19. (a) Show that if $x^6 - 1$ is factored as the difference of two cubes, the factored form is $(x+1)(x-1)(x^4+x^2+1)$.
    (b) Show that if $x^6 - 1$ is factored as the difference of two squares, the factored form is $(x+1)(x-1)(x^2+x+1)(x^2-x+1)$.
    (c) Factor x^4+x^2+1 by writing it in the form $x^4+2x^2+1-x^2$, and so demonstrate that the factored forms in (a) and (b) are equivalent.

20. Factor $4x^4+1$, by writing it as $4x^4+4x^2+1-4x^2$, and noting that this is the difference of two squares.

21. Factor a^4+4b^4 by expressing it as the difference of two squares.

22. Factor: $x^4+x^2y^2+y^4$.

23. Factor: $x^4-12x^2y^2+16y^4$.

24. Factor: $4t^4+11t^2u^2+9u^4$.

25. Factor: $4a^4+625b^4$.

26. Show that the value of $(x^4+x^2+1) \div (x^3+1)$ when $x = 1.5$ is 1.9.

Chapter Review

Factor the following expressions:

1. $3x^2-27x$
2. $3x^3+12x^2+12x$
3. $4a^2-9b^2$
4. $4a^2-9ab-9b^2$
5. x^3-1
6. x^3-x
7. $4t^2-100$
8. $3a(t+2)-2(2+t)$
9. $4-20n+25n^2$
10. $4-15n-25n^2$
11. $81+108y+36y^2$
12. $(p-q)^2-4r^2$
13. $a^2-2ab+b^2-4c^2$
14. $x^2-3x-xy+3y$
15. x^2-y^2-4y-4
16. $2ax-a^2-x^2$
17. $3x^3+2x^2-9x-6$
18. $xy+9+3(x+y)$
19. $6a-x^2-2x+3ax$
20. $(2x+2.5)^2-(x+1.5)^2$
21. $a^2+2a-1023$
22. $(a-b)^2+a-b$
23. $6x^4-15x^2-9$
24. $2R^2+2Rh-R-h$
25. $y^2(y-4)+4(4-y)$

Solve the following equations:

26. $(x+3)(x-2)-(x-3)(x+2)=4$
27. $(2x-3)(x+4)=2x(x+1)-5$
28. $(2x-5)^2-3(x-2)^2=(x+3)^2$
29. Write the polynomial form of $(5x-2y)^3$.
30. Show that for all values of x, $2x^2-3x+4=2(x-\frac{3}{4})^2+\frac{23}{8}$.

[05-12-15-P2]

Chapter Test

Factor the following expressions:

1. $3x^3-27x$
2. $2n^2-n-3$
3. $3x^2-5x-12$
4. $3x^2-9x-12$
5. x^4-1
6. x^4+x
7. x^4-6x^2+9
8. $2x^4-x^3-6x^2$
9. $12n-3n^3$
10. $18-12x-6x^2$
11. $3a(t-2)-2(2-t)$
12. $9t^2-(x-2y)^2$
13. $3x(n-1)+1-n$
14. $x^2-y^2-4y-4x$
15. x^3-8y^3
16. $10t^2-15t-25$
17. $a^2+2ab+b^2-c^2$
18. $a^2+2bc-b^2-c^2$
19. x^4+x^3-x-1
20. $(3y-2.5)^2-(y+1.5)^2$
21. $12-7nt-12n^2t^2$
22. $2x^3+8x^2-2x-8$
23. $2(x-y)^2-3(x-y)$
24. $15xy-10y^2-5x^2$
25. $n(n+1)(n+3)-3n$

Solve the following equations:

26. $3(x-2)^2-2(x+1)(x-1)=x(x-9)$
27. $(2x-3)(2x+3)-(2x-1)^2=0$
28. $(3x+1)(x-3)-(2x+1)(x-2)=x^2$
29. Write the polynomial form of $(4x-y)^3$.
30. Show that for all values of x, $4x^2-6x+1=4(x-\frac{3}{4})^2-\frac{5}{4}$.