Chapter-7
Algebraic Identities

1. $(a+b)^2 = a^2+2ab+b^2$
2. $(a-b)^2 = a^2-2ab+b^2$

WS-1

Q1: Find the following by using Identity-1

(i) $(2x+5)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= (2x)^2+2\times2x\times5+5^2$

$= 4x^2+20x+25$

(ii) $(8x+3y)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= (8x)^2+2\times8x\times3y+(3y)^2$

$= 64x^2+48xy+9y^2$

(iii) $\left(\frac{3}{5}a+\frac{2}{3}b\right)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= \left(\frac{3}{5}a\right)^2+2\times\frac{3}{5}a\times\frac{2}{3}b+\left(\frac{2}{3}b\right)^2$

$\frac{9}{25}a^2+\frac{4}{5}ab+\frac{4}{9}b^2$

(iv) $(7pq+4ab)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= (7pq)^2 + 2\times 7pq \times 4ab + (4ab)^2$

$= 49p^2q^2 + 56pqab + 16a^2b^2$

(v) $(0.2x+1.5y)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= (0.2x)^2 + 2\times 0.2x \times 1.5y + (1.5y)^2$

$= 0.04x^2 + 0.60xy + 2.25y^2$

(vi) $(2m^2+3n^2)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$= (2m^2)^2 + 2\times 2m^2 \times 3n^2 + (3n^2)^2$

$4m^4 + 12m^2n^2 + 9n^4$

Q2: Evaluate by using identity

(i) $(101)^2$

$= (100+1)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$(100)^2 + 2\times 100\times 1 + (1)^2$

10201

(ii) $(52)^2$

$(50+2)^2$

Using $(a+b)^2 = a^2+2ab+b^2$

$(50)^2 + 2\times 50\times 2 + (2)^4$

$2500 + 200 + 4$

$= 2704$

(iii) $(8.1)^2$

$(8 + 0.1)^2$

Using $(a+b)^2 = a^2 + 2ab + b^2$

$(8)^2 + 2 \times 8 \times 0.1 + (0.1)^2$

$64 + 1.6 + 0.01$

$= 65.61$

(iv) $(410)^2$

$(400 + 10)^2$

Using $(a+b)^2 = a^2 + 2ab + b^2$

$(400)^2 + 2 \times 400 \times 10 + (10)^2$

$160000 + 80,000 + 100$

$= 240100$

(v) $(203)^2$

$(200 + 3)^2$

Using $(a+b)^2 = a^2 + 2ab + b^2$

$= (200)^2 + 2 \times 200 \times 3 + (3)^2$

$= 40,000 + 1200 + 9$

$= 41209$

(vi) $(10.2)^2$

$(10 + 0.2)^2$

Using $(a+b)^2 = a^2 + 2ab + b^2$

$10^2 + 2 \times 10 \times 0.2 + (0.2)^2$

$100 + 4 + 0.04 = 104.04$

WS-2

Q1: Find the following

(i) $(x-7)^2$

Using $(a-b)^2 = a^2 - 2ab + b^2$

$x^2 - 2 \times x \times 7 + 7^2$

$= x^2 - 14x + 49$

(iii) $\left(\frac{7x}{4} - \frac{2y}{3}\right)^2$

Using $(a-b)^2 = a^2 - 2ab + b^2$

$\left(\frac{7x}{4}\right)^2 - 2 \times \left(\frac{7x}{4}\right)\left(\frac{2y}{3}\right) + \left(\frac{2y}{3}\right)^2$

$= \frac{49x^2}{16} - \frac{7xy}{3} + \frac{4y^2}{9}$

(iv) $(8mn - 3pq)^2$

Using $(a-b)^2 = a^2 - 2ab + b^2$

$(8mn)^2 - 2 \times 8mn \times 3pq + (3pq)^2$

$64m^2n^2 - 48mnpq + 9p^2q^2$

(v) $(0.1x - 0.5y)^2$

Using $(a-b)^2 = a^2 - 2ab + b^2$

$(0.1x)^2 - 2 \times 0.1x \times 0.5y + (0.5y)^2$

$= 0.01x^2 - 0.1xy + 0.25y^2$

Date : / /20

(vi) $(a^2-b^2)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

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

$a^4 - 2a^2b^2 + b^4$

Q2: Evaluate

(i) $(48)^2$

$(50-2)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$(50)^2 - 2 \times 50 \times 2 + (2)^2$

$2500 - 200 + 4$

$= 2396$

(ii) $(9.9)^2$

$= (10-0.1)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$= 10^2 - 2(10)(0.1) + 0.1^2$

$= 100 - 2 + 0.01$

$= 98.01$

(v) $(87)^2$

$= (90-3)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$90^2 - 2(90)(3) - 3^2$

$8100 - 540 + 9$

$= 7569$

(vi) $(19.9)^2$

$(20-0.1)^2$

Using $(a-b)^2 = a^2 - 2ab + b^2$

$20^2 - 2(20)(0.1) + 0.1^2$

$400 - 4 + 0.01$

$= 396.01$

3. $(a+b)(a-b) = a^2 - b^2$

WS-3

Q1: Find the following

(i) $(2x+7y)(2x-7y)$

Using $(a+b)(a-b) = a^2 - b^2$

$= (2x)^2 - (7y)^2$

$= 4x^2 - 49y^2$

(ii) $(5ab-8c)(5ab+8c)$

Using $(a+b)(a-b) = a^2 - b^2$

$= (5ab)^2 - (8c)^2$

$= 25a^2b^2 - 64c^2$

(iii) $(4p^2+q^2)(4p^2-q^2)$

Using $(a+b)(a-b) = a^2 - b^2$

$(4p^2)^2 - (q^2)^2$

$= 16p^4 - q^4$

(iv) $\left(\frac{x}{3} - \frac{y}{2}\right)\left(\frac{x}{3} + \frac{y}{2}\right)$

Using $(a+b)(a-b) = a^2 - b^2$

$\left(\frac{x}{3}\right)^2 - \left(\frac{y}{2}\right)^2$

$= \frac{x^2}{9} - \frac{y^2}{4}$

(v) $(0.1m - 0.2n)(0.1m + 0.2n)$

Using $(a+b)(a-b) = a^2 - b^2$

$(0.1m)^2 - (0.2n)^2$

$0.01m^2 - 0.04n^2$

(vi) $(a^3 + b^3)(a^3 - b^3)$

Using $(a+b)(a-b) = a^2 - b^2$

$= (a^3)^2 - (b^3)^2$

$= a^6 - b^6$

Date : / /20

HW Parts (14/7/22)

WS-2

Q1:(ii) $(5a-4b)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$(5a)^2 - 2\times5a\times4b + (4b)^2$

$25a^2 - 40ab + 16b^2$

Q2:(iii) $(299)^2$

$(300-1)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$(300)^2 - 2\times300\times1 + (1)^2$

$90000 - 600 + 1$

$= 89401$

(iv) $(98)^2$

$(100-2)^2$

Using $(a-b)^2 = a^2-2ab+b^2$

$100^2 - 2\times100\times2 + 2^2$

$10000 - 400 + 4$

$= 9604$

WS-3

Date : / /20

WS-3

Q2: Evaluate

(i) $(81)^2 - (19)^2$

Using $(a+b)(a-b) = a^2 - b^2$

$= (81+19)(81-19)$

$= 100 \times 62$

$= 6200$

(ii) $(290)^2 - (210)^2$

Using $(a+b)(a-b) = a^2 - b^2$

$(290+210)(290-210)$

$= 500 \times 80$

$= 40,000$

(iii) $(58)^2 - (12)^2$

Using $(a^2-b^2) = (a+b)(a-b)$

$(58+12)(58-12)$

$= 70 \times 46$

$= 3220$

(iv) $(176)^2 - (24)^2$

Using $(a^2-b^2) = (a+b)(a-b)$

$(176+24)(176-24)$

200×152

$= 30400$

(v) $(367)^2 - 33^2$

Using $a^2 - b^2 = (a+b)(a-b)$

$(367+33)(367-33)$

400×334

$= 133600$

(vi) $(545)^2 - (445)^2$

Using $a^2 - b^2 = (a+b)(a-b)$

$= (545+445)(545-445)$

$= 900 \times 100$

$= 99000$

Q3: Simplify

(i) $107 \times 93 = (100+7)(100-7)$

Using $(a+b)(a-b) = a^2 - b^2$

$(100)^2 - (7)^2$

$= 10000 - 49$

$= 9951$

(ii) 211×189

$(200+11)(200-11)$

Using $(a+b)(a-b) = a^2 - b^2$

$(200)^2 - (11)^2$

$40,000 - 121$

$= 39879$

(iii) 195×205

$(200-5)(200+5)$

Using $(a+b)(a-b) = a^2-b^2$

$(200)^2-(5)^2$

$= 40,000 - 25$

$= 39975$

(iv) 308×292

$(300+8)(300-8)$

Using $(a+b)(a-b) = a^2-b^2$

$= (300)^2-(8)^2$

$= 90,000 - 64$

$= 89936$

(v) 12.4×11.6

$(12+0.4)(12-0.4)$

Using $(a+b)(a-b) = a^2-b^2$

$12^2-0.4^2$

$= 144-0.16$

$= 143.84$

(vi) 30.9×29.1

$(30+0.9)(30-0.9)$

Using

$(30)^2-(0.9)^2$

$= 900 - 0.81$

$= 899.19$

$(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

WS-4

Q1: Expand

(i) $(x-2y+3z)^2$

$[x+(-2y)+3z]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$= x^2+(-2y)^2+(3z)^2+2(x)(-2y)+2(-2y)(3z)+2(3z)(x)$
$= x^2+4y^2+9z^2-4xy-12yz+6xz$

(ii) $(-5x+2y+z)^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(-5x)^2+(2y)^2+z^2+2(-5x)(2y)+2(2y)(z)+2(-5x)(z)$
$25x^2+4y^2+z^2-20xy+4yz-10xz$

(iii) $(4x+y-3z)^2$

$[4x+y+(-3z)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(4x)^2+y^2+(-3z)^2+2(4x)(y)+2(y)(-3z)+2(-3z)(4x)$
$16x^2+y^2+9z^2+8xy-6yz-24xz$

(IV) $(3a-5b-7c)^2$

$[3a+(-5b)+(-7c)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(3a)^2+(-5b)^2+(-7c)^2+2(3a)(-5b)+2(-5b)(-7c)+2(-7c)(3a)$

$9a^2+25b^2+49c^2-30ab+70bc-42ac$

(V) $(-2a-b+3c)^2$

$[-2a+(-b)+3c]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(-2a)^2+(-b)^2+(3c)^2+2(-2a)(-b)+2(-b)(3c)+2(3c)(-2a)$

$4a^2+b^2+9c^2+4ab-6bc-12ac$

(VI) $(-a+6b-2c)^2$

$[-a+6b+(-2c)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(-a)^2+(6b)^2+(-2c)^2+2(-a)(6b)+2(6b)(-2c)+2(-2c)(-a)$

$a^2+36b^2+4c^2-12ab-24bc+4ac$

(VII) $(1+2x-3y)^2$

$[1+2x+(-3y)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

Date : / /20

$(1)^2+(2x)^2+(-3y)^2+2(1)(2x)+2(2x)(-3y)+2(-3y)(1)$

$1+4x^2+9y^2+4x-12xy-6y$

(VIII) $(2x-4y-1)^2$

$[2x+(-4y)+(-1)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(2x)^2+(-4y)^2+(-1)^2+2(2x)(-4y)+2(-4y)(-1)+2(-1)(2x)$

$4x^2+16y^2+1-16xy+8y-4x$

(IX) $(6p-5q-4x)^2$

$[6p+(-5q)+(-4x)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(6p)^2+(-5q)^2+(-4x)^2+2(6p)(-5q)+2(-5q)(-4x)+2(-4x)(6$

$36p^2+25q^2+16x^2-60pq+40qx-48px$

5) $(x+a)(x+b) = x^2+(a+b)x+ab$

WS-5

Q1: Find the product

(i) $(x+5)(x+4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(5+4)x+5\times4$

$x^2+9x+20$

(ii) $(a+3)(a+6)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$a^2+(3+6)a+3\times6$

$a^2+9a+18$

(iii) $(x-9)(x+7)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(-9+7)x+(-9)\times7$

$x^2-2x-63$

(iv) $(x+8)(x-5)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(8+(-5))x+8\times(-5)$

$x^2+3x-40$

(v) $(z-3)(z-1)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$z^2+(-3+(-1))z+(-3)\times(-1)$

z^2-4z+3

(vi) $(p-5)(p-4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$p^2+(-5+(-4))p+(-5)\times(-4)$

$p^2-9p+20$

(vii) $(y-1)(y+2)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$y^2+(-1+2)y+(-1)\times2$

y^2+1y-2

Date : / /20

(VIII) $(z+3)(z-7)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$z^2+(3+(-7))z+3\times(-7)$

$z^2-4z-21$

(IX) $(p+8)(p-3)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$p^2+(8+(-3))p+8\times(-3)$

$p^2+5p-24$

(X) $(z+6)(z-5)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$z^2+(6-5)z+6\times(-5)$

$z^2+1z-30$

(XI) $(x-6)(x-9)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(-6-9)x+(-6)\times(-9)$

$x^2-15x+54$

(XII) $(x-10)(x+9)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(-10+9)x+(-10)\times 9$

$x^2-1x-90$

(XIII) $(y-4)(y+4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$y^2+(-4+4)y+(-4)\times 4$

y^2-16

(xiv) $(x-4)(x-14)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(-4-14)x+(-4)\times(-14)$

$x^2-18x+56$

(xv) $(x-8)(x-2)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$x^2+(-8-2)x+(-8)\times(-2)$

$x^2-10x+16$

WS-4

(x) $(p+5q+2)^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$p^2+(5q)^2+2^2+2(p)(5q)+2(5q)(2)+2(2)(p)$

$p^2+25q^2+4+10pq+20q+4p$

(xi) $(3x-4y-5)^2$

$[3x+(-4y)+(-5)]^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(3x)^2+(-4y)^2+(-5)^2+2(3x)(-4y)+2(-4y)(-5)+2(-5)(3x)$

$9x^2+16y^2+25-24xy+40y-30x$

(xii) $(-2x+6y+4)^2$

Using $(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$(-2x)^2+(6y)^2+4^2+2(-2x)(6y)+2(6y)(4)+2(4)(-2x)$

$4x^2+36y^2+16-24xy+48y-16x$

WS-5

Q2: Evaluate

(i) 102×104

$(100+2)(100+4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$100^2+(2+4)\times100+2\times4$

$10,000+600+8$

10608

(ii) 105×103

$= (100+5)(100+3)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$100^2+(5+3)\times100+5\times3$

$10,000+800+15$

$= 10815$

(iii) 206×205

$= (200+6)(200+5)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= 200^2+(6+5)\times200+6\times5$

$= 40,000+2200+30$

$= 42230$

(iv) 98×96

$= (100-2)(100-4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

Page No.
Date : / /20

$= 100^2 + (-2-4) \times 100 + (-2) \times (-4)$
$= 10,000 - 600 + 8$
$= 9408$

(v) 87×85
$(100 - 13)(100 - 15)$

Using $(x+a)(x+b) = x^2 + (a+b)x + ab$
$100^2 + (-13-15) \times 100 + (-13) \times (-15)$
$10,000 - 2800 + 325$
$=$

(VI) 104×95
$(100+4)(100-5)$

Using $(x+a)(x+b) = x^2 + (a+b)x + ab$

$= 100^2 + (4-5) \times 100 + 4 \times (-5)$
$= 10,000 - 100 - 20$
$= 9880$

(VII) 97×102
$(100-3)(100+2)$

Using $(x+a)(x+b) = x^2 + (a+b)x + ab$

$= 100^2 + (-3+2) \times 100 + (-3) \times 2$
$= 10,000 - 100 - 6$
$= 9894$

Date : / /20

(VIII) 203 X 198

$(200+3)(200-2)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= 200^2+(3-2)\times 200+3\times(-2)$

$= 40,000+200-6$

$= 40194$

(IX) 35 X 37

$(40-5)(40-3)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= 40^2+(-5-3)\times 40+(-5)\times(-3)$

$= 1600-320+15$

$= 1295$

(X) 106 X 93

$(100+6)(100-7)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= 100^2+(6-7)\times 100+6\times(-7)$

$= 10,000-100-42$

$= 9858$

Q3: Evaluate

(i) $(x^2+3)(x^2+4)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$(x^2)^2+(3+4)x^2+3\times 4$

$= x^4+7x^2+12$

(ii) $\left[x+\frac{4}{3}\right]\left[x+\frac{1}{3}\right]$

Using $(x+a)(x+b)=x^2+(a+b)x+ab$

$x^2+\left[\frac{4}{3}+\frac{1}{3}\right]x+\frac{4}{3}\times\frac{1}{3}$

$x^2+\frac{5}{3}x+\frac{4}{9}$

(iii) $\left[x-\frac{3}{5}\right]\left[x-\frac{1}{2}\right]$

Using $(x+a)(x+b)=x^2+(a+b)x+ab$

$x^2+\left[\left(\frac{-3}{5}\right)+\left(\frac{-1}{2}\right)\right]x+\left(\frac{-3}{5}\right)\times\left(\frac{-1}{2}\right)$

$x^2+\frac{-11}{10}x+\frac{3}{10}$

(iv) $(y^2-6)(y^2+7)$

Using $(x+a)(x+b)=x^2+(a+b)x+ab$

$(y^2)^2+(-6+7)y^2+(-6)\times 7$

$=y^4+1y^2-42$

(v) $(z^2+4)\left(z^2-\frac{1}{4}\right)$

Using $(x+a)(x+b)=x^2+(a+b)x+ab$

$(z^2)^2+\left[4-\frac{1}{4}\right]z+4\times\left(\frac{-1}{4}\right)$

Date : / /20

$= z^4 + \frac{15}{4} z^2 + 1$

(VI) $(y^2-3)(y^2-1)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$(y^2)^2 + [(-3)+(-1)]y^2 + (-3)\times(-1)$

$y^4 - 4y^2 + 3$

(VII) $(x^3+5)(x^2+2)$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= (x^3)^2 + (5+2)x^3 + 5\times 2$

$= x^6 + 7x^3 + 10$

(VIII) $\left[p^2 - \frac{1}{4}\right]\left[p^2 + \frac{1}{8}\right]$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= (p^2)^2 + \left[\frac{-1}{4} + \frac{1}{8}\right]p^2 + \left(\frac{-1}{4}\right)\times\frac{1}{8}$

$= p^4 - \frac{1}{8}p^2 - \frac{1}{32}$

(IX) $\left[z + \frac{1}{6}\right][z+6]$

Using $(x+a)(x+b) = x^2+(a+b)x+ab$

$= z^2 + \left[\frac{1}{6} + \frac{6}{1}\right] z + \frac{1}{6} \times 6$

$= z^2 + \frac{37}{6} z + 1$

WS-6

Factorise

1. x^2+z^2-2xz

Using $a^2+b^2-2ab = (a-b)^2$

$= (x-z)^2$

$= (x-z)(x-z)$

2. $4x^2+9y^2-12xy$

$(2x)^2+(3y)^2-2\times 2x \times 3y$

Using $a^2+b^2+2ab = (a-b)^2$

$= (2x-3y)^2$

$= (2x-3y)(2x-3y)$

3. $64a^2+49b^2+112ab$

$(8a)^2+(7b)^2+2\times 8a \times 7b$

Using $a^2+b^2+2ab = (a+b)^2$

$= (8a+7b)^2$

$= (8a+7b)(8a+7b)$

Page No.

Date : / /20

4. $121p^2+16q^2-88pq$

$= (11p)^2+(4q)^2-2\times 11p\times 4q$

Using $a^2+b^2-2ab = (a-b)^2$

$= (11p-4q)^2$

$= (11p-4q)(11p-4q)$

5. $9x^2y-24xy^2+16y^3$

$= y(9x^2-24xy+16y^2)$

$= y[(3x)^2-2(3x)(4y)+(4y)^2]$

Using $a^2-2ab+b^2 = (a-b)^2$

$= y(3x-4y)^2$

$= y(3x-4y)(3x-4y)$

6. $2a^3+4a^2b+2ab^2$

$= 2a(a^2+2ab+b^2)$

Using Identity $a^2+2ab+b^2 = (a+b)^2$

$= 2a(a+b)^2$

$= 2a(a+b)(a+b)$

7. $50a^2+98b^2+140ab$

$= 2(25a^2+49b^2+70ab)$

$= 2[(5a)^2+(7b)^2+2\times 5a\times 7b]$

Using Identity $a^2+b^2+2ab = (a+b)^2$

$= 2(5a+7b)^2$

$= 2(5a+7b)(5a+7b)$

Date: / /20

8. $64x^2 - 81y^2$

$= (8x)^2 - (9y)^2$

Using Identity $a^2 - b^2 = (a+b)(a-b)$

$= (8x+9y)(8x-9y)$

9. $25p^2 - 9q^2$

$= (5p)^2 - (3q)^2$

Using Identity $a^2 - b^2 = (a+b)(a-b)$

$(5p+3q)(5p-3q)$

10. $16a^2b - 64b^3$

$= 16b(a^2 - 4b^2)$

$= 16b[(a)^2 - (2b)^2]$

Using Identity $a^2 - b^2 = (a+b)(a-b)$

$= 16b(a+2b)(a-2b)$

~~10 $16a^2b - 64b^2$~~

11. $25x^3y^3 - 49xy$

$xy(25x^2y^2 - 49)$

$xy[(25xy)^2 - 7^2]$

Using $a^2 - b^2 = (a+b)(a-b)$

$xy(5xy+7)(5xy-7)$

12. $p^4 - 256$

$= (p^2)^2 - (16)^2$

Using $a^2 - b^2 = (a+b)(a-b)$

$(p^2+16)(p^2-16)$

$(p^2+16)(p^2-4^2)$

$(p^2+16)(p+4)(p-4$

13. $a^2-(b-c)^2$

using $a^2-b^2=(a+b)(a-b)$

$=(a+b-c)[a-(b-c)]$

$=(a+b-c)(a-b+c)$

14. $25m^2-(4n+3l)^2$

$=(5m)^2-(4n+3l)^2$

using $a^2-b^2=(a+b)(a-b)$

$=(5m+4n+3l)[5m-(4n+3l)]$

$=(5m+4n+3l)(5m-4n-3l)$

15. $(2a+3b)^2-4c^2$

$(2a+3b)^2-(2c)^2$

using $a^2-b^2=(a+b)(a-b)$

$(2a+3b+2c)(2a+3b-2c)$

16. $(64m^2-144mn+81n^2)-25p^2$

$=[(8m)^2-2\times 8m\times 9n+(9n)^2]-(5p)^2$

using $a^2-2ab+b^2=(a-b)^2$

$=(8m-9n)^2-(5p)^2$

using $a^2-b^2=(a+b)(a-b)$

$=(8m-9n+5p)(8m-9n-5p)$

17. $16x^2+9y^2+4z^2+24xy+12yz+16zx$

$=(4x)^2+(3y)^2+(2z)^2+2x(2x)(3y)+2x(3y)(2z)+2(2z)(4x)$

$=$ ~~16x~~ using $a^2+b^2+c^2+2ab+2bc+2ca$

$(4x+3y+2z)^2$

$(4x+3y+2z)(4x+3y+2z)$

18. $x^2+4y^2+9z^2-4xy+12yz-6zx$

$= (-x)^2+(2y)^2+(3z)^2+2(-x)(2y)+2(2y)(3z)+2(3z)(-x)$

Using $a^2+b^2+c^2+2ab+2bc+2ca = (a+b+c)^2$

$= (-x+2y+3z)^2$

$= (-x+2y+3z)(-x+2y+3z)$

19. $4a^2+b^2+25c^2-4ab-10bc+20ca$

$= (2a)^2+(-b)^2+(5c)^2+2(2a)(-b)+2(-b)(5c)+2(5c)(2a)$

Using $a^2+b^2+c^2+2ab+2bc+2ca = (a+b+c)^2$

$= (2a-b+5c)^2$

$= (2a-b+5c)(2a-b+5c)$

20. $a^2+\frac{b^2}{4}+\frac{c^2}{9}+ab+\frac{bc}{3}+\frac{2}{3}ca$

$= a^2+\left(\frac{b}{2}\right)^2+\left(\frac{c}{3}\right)^2+2(a)\left(\frac{b}{2}\right)+2\left(\frac{b}{2}\right)\left(\frac{c}{3}\right)+2(a)\left(\frac{c}{3}\right)$

Using $a^2+b^2+c^2+2ab+2bc+2ca = (a+b+c)^2$

$= \left(a+\frac{b}{2}+\frac{c}{3}\right)^2$

$= \left(a+\frac{b}{2}+\frac{c}{3}\right)\left(a+\frac{b}{2}+\frac{c}{3}\right)$

WS-7

1. $x^2+14x+33$

$= x^2+11x+3x+33$
$= x(x+11)+3(x+11)$
$= (x+11)(x+3)$

2. x^2+x-72

$= x^2+9x-8x-72$
$= x(x+9)-8(x+9)$
$= (x+9)(x-8)$

3. y^2-y-6

$y^2-3y+2y-6$
$= y(y-3)+2(y-3)$
$= (y-3)(y+2)$

4. $x^2+12x+27$

$x^2+9x+3x+27$
$x(x+9)+3(x+9)$
$= (x+9)(x+3)$

5. $y^2+y-132$

$y^2+12y-11y-132$
$y(y+12)-11(y+12)$
$= (y+12)(y-11)$

Date : / /20

6. $x^2+11x+30$

$x^2+6x+5x+30$

$x(x+6)+5(x+6)$

$= (x+6)(x+5)$

7. $x^2-11x-42$

$x^2-14x+3x-42$

$x(x-14)+3(x-14)$

$= (x-14)(x+3)$

8. $z^2-12z+27$

$z^2-9z-3z+27$

$z(z-9)-3(z-9)$

$= (z-9)(z-3)$

9. p^2-5p-6

$p^2-6p+p-6$

$p(p-6)+1(p-6)$

$= (p+1)(p-6)$

10. p^2+p-56

$p^2+8p-7p-56$

$p(p+8)-7(p+8)$

$= (p+8)(p-7)$

11. $x^2-8x-65$

$x^2-13x+5x-65$

$x(x-13)+5(x-13)$

$= (x-13)(x+5)$

12. $x^2+8x+15$

$x^2+5x+3x+15$

$x(x+5)+3(x+5)$

$=(x+5)(x+3)$

13. $x^2+2x-24$

$x^2+6x-4x-24$

$x(x+6)-4(x+6)$

$=(x+6)(x-4)$

14. $x^2-3x-54$

$x^2-9x+6x-54$

$x(x-9)+6(x-9)$

$=(x-9)(x+6)$

15. $a^2-7a+12$

$a^2-3a-4a+12$

$=a(a-3)-4(a-3)$

$=(a-3)(a-4)$

16. $p^2-3pq+2q^2$

$p^2-2pq-1pq+2q^2$

$=p(p-2q)-q(1p-2q)$

$=(p-2q)(p-q)$

Value Based Questions

1. No. of CD's Gautam purchased = $x^2+8x-20$

No. of CD's Sanyam purchased = $(x+4)^2$

$=x^2+4^2+2\times x\times 4$

$= x^2 + 16 + 8x$

$= x + 8x + 16$

(i) Sanyam purchased more CD's by 36

$x^2 + 8x + 16 - (x^2 + 8x - 20)$

$x^2 + 8x + 16 - x^2 - 8x + 20$

$= 36$

(ii) Advantage: Improves Concentration

Disadvantage: Distraction in Study.

2. Base of flower pot $= x^2 + 6x + 9$

Area of rectangular lane $= (x+3)(7x+21)$

No. of pots placed $= \dfrac{(x+3)(7x+21)}{x^2+6x+9}$

$= \dfrac{(x+3)(7x+21)}{x^2+3x+3x+9}$

$= \dfrac{(x+3)(7x+21)}{x(x+3)+3(x+3)}$

$= \dfrac{(x+3)(7x+21)}{(x+3)(x+3)}$

$= \dfrac{7x+21}{x+3} \quad = \dfrac{7(x+3)}{x+3}$

$= 7$ Ans

Brain Teasers

Q1: a) $1-6z+9z^2$

$= 1^2-2\times 1\times 3z+(3z)^2$

= Using $a^2-2ab+b^2$

$= (1-3z)^2$

$= (1-3z)(1-3z)$

b) $y^2+3y+y+3$

$= y(y+3)+1(y+3)$

$= (y+3)(y+1)$

d) $p^2-17p-38$

$= p^2-19p+2p-38$

$= p(p-19)+2(p-19)$

$= (p+2)(p-19)$

e) Area of Square $= 4x^2+12x+9$

$Side^2 = (2x)^2+2\times 2x\times 3+3^2$

= Using $a^2+2ab+b^2=(a+b)^2$

$= Side^2 = (2x+3)^2$

$Side = 2x+3$

(B) Answer the following

a) $(a+3)(a-3)(a^2+9)$

Using $(a+b)(a-b) = a^2-b^2$

$= (a^2-3^2)(a^2+3^2)$

$= (a^2-9)(a^2+9)$

Using $(a+b)(a-b) = a^2-b^2$

$= (a^2)^2-9^2$

$= a^4-81$

Date : / /20

b) $x^2 + \frac{1}{x^2} = 6$ find $x^4 + \frac{1}{x^4}$

$x^2 + \frac{1}{x^2} = 6$

Squaring both sides

$\left[x^2 + \frac{1}{x^2}\right]^2 = 6^2$

$= (a+b)^2 = a^2 + b^2 + 2ab$

$= (x^2)^2 + \left(\frac{1}{x^2}\right)^2 + 2 \times x^2 \times \frac{1}{x^2} = 36$

$= x^4 + \frac{1}{x^4} + 2 = 36$

$= x^4 + \frac{1}{x^4} = 36 - 2$

$= x^2 + \frac{1}{x^4} = 34$

c) xy^2k find $= xy^2k = (4xy + 3y)^2 - (4xy - 3y)^2$

using $(a^2 + b^2 = (a+b)(a-b)$

$x^2yk = [4xy + 3y + 4xy - 3y][4xy + 3y - 4xy + 3y]$

$x^2yk = 8xy * 6y$

$x^2y^2k = 48xy^2$

$K = 48$

d) $a^2+b^2=9$, $ab=4$

$3(a+b)^2-2(a-b)^2$
$= 3(a^2+b^2+2ab)-2(a^2+b^2-2ab)$
$= 3(9+2\times4)-2(9-2\times4)$
$= 3(9+8)-2(9-8)$
$= 3(17)-2(1)$
$= 51-2$
$= 49$

e) If $a+b+c=12$
$a^2+b^2+c^2=64$
Find $ab+bc+ca=$
Using $(a^2+b^2+c)^2=$

$12^2 = 64+2(ab+bc+ca)$
$144-64 = 2(ab+bc+ca)$
$80 = 2(ab+bc+ca)$
$40 = (ab+bc+ca)$

Q2: Find the Product

(i) $(7x-9y)(7x-9y) = (7x)^2-(9y)^2$
$= (7x-9y)^2$
$= 49x^2-81y^2$
Using $(a-b)^2 = a^2+b^2-2ab$
$= (7x)^2+(9y)^2-2\times7x\times9y$
$= 49x^2+81y^2-126xy$

(ii) $(6ax+5by)(6ax-5by)$

Using $(a+b)(a-b) = a^2-b^2$

$= (6ax)^2 - (5by)^2$

$= 36a^2x^2 - 25b^2y^2$

(iii) $\left[\frac{3}{4}p^2 + \frac{2}{3}q^2\right]\left[\frac{3}{4}p^2 + \frac{2}{3}q^2\right]$

$\left[\frac{3}{4}p^2 + \frac{2}{3}q^2\right]^2$

Using $(a+b)^2 = a^2+b^2+2ab$

$= \left(\frac{3}{4}p^2\right)^2 + \left(\frac{2}{3}q^2\right)^2 + 2\left(\frac{3}{4}p^2\right)\left(\frac{2}{3}q^2\right)$

$= \frac{9}{16}p^4 + \frac{4}{9}q^2 + p^2q^2$

(iv) $\left[x + \frac{3}{4}y - 4z\right]^2$

$(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

$= x^2 + \left(\frac{3}{4}y\right)^2 + (-4z)^2 + 2(x)\left(\frac{3}{4}y\right) + 2\left(\frac{3}{4}y\right)(-4z) + 2(-4z)(x)$

$= x^2 + \frac{9}{16}y^2 + 16z^2 + \frac{3}{2}xy - 6yz - 8xz$

(v) $(x+2y)(x-2y)(x^2+4y^2)$

Using $(a+b)(a-b) = a^2-b^2$

$= (x^2-4y^2)(x^2+4y^2)$

Using $(a+b)(a-b) = a^2-b^2$

$= (x^2)^2 - (4y^2)^2$

$= x^4 - 16y^4$

(vi) $\left[\frac{x+1}{x}\right]\left[\frac{x-1}{x}\right]\left[\frac{x^2+1}{x^2}\right]\left[\frac{x^4+1}{x^4}\right]$

Using $(a+b)(a-b) = a^2 - b^2$

$\left(\frac{x^2-1}{x^2}\right)\left(\frac{x^2+1}{x^2}\right)\left[\frac{x^4+1}{x^4}\right]$

Using $(a+b)(a-b) = a^2 - b^2$

$\left[(x^2)^2 - \left(\frac{1}{x^2}\right)^2\right]\left[\frac{x^4+1}{x^4}\right]$

$= \left[\frac{x^4-1}{x^4}\right]\left[\frac{x^4+1}{x^4}\right]$

$= \frac{(x^4)^2 - 1}{(x^4)^2} \Rightarrow \frac{x^8 - 1}{x^8}$

Q3: $4x^2 + 12xy + 9y^2$, $x = -2$, $y = 2$

$= (2x)^2 + 2 \times 2x \times 3y + (3y)^2$

Using $a^2 + 2ab + b^2 = (a+b)^2$

$= (2x+3y)^2$

Put $x = -2$, $y = 2$

$[2(-2) + 3(2)]^2$

$= [-4+6]^2$

$= 4$

Page No.
Date : / /20

$\frac{4}{25}m^2 - mn + \frac{25}{16}n^2, m=5, n=8$

$\left(\frac{2m}{5}\right)^2 - \frac{2}{5} \times 2m \times \frac{5}{4}n + \left(\frac{5}{4}\right)$

Using

$= \left[\frac{2}{5}m - \frac{5}{4}n\right]^2$

Put $m=5, n=8$

$= \frac{2}{5} \times 5 - \frac{5}{4} \times 8^2$

$= 2 - 10$

$= -8$

Q4: Simplify

(i) $(a+b)^2 + (a-b)^2$

$= a^2 + b^2 + 2ab + a^2 + b^2 - 2ab$

$= 2a^2 + 2b^2$

$= 2(a^2 + b^2)$

(ii) $(3x+7y)^2 - (3x-7y)^2$

$= (3x)^2 + (7y^2) + 2 \times 3x \times 7y - [(3x)^2 + (7y)^2 - 2 \times 3x \times 7y]$

$= 9x^2 + 49y^2 + 42xy - [9x^2 + 49y^2 - 42xy]$

$= 9x^2 + 49y^2 + 42xy - 9x^2 - 49y^2 + 4xy$

$= 84xy$

(iii) $(6a+5b+4c)^2 - (6a-5b-4c)^2$

Using $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

Date: / /20

$= (6a)^2 + (5b)^2 + (4c)^2 + 2(6a)(5b) + 2(5b)(4c) + 2(4c)(6a)$
$-[(6a)^2 + (-5b)^2 + (-4c)^2 + 2(6a)(-5b) + 2(-5b)(-4c) + 2(-4c)(6a)]$

$= 36a^2 + 25b^2 + 16c^2 + 60ab + 40bc + 48ca - [36a^2 + 25b^2 + 16c^2$
$- 60ab + 40bc + 48ca$
$= 36a^2 + 25b^2 + 16c^2 + 60ab + 40bc + 48ca - 36a^2 - 25b^2 - 16c^2 + 60ab$
$- 40bc + 48ca$
$= 120ab + 96ac$

(iv) $(a^2 - b^2)(a^2 + b^2) - (a^2 - b^2)^2$
Using $(a-b)(a+b) = a^2 - b^2$
$= a^4 - b^4 - [(a^2)^2 + (b^2)^2 - 2a^2b^2]$
$= a^4 - b^4 - a^4 - b^4 + 2a^2b^2$
$= -2b^4 + 2a^2b^2$
$= -2b^2(b^2 - a^2)$

Q5: Evaluate

(i) 103×97
$(100+3)(100-3)$
Using $(a+b)(a-b) = a^2 - b^2$
$= 100^2 - 3^2$
$= 10,000 - 9$
$= 9991$

(ii) $(10.1)^2$
$(10+0.1)^2$
Using $(a+b)^2 = a^2 + b^2 + 2ab$
$= 10^2 + 0.1^2 + 2 \times 10 \times 0.1$
$= 100 + 0.01 + 2$
$= 102.01$

Page No.

Date : / /20

(iii) $85^2 - 75^2$

Using $a^2 - b^2 = (a+b)(a-b)$

$= (85+75)(85-75)$

$= 160 \times 10$

$= 1600$

(iv) 291×309

$(300-9)(300+9)$

Using $(a+b)(a-b) = a^2 - b^2$

$300^2 - 9^2$

$= 90,000 - 81$

$= 89919$

Q6: Evaluate x

(i) $36x = 78^2 - 42^2$

Using $a^2 - b^2 = (a+b)(a-b)$

$\Rightarrow 36x = (78+42)(78-42)$

$\Rightarrow 36x = 120 \times 36$

$\Rightarrow x = \frac{120 \times 36}{36}$

$\Rightarrow x = 120$

(ii) $6.2x = 8.1 \times 8.1 - 1.9 \times 1.9$

$6.2x = (8.1)^2 - (1.9)^2$

$\Rightarrow 6.2x = (8.1+1.9)(8.1-1.9)$

$\Rightarrow 6.2x = 10 \times 6.2$

$\Rightarrow x = \frac{10 \times 6.2}{6.2}$

$\Rightarrow x = 10$

Q8: Factorise

(i) $z^2 - 4z - 77$

$z^2 - 11z + 7z - 77$

$z^2 - 11z + 7z - 77$

$z(z-11) + 7(z-11)$

$= (z-11)(z+7)$

(ii) $x^2 + 25x + 144$

$x^2 + 16x + 9x + 144$

$= x(x+16) + 9(x+16)$

$= (x+9)(x+16)$

(iii) $x^2 + 5x - 104$

$x^2 + 13x - 8x - 104$

$x(x+13) - 8(x+13)$

$(x+13)(x-8)$

(iv) $49x^2 - 64$

$= (7x)^2 - (8)^2$

using $a^2 - b^2 = (a+b)(a-b)$

$= (7x+8)(7x-8)$

(v) $x^2 - 1 - 2y - y^2$

$x^2 - (1 + 2y + y^2)$

$x^2 - [1^2 + 2 \times 1 \times y + y^2]$

$x^2 - (1+y)^2$

using $x^2 - y^2 = (x+y)(x-y)$

$(x + 1 + y)[x - (y+1)]$

$(x + 1 + y)(x - 1 - 1)$

Date : / /20

(VI) $4(x-y)^2 - 12(x-y) + 9$

put $x-y = a$

$4a^2 - 12a + 9$

$= 4a^2 - 6a - 6a + 9$

$= 2a(2a-3) - 3(2a-3)$

$= (2a-3)(2a-3)$

$= [2(x-y)-3][2(x-y)-3]$

(VII) $x^2 + y - xy - x$

$= x^2 - xy - x + y$

$= x(x-y) - 1(x-y)$

$= (x-y)(x-1)$

(VIII) $81(x+1)^2 + 90(x+1)(y+2) + 25(y+2)^2$

Put $x+1 = a$, $y+2 = b$

$81a^2 + 90ab + 25b^2$

$= (9a)^2 + 2 \times 9a \times 5b + (5b)^2$

= Using $a^2 + 2ab + b^2 = (a+b)^2$

$= (9a + 5b)^2$

$= [9(x+1) + 5(y+2)]^2$

$= (9x + 9 + 5y + 10)^2$

$= (9x + 5y + 19)^2$

Q8: $x \frac{1}{x} = 8$ Find $x^2 + \frac{1}{x^2}$

$x + \frac{1}{x} = 8$

Squaring both sides

$\left(x + \frac{1}{x}\right)^2 = 8^2$

$x^2 + \frac{1}{x^2} = 64 + 2 \times x \times \frac{1}{x} = 64$

$x^2 + \frac{1}{x^2} + 2 = 64$

$x^2 + \frac{1}{x^2} = 64 - 2$

$x^2 + \frac{1}{x^2} = 62$

Q9: If $a - \frac{1}{a} = 5$ Find $a^2 + \frac{1}{a^2}$

$a - \frac{1}{a} = 5$

Squaring both sides

$\left(a - \frac{1}{a}\right)^2 = 5^2$

$a^2 + \frac{1}{a^2} = 25$

$a^2 + \frac{1}{a^2} - 2 \times a \times \frac{1}{a} = 25$

$a^2 + \frac{1}{a^2} - 2 = 25$

$a^2 + \frac{1}{a^2} = 27$

Q10: $a^2 + \frac{1}{a^2} = 23$ find $\left[a + \frac{1}{a}\right]$

Date : / /20

$= \left(a+\frac{1}{a}\right)^2 = a^2+\frac{1}{a^2}+2 \cdot a \cdot \frac{1}{a}$

$= \left(a+\frac{1}{a}\right)^2 = 23+2$

$= \left(a+\frac{1}{a}\right)^2 = 25$

$= \left(a+\frac{1}{a}\right)^2 = 5^2$

$= a+\frac{1}{a} = 5$

Q11: $x^2+\frac{1}{x^2} = 51$ find $x-\frac{1}{x}$

$\left(x-\frac{1}{x}\right)^2 = x^2+\frac{1}{x^2}-2$

$\left(x-\frac{1}{x}\right)^2 = 51-2$

$\left(x-\frac{1}{x}\right)^2 = 7^2$

$x-\frac{1}{x} = 7$

Q12: $\frac{2.3 \times 2.3 - 0.3 \times 0.3}{2.3 \times 2.3 - 2 \times 2.3 \times 0.3 + 0.3 \times 0.3}$

$\frac{(2.3)^2-(0.3)^2}{(2.3)^2-2\times2.3\times0.3+(0.3)^2}$ Using $a^2-b^2=(a+b)(a-b)$ Using $(a-b)^2=a^2+b^2-2ab=(a$

$\frac{(2.3+0.3)(2.3-0.3)}{(2.3-0.3)^2}$

$=\frac{2.6}{2}=1.3$

Q13: $3x-4y=10$, $xy=-1$, find $9x^2+16y^2$

$3x-4y=10$

Squaring both sides

$(3x-4y)^2=10^2$

$(3x)^2+(4y)^2-2\times3x\times4y=100$

$9x^2+16y^2-24xy=100$

$9x^2+16y^2-24(-1)=100$

$9x^2+16y^2+24=100$

$9x^2+16y^2=100-24$

$9x^2+16y^2=76$

Q14: $5x-2y=7$, $xy=2$, find $(5x+2y)^2$

$(5x+2y)^2$

$(5x-2y)=7$

Squaring both sides

$(5x)^2+(2y)^2=2\times5x\times2y=7^2$

$25x^2+4y^2-20xy=49$

$25x^2+4y^2-20(2)=49$

$25x^2+4y^2-40=49$

$25x^2+4y^2=89$

Now $(5x+2y)^2 = (5x)^2 + (2y)^2 + 2 \times 5x \times 2y$

$= 25x^2 + 4y^2 + 20xy$

$= 89 + 20(2)$

$= 89 + 40$

So $(5x+2y)^2 = 129$

15. $a + \frac{1}{a} = \frac{17}{4}$, find $\left(a + \frac{1}{a}\right)$

Squaring both sided

$$\left(a + \frac{1}{a}\right)^2 = \left(\frac{17}{4}\right)^2$$

$$a^2 + \frac{1}{a^2} + 2 = \frac{289}{16}$$

$$a^2 + \frac{1}{a^2} = \frac{289}{16} - 2$$

$$a^2 + \frac{1}{a^2} = \frac{257}{16}$$

$$\left(a - \frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} - 2$$

$$\left(a - \frac{1}{a}\right)^2 = \frac{257 - 2}{16}$$

$$\left(a - \frac{1}{a}\right)^2 = \frac{257 - 32}{16}$$

$$\left(a - \frac{1}{a}\right)^2 = \frac{225}{4}$$

$$a - \frac{1}{a} = \frac{15}{2}$$

HOTS

1. No. of observations = $x+3$
Sum of observations = x^4-81

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{No. of observations}}$$

$$= \frac{x^4-81}{x+3} = \frac{(x^2)^2-9^2}{x+3}$$

$$= \frac{(x^2+9)(x^2-9)}{x+3}$$

$$= \frac{(x^2+9)(x^2-3^2)}{x+3}$$

$$= \frac{(x^2+9)(x-3)(x+3)}{x+3}$$

Mean $(x^2+9)(x-3)$

2. Area of circle $= \pi x^2 + 10\pi x + 25\pi$

$\pi r^2 = \pi(x^2+10x+25)$

$r^2 = x^2 + 2\times x \times 5 + 5^2$

$r^2 = (x+5)^2$

$r = x+5$