Worksheet

1. Add:
   a. $x + 2y - 3z,\ 2x + 5y - 3z,\ -x + 3y + 2z$
   b. $x^2 + y^2 - 2z^2,\ x^2 + y^2 + z^2,\ 3x^2 + 2y^2 - 3z^2$
   c. $4x^2 + 3xy - 5y^2,\ x^2 - xy + 3y^2,\ 2x^2 + 5xy - y^2$
   d. $2a + 3b - 4c,\ a + 2b + c,\ 3a - b + 2c$

2. Subtract:
   a. $35x^2 - 12x + 3$ from $7x^2 - 15x - 1$
   b. $3mn^3 + 5m^2 + m^3n + n^2 + 8m^2n^2$ from $3m^2n^2 - m^2 - m^3n + mn^3 + 5n^2$

3. Multiply:
   a. $4x^2y^3$ by $-x^2y^3$
   b. $-7x^2y^2z$ by $-4xy^3z^2$
   c. $\dfrac{1}{2}x^2y^3$ by $-\dfrac{2}{3}xy^2$
   d. $32\ xy^2z$ by $-\dfrac{1}{8}x^2yz^2$

4. Subtract the second polynomial from the first by column method.
   a. $8x^3 + y^3 + z^3 - 6xyz$ and $-27x^3 - y^3 - z^3 - 9xyz$
   b. $x^3 + 3x^2 - 5x + 3$ and $2x^3 + x^2 + 7 - 3x$
   c. $-5m + 3m^2 + m^3 - 1$ and $5 - 5m^3 + 3m^2 + m$

5. Multiply:
   a. $(4x^2 - 5x + 4)$ by $(2x - 1)$
   b. $(4a - 3b - c)$ by $(2b - c)$

6. Multiply the following.
   a. $(y^2 - 5y + 1)\ (4y^2 - y + 2)$
   b. $(3x^2 + 2x - 1)\ (6x^2 - x + 5)$

7. Divide each of the following polynomial and write their quotient and remainder. Also, verify using division algorithm.
   a. $3x^4 + 5x^3 - 5x^2 - 8x - 13$ by $x + 3$
   b. $8t^5 - 12t^4 - 14t - 4t^2 - 2$ by $2t - 3$
   c. $6x^4 + 7x^3 - 3x^2 + 2x - 1$ by $x^2 + 1$

8. Simplify:
   a. $\dfrac{1}{5}ab\ (5a^2b + 45b^2)$
   b. $-\dfrac{2}{3}x(9x^2y - 45xy^2)$
   c. $\dfrac{1}{mn}\ (3mn^2 - m^3n)$
   d. $\dfrac{2xz}{11y}\ (-22x^2yz + 33yxz + 11xyz^2)$

9. Subtract $4x^2 - 21xy$ from the sum of $6x^2 + 2xy + 5y^2$ and $x^2 - 3xy - 5y^2$.

10. Add: $\dfrac{3}{5}x^2 + 5xy - \dfrac{1}{2}$ and $x^2 + 32xy + \dfrac{1}{4}y^2 - 5x^2$.

11. From the sum of $8m^2 - 3mn + n^2$ and $3m^2 - mn - 3n^2$ subtract the sum of $4m^2 - 7mn + 5n^2$ and $2m^2 + 13mn - 7n^2$.

12. If three sides of a triangle are $5x^3 - 12x$, $6x^2 - 5x^3 + x$ and $3x^2 + 5x$, then find the

perimeter of the triangle.

13. Choose the correct answer.

   a. Which among the following is a polynomial?

   i. $\sqrt{x} + \dfrac{3}{\sqrt{x}} - 3x$ ii. $x^{-2} + x^{-1} + 4x^3$

   iii. $x^3 + x^2 + 3x - 5$ iv. $x^{1/5} + x^5 - 1$

   b. The degree of the polynomial $x^2 + x^5 + x$ is

   i. 2   ii. 1   iii. 5   iv. 0

   c. The coefficient of x^2 in $3xy + 5x^3 - 2x^2$ is

   i. 3   ii. 2   iii. –2   iv. 3y

   d. The pair of like terms among the following is

   i. xy^2, x^2y ii. xyz, yz iii. $2x^2y^2, -x^2y^2$ iv. xy^2z, xyz^2

   e. Which of the following polynomial is of degree 3?

   i. $x^2 + 5x^3 - 2$ ii. $x^5 + 5x^3 - 2$ iii. $x + 5x^2 - 2$ iv. $x^4 + 5x^3 - 2$

14. Match each polynomial with its degree.

I	II
a. $x^5 + x^3 + 5x$	i. 3
b. $x^2y + x^2 + 5x$	ii. 6
c. $x^3 + 2x^2y^2 + 5x$	iii. 7
d. $x^2y^5 + x^3y + 5x$	iv. 4
e. $x^5 + x^3 + 5x^4y^2$	v. 5

15. If area of a rectangle of length $(2x + 3)$ is $(4x^2 - 9)$ sq. units, then find its perimeter.

16. Find the area of a square of side $2a + 3b$.

Answers to Worksheet

1. a. $2x + 10y - 4z$ b. $5x^2 + 4y^2 - 4z^2$
   c. $7x^2 + 7xy - 3y^2$ d. $6a + 4b - c$

2. a. $-28x^2 - 3x - 4$ b. $-5m^2n^2 - 6m^2 - 2m^3n - 2mn^3 + 4n^2$

3. a. $-4x^4y^6$ b. $28x^3y^5z^3$ c. $\dfrac{-1}{3}x^3y^5$ d. $-4x^3y^3z^3$

4. a. $35x^3 + 2y^3 + 2z^3 + 3xyz$ b. $-x^3 + 2x^2 - 2x - 4$
   c. $6m^3 - 6m - 6$

5. a. $8x^3 - 14x^2 + 13x - 4$ b. $-6b^2 + c^2 + 8ab + bc - 4ac$

6. a. $4y^4 - 21y^3 + 11y^2 - 11y + 2$ b. $18x^4 + 9x^3 + 7x^2 + 11x - 5$

7. a. $Q = 3x^3 - 4x^2 + 7x - 29$ b. $Q = 4t^4 - 2t - 10$ c. $Q = 6x^2 + 7x - 9$

$R = 74$ $R = -32$ $R = -5x + 8$

8. a. $a^3b^2 + 9ab^3$ b. $-6x^3y + 30x^2y^2$
   c. $3n - m^2$ d. $-4x^3z^2 + 6x^2z^2 + 2x^2z^3$

9. $3x^2 + 20xy$ 10. $\dfrac{-17}{5}x^2 + 37xy + \dfrac{1}{4}y^2 - \dfrac{1}{2}$ 11. $5m^2 - 10mn$

12. $9x^2 - 6x$

13. a. iii   b. iii   c. iii   d. iii   e. i

14. a. v   b. i   c. iv   d. iii   e. ii

15. $P = 8x$

16. $A = 4a^2 + 12ab + 9b^2$