

SOLUTIONS

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SOLUTIONS: CHAPTER TEST (POLYNOMIALS)

Mathematics | Class IX (2026/POLYN/09/002)

Section A: Multiple Choice Questions

- (d) 5. $p(x) = (x+1)(x^2 - x - x^4 + 1)$. The highest power of x comes from $x \times (-x^4) = -x^5$.
- (b) 1. $p(2\sqrt{2}) = (2\sqrt{2})^2 - 2\sqrt{2}(2\sqrt{2}) + 1 = 8 - 8 + 1 = 1$.
- (c) Cubic polynomial. A polynomial with degree 3 is cubic.
- (a) $-\frac{3}{4}$. Set $\frac{2}{3}x + \frac{1}{2} = 0 \implies \frac{2}{3}x = -\frac{1}{2} \implies x = -\frac{1}{2} \times \frac{3}{2} = -\frac{3}{4}$.
- (b) 1. If $(x+1)$ is a factor, then $p(-1) = 0$. $(-1)^2 - k = 0 \implies 1 - k = 0 \implies k = 1$.
- (c) (0, -6). On the y-axis, $x = 0$. $y = 3(0) - 6 = -6$.
- (b) $x^4 - y^4$. $(x-y)(x+y) = x^2 - y^2$. Then $(x^2 - y^2)(x^2 + y^2) = (x^2)^2 - (y^2)^2 = x^4 - y^4$.
- (c) 6. $(x+3)^2 = x^2 + 2(x)(3) + 3^2 = x^2 + 6x + 9$.

Section B: Very Short Answer Questions

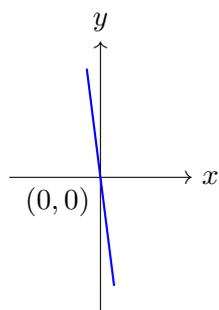
- (i) $\frac{x^3+2x+1}{x} = x^2 + 2 + x^{-1}$. This is **not a polynomial** (negative power). However, if considering the numerator, its degree is 3. (ii) $5x^4 - \pi x^2 + 10$: **Degree = 4**.
- $(100+3)(100+7) = 100^2 + (3+7)100 + (3 \times 7) = 10000 + 1000 + 21 = \mathbf{11021}$.
- $p(1) = 2 + 1 + 2(1)^2 - 1^3 = 2 + 1 + 2 - 1 = 4$.
 $p(-2) = 2 + (-2) + 2(-2)^2 - (-2)^3 = 2 - 2 + 8 + 8 = \mathbf{16}$.
- Let the zero of $ax + b$ be $x = -b/a$. For $x^2 - 1$ to be divisible by $ax + b$, $(-b/a)^2 - 1 = 0 \implies b^2/a^2 = 1 \implies \mathbf{b^2 = a^2}$ or $\mathbf{a = \pm b}$.

Section C: Short Answer Questions

- $p(3) = 3^2 - 3(3) = 9 - 9 = 0$. $p(0) = 0^2 - 3(0) = 0$. Both are zeroes. On a graph, these points (0, 0) and (3, 0) are where the parabola intersects the x-axis.
- Squaring $(x - \frac{1}{x}) = 4$:
 $x^2 + \frac{1}{x^2} - 2(x)(\frac{1}{x}) = 16 \implies x^2 + \frac{1}{x^2} - 2 = 16 \implies \mathbf{x^2 + \frac{1}{x^2} = 18}$.
- (i) $4y^2 - 4y + 1 = (2y)^2 - 2(2y)(1) + 1^2 = \mathbf{(2y - 1)^2}$.
(ii) $9x^2 - \frac{y^2}{100} = (3x)^2 - (\frac{y}{10})^2 = \mathbf{(3x - \frac{y}{10})(3x + \frac{y}{10})}$.

Section D: Long Answer Questions

- (i) $p(x) = [(x-2) - (x+2)][(x-2) + (x+2)] = (-4)(2x) = -8x$. Zero is $\mathbf{x=0}$.
(ii) Result is **linear** (degree 1).
(iii)



2. (i) $(3a - 5b)^2 = 9a^2 - 30ab + 25b^2$. $(2x + 1)(2x - 1) = 4x^2 - 1$.
 (ii) $x^2 + 7x + 10 = x^2 + 5x + 2x + 10 = (x + 5)(x + 2)$. Length = $x + 5$, Breadth = $x + 2$.
 (iii) If $x = 5$, $L = 10$, $B = 7$. Perimeter = $2(10 + 7) = \mathbf{34}$ units.

Section E: Case Study Based Question

1. (c) **0 meters.** $H(2) = 2^2 - 4(2) + 4 = 4 - 8 + 4 = 0$.
2. (a) **2.** The coefficient of d in $2d + 5$ is 2.
3. (b) **d=3 and d=5.** Set $(d - 3)(d - 5) = 0 \implies d = 3, 5$.
4. (b) **2.** A cubic polynomial changes direction at most $n - 1 = 2$ times.
5. (d) **Both (a) and (c).** One can use $(a^2 - b^2)$ or expand both squares and subtract.