}+b^{2}+c^{2}=90$, and $a+b+c=20$, then the value of $a b+b c+c a$. |  |  |  |  |  |  |  |
|  | A | 170 | B | 160 | C | 165 | D | 155 |
| Q.8. | Zero of the polynomial $p(x)$, where $p(x)=a x+1, a \neq 0$ is |  |  |  |  |  |  |  |
|  | A | $\frac{1}{a}$ | B | 0 | C | $\frac{-1}{a}$ | D | $-a$ |


|  | ASSERTION AND REASONING: <br> Directions: Choose the correct answer out of the following choices: <br> (a) Assertion and Reason both are correct statements and Reason is the correct explanation of Assertion. <br> (b) Assertion and Reason both are correct statements but Reason is not the correct explanation of Assertion. <br> (c) Assertion is correct statement but Reason is wrong statement. <br> (d) Assertion is wrong statement but Reason is correct statement. |
| :---: | :---: |
| Q.9. | Assertion: $(x+2)$ is a factor of $\mathrm{x}^{3}+3 \mathrm{x}^{2}+5 \mathrm{x}+6$ and of $2 \mathrm{x}+4$ <br> Reason: If $p(x)$ be a polynomial of degree greater than or equal to one, then $(x-a)$ is a factor of $p(x)$, if $\mathrm{p}(\mathrm{a})=0$ |
| Q.10. | Assertion: -7 is a constant polynomial. <br> Reason: Degree of a constant polynomial is zero. |
|  | Questions of 2 marks each |
| Q.11. | Expand ( $2 x-3 y+z)^{2}$ using suitable identity. |
| Q.12. | Find the value of $8 x^{3}+27 y^{3}$, if $2 x+3 y=8$ and $x y=2$. |
| Q.13. | Factorize $250 p^{3}-432 q^{3}$ |
|  | Questions of 3 marks each |
| Q.14. | $\text { If } \mathrm{p}(\mathrm{x})=4 x^{3}-3 x^{2}+2 x-4, \text { find } \frac{p(2)}{p(0) \times p(1)}$ |
| Q.15. | If $x^{2}+\frac{1}{x^{2}}=98$, then find the value of $x^{3}+\frac{1}{x^{3}}$. |
| Q.16. | Factorize $6 x^{3}-25 x^{2}+32 x-12$. |
|  | Questions of 5 marks each |
| Q.17. | i) The polynomial $a x^{3}+3 x^{2}-13$ and $2 x^{3}-5 x+a$ leave the same remainder in each case, when divided by $x-2$. Find the value of ' $a$ '. <br> ii) Use suitable identity and find the product: <br> a) $105 \times 106$ <br> b) $(2 x+y)(2 x-y)\left(4 x^{2}+y^{2}\right)$ |
| Q.18. | The polynomial $p(x)=x^{4}-2 x^{3}+3 x^{2}-a x+8$ is a polynomial such that when it is divided by $(x-1)$ the remainder is 5 . Determine the remainder when $p(x)$ is divided by $(x-2)$ and $(x+1)$. |


ii) Factorize $8 x^{3}+27 y^{3}+36 x^{2} y+54 x y^{2}$

## Case study-based (4 marks)

Q.20.

On one day, principal of a particular school visited the classroom. Class teacher was teaching the concept of polynomial to students. He was very much impressed by her way of teaching. To check, whether the students also understand the concept taught by her or not, he asked various questions to students. Some of them are given below. Answer them.

i) Without actually calculating the cubes, find the value of $\left(\frac{1}{2}\right)^{3}+\left(\frac{1}{3}\right)^{3}-\left(\frac{5}{6}\right)^{3}$
ii) Show that $(x-1)$ is a factor of the polynomial $f(x)=2 x^{3}-3 x^{2}+7 x-6$.
iii) Factorise $2 x^{2}+y^{2}+8 z^{2}-2 \sqrt{2} x y+4 \sqrt{2} y z-8 x z$

| ANSWERS |  |  |  |  |  |  |  |
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| Q. 1 | C | Q. 2 | A | Q. 3 | B | Q. 4 | B |
| Q. 5 | D | Q. 6 | A | Q. 7 | D | Q. 8 | C |
| Q. 9 | A | Q. 10 | A | Q. 11 | $\begin{array}{\|l\|} \hline 4 x^{2}+9 y^{2}+z^{2}- \\ 12 x y-6 y z+4 x z \\ \hline \end{array}$ | Q. 12 | 224 |
| Q. 13 | $\begin{aligned} & 2(5 p \\ & -6 q)\left(25 p^{2}\right. \\ & \left.+36 q^{2}+30 p q\right) \end{aligned}$ | Q. 14 | 5 | Q. 15 | 970 | Q. 16 | $\begin{aligned} & (x-2)(3 x \\ & -2)(2 x-3) \end{aligned}$ |
| Q. 17 | i) 1 <br> ii) a) 11130 <br> b) $16 x^{4}-y^{4}$ | $\begin{aligned} & \text { Q. } 18 \\ & \text { Q. } 19 \end{aligned}$ | $\begin{aligned} & \quad 5,10,19 \\ & \begin{array}{l} (2 x+3 y)(2 x+3 y) \\ (2 x+3 y) \end{array} \end{aligned}$ | Q. 20 | i) $\frac{-5}{12}$ | Q. 20 | $\begin{aligned} & (-\sqrt{2} x+y \\ & +2 \sqrt{2} z)(-\sqrt{2} x \\ & +y+2 \sqrt{2} z) \end{aligned}$ |

