EXAM REVIEW – Chapter 5

CHAPTER 5: Polynomials & Factoring

58. (a)

$$\begin{aligned}&(2x-y)^2-2(x-2y)(x-4y)\\&=(2x-y)(2x-y)-2(x-2y)(x-4y)\\&=(4x^2-2xy-2xy+y^2)-2(x^2-4xy-2xy+8y^2)\\&=(4x^2-4xy+y^2)-2(x^2-6xy+8y^2)\\&=4x^2-4xy+y^2-2x^2+12xy-16y^2\\&=2x^2+8xy-15y^2\end{aligned}$$

(b)

$$\begin{aligned}&3(3x^2-2y^2)-(4x+y)^2\\&=9x^2-6y^2-(4x+y)(4x+y)\\&=9x^2-6y^2-(16x^2+4xy+4xy+y^2)\\&=9x^2-6y^2-16x^2-8xy-y^2\\&=-7x^2-8xy-7y^2\end{aligned}$$

59. (a)

$$\begin{aligned}&10xy-25x\\&=5x(2y-5)\end{aligned}$$

(b)

$$\begin{aligned}&6x^3y^3-4x^2y^4+2xy^5\\&=2xy^3(3x^2-2xy+y^2)\end{aligned}$$

(c)

$$\begin{aligned}&x^2-13x+40\\&=(x-8)(x-5)\end{aligned}$$

(d)

$$\begin{aligned}&x^2+7x+12\\&=(x+5)(x+2)\end{aligned}$$

(e)

$$\begin{aligned}&9x^2+81y^2\\&=9(x^2+9y^2)\end{aligned}$$

NOTE: a sum of squares CANNOT be factored.

(f)

$$\begin{aligned}&4m^2-3m-10\\&=\frac{(4m-8)(4m+5)}{4}\\&=\frac{4(m-2)(4m+5)}{4}\\&=(m-2)(4m+5)\end{aligned}$$

(g)

$$a^2 - 81b^2$$
$$= (a - 9b)(a + 9b)$$

(h)

$$x^2 - x - 30$$
$$= (x - 6)(x + 5)$$

(i)

$$2z(x - 3y) + 7(x - 3y)$$
$$= (x - 3y)(2z + 7)$$

NOTE : *The bracket is the GCF*.

(j)

$$2d^2 + 4d - 3cd - 6c$$
$$= (2d^2 + 4d) - (3cd + 6c)$$
$$= 2d(d + 2) - 3c(d + 2)$$
$$= (d + 2)(2d - 3)$$

NOTE : *Grouping was required in the first step*.

(k)

$x^2 + 7x + 22$

need the Quadratic Formula

which wasn't taught until Chapter 6.

$\therefore$ *no* integer *solution*

(l)

$$15x^2 - 5x - 10$$
$$= 5(3x^2 - x - 2)$$
$$= \frac{5(3x - 6)(3x + 1)}{3}$$
$$= \frac{5 \times 3(x - 2)(3x + 1)}{3}$$
$$= 5(x - 2)(3x + 1)$$

(m)

$$21a^2 - ab - 2b^2$$
$$= \frac{(21a - 7b)(21a + 6b)}{21}$$
$$= \frac{7(3a - b)3(7a + 2b)}{21}$$
$$= (3a - b)(7a + 2b)$$

(n)

$$15x^2 - 19xy + 6y^2$$
$$= \frac{(15x - 9y)(15x - 10y)}{15}$$
$$= \frac{3(5x - 3y)5(3x - 2y)}{15}$$
$$= (5x - 3y)(3x - 2y)$$

(o)

$$7x^2 - 63$$
$$= 7(x^2 - 9)$$
$$= 7(x - 3)(x + 3)$$

(p)

$$2x^3 - 10x^2 + 8x$$
$$= 2x(x^2 - 5x + 4)$$
$$= 2x(x - 4)(x - 1)$$

60. (a) $vertex = (3, -16)$

(b)

$$y = (x - 3)^2 - 16$$
$$= (x - 3)(x - 3) - 16$$
$$= (x^2 - 3x - 3x + 9) - 16$$
$$= x^2 - 6x + 9 - 16$$
$$= x^2 - 6x - 7$$

(c)

$$y = x^2 - 6x - 7$$
$$= (x - 7)(x + 1)$$

(d)

$\therefore$ *the* $x-$ int *ercepts are* $x = 7$ *and* $x = -1$

These are also known as the "zeros".