المملكة المغربية
وزارة التربية الوطنية والتكوين المهني
الأكاديمية الجهوية للتربية والتكوين
جهة الدار البيضاء الكبرى
نيابة المحمدية

حلول التمارين

النشر و التعميل و المتطابقات الهامة

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تمرين ① :

1) –لننشر و نحسب ما يلي :

$$a=\sqrt{3}\left(\sqrt{3}+\sqrt{2}-5\right)$$
$$=\sqrt{3}^2+\sqrt{6}-5\sqrt{3}$$
$$=3+\sqrt{6}-5\sqrt{3}$$

$$b=\left(2-\sqrt{5}\right)\left(2+\sqrt{5}\right)$$
$$=2^2-\sqrt{5}^2$$
$$=4-5$$
$$=-1$$

$$c=\left(\sqrt{8}-\sqrt{2}\right)^2$$
$$=\sqrt{8}^2-2\times\sqrt{8}\times\sqrt{2}+\sqrt{2}^2$$
$$=8-2\sqrt{16}+2$$
$$=8-8+2$$
$$=2$$

$$d=\left(3+2\sqrt{7}\right)^2$$
$$=3^2+2\times3\times2\sqrt{7}+\left(2\sqrt{7}\right)^2$$
$$=9+12\sqrt{7}+28$$
$$=37+12\sqrt{7}$$

2) –لنعمل ما يلي :

$$e=\sqrt{6}+2\sqrt{3}$$
$$=\sqrt{3}\times\sqrt{2}+2\sqrt{3}$$
$$=\sqrt{3}\left(\sqrt{2}+2\right)$$

$$f=-2\sqrt{14}-2\sqrt{7}$$
$$=-2\sqrt{7}\times\sqrt{2}-2\sqrt{7}$$
$$=-2\sqrt{7}\left(\sqrt{2}+1\right)$$

$$g=3-\sqrt{2}^2$$
$$=\sqrt{3}^2-\sqrt{2}^2$$
$$=\left(\sqrt{3}-\sqrt{2}\right)\left(\sqrt{3}+\sqrt{2}\right)$$

$$h=\sqrt{15}-2\sqrt{35}$$
$$=\sqrt{5}\times\sqrt{3}-2\sqrt{5}\times\sqrt{7}$$
$$=\sqrt{5}\left(\sqrt{3}-2\sqrt{7}\right)$$

تمرين ② :

1) –بسط ما يلي :

$$A=2x^2+3x-5+\sqrt{2}-5x+x^2\sqrt{5}-7x+1$$
$$=2x^2+x^2\sqrt{5}+3x-5x-7x+1-5+\sqrt{2}$$
$$=\left(2+\sqrt{5}\right)x^2-9x-4+\sqrt{2}$$

$$B=3x^3-\left[-\left(2x^3-4x^2+x-5\right)+\left(-2x^2+x-5\right)\right]-x^2+1$$
$$=3x^3-\left[-2x^3+4x^2-x+5-2x^2+x-5\right]-x^2+1$$
$$=3x^3+2x^3-4x^2+x-5+2x^2-x+5-x^2+1$$
$$=5x^3-3x^2+1$$

2) –لننشر ثم نبسط إذا كان ممكنا :

$$C=2\left(3x-1\right)$$
$$=6x-2$$

$$D=-\sqrt{2}\left(2x-\sqrt{2}\right)$$
$$=-2\sqrt{2}x+\sqrt{2}^2$$
$$=-2\sqrt{2}x+2$$

$$E=3x\left(1-x\right)-4\left(x+\frac{1}{4}\right)$$
$$=3x-3x^2-4x-\frac{4}{4}$$
$$=-x-3x^2-1$$

$$F=\left(-5x-1\right)\left(-x+2\right)$$
$$=5x^2-10x+x-2$$
$$=5x^2-9x-2$$

$$G=\left(\sqrt{3}\,x-1\right)\left(x+\sqrt{3}\right)$$
$$=\sqrt{3}\,x^2+\sqrt{3}^2x-x-\sqrt{3}$$
$$=\sqrt{3}\,x^2+3x-x-\sqrt{3}$$
$$=\sqrt{3}x^2+2x-\sqrt{3}$$

$$H=2x\left(3x-1\right)\left(-x+4\right)$$
$$=\left(6x^2-2x\right)\left(-x+4\right)$$
$$=-6x^3+24x^2+2x^2-8x$$
$$=-6x^3+26x^2-8x$$

$$I=\left(-\sqrt{5}\,x-1\right)^2$$
$$=\left(-\sqrt{5}x\right)^2-2\times\left(-\sqrt{5}x\right)\times1+1^2$$
$$=5x^2+2\sqrt{5}\,x+1$$

$$L=\left(2\sqrt{2}\,x-\sqrt{3}\right)\left(2\sqrt{2}\,x+\sqrt{3}\right)\left(8x^2+3\right)$$
$$=\left(\left(2\sqrt{2}\,x\right)^2-\sqrt{3}^2\right)\left(8x^2+3\right)$$
$$=\left(8x^2-3\right)\left(8x^2+3\right)$$
$$=\left(8x^2\right)^2-3^2$$
$$=64x^4-9$$

$$K=\left(2\sqrt{2}\,x-\sqrt{2}\right)^2$$
$$=\left(2\sqrt{2}x\right)^2-2\times 2\sqrt{2}\,x\times\sqrt{2}+\sqrt{2}^2$$
$$=8x^2-4\sqrt{2}^2x+2$$
$$=8x^2-8x+2$$

$$J=\left(3x-\sqrt{7}\right)\left(3x+\sqrt{7}\right)$$
$$=(3x)^2-\sqrt{7}^2$$
$$=9x^2-7$$

$$O=(3x-1)^2-(4x+3)(x-1)$$
$$=(3x)^2-2\times 3x\times 1+1^2-4x^2+4x-3x+3$$
$$=9x^2-6x+1-4x^2+4x-3x+3$$
$$=5x^2-5x+4$$

$$N=3x-\left(5x-\sqrt{2}\right)\left(5x+\sqrt{2}\right)$$
$$=3x-\left((5x)^2-\sqrt{2}^2\right)$$
$$=3x-25x^2+2$$

$$M=4x(2x-1)(2x+1)$$
$$=4x\left((2x)^2-1^2\right)$$
$$=4x\left(4x^2-1\right)$$
$$=16x^3-4x$$

$$Q=(x-3)^2-(x+3)(x-3)-(x+3)^2$$
$$=x^2-2\times x\times 3+3^2-\left(x^2-3^2\right)-\left(x^2+2\times x\times 3+3^2\right)$$
$$=x^2-6x+9-x^2+9-x^2-6x-9$$
$$=-x^2-12x+9$$

$$P=\left(\sqrt{2}\,x-\sqrt{5}\right)\left(\sqrt{2}\,x+\sqrt{5}\right)-(1+x)^2$$
$$=\left(\sqrt{2}\,x\right)^2-\sqrt{5}^2-\left(1^2+2\times 1\times x+x^2\right)$$
$$=2x^2-5-1-2x-x^2$$
$$=x^2-2x-6$$

تمرين ③ :

لنعمـــل ما يلي :

$$c=(x+1)(2x-5)-(x+1)(3x-7)+(x+1)$$
$$=(x+1)\left[(2x-5)-(3x-7)+1\right]$$
$$=(x+1)(2x-5-3x+7+1)$$
$$=(x+1)(-x+3)$$

$$b=2x(3x+4)-2x(x+1)+2x$$
$$=2x\left[(3x+4)-(x+1)+1\right]$$
$$=2x(3x+4-x-1+1)$$
$$=2x(2x+4)$$
$$=2x\times 2(x+2)$$
$$=4x(x+2)$$

$$a=25abc^2-15ab^2c-10a^2bc$$
$$=5abc(5c-3b-2a)$$

$$d=4x^2-9+(2x-3)(5x+11)$$
$$=(2x)^2-3^2+(2x-3)(5x+11)$$
$$=(2x+3)(2x-3)+(2x-3)(5x+11)$$
$$=(2x-3)\left[(2x+3)+(5x+11)\right]$$
$$=(2x-3)(2x+3+5x+11)$$
$$=(2x-3)(7x+14)$$
$$=(2x-3)\times 7(x+2)$$
$$=7(2x-3)(x+2)$$

$$f=4x^2-7$$
$$=(2x)^2-\sqrt{7}^2$$
$$=\left(2x+\sqrt{7}\right)\left(2x-\sqrt{7}\right)$$

$$e=(2x+5)^2-(x-1)^2$$
$$=\left[(2x+5)-(x-1)\right]\left[(2x+5)+(x-1)\right]$$
$$=(2x+5-x+1)(2x+5+x-1)$$
$$=(x+6)(3x+4)$$

$$h = 27x^2 - 12 + (3x-2)^2$$
$$= 3\left(9x^2 - 4\right) + (3x-2)^2$$
$$= 3\left((3x)^2 - 2^2\right) + (3x-2)^2$$
$$= 3(3x-2)(3x+2) + (3x-2)^2$$
$$= (3x-2)\left[3(3x+2) + (3x-2)\right]$$
$$= (3x-2)(9x+6+3x-2)$$
$$= (3x-2)(12x+4)$$
$$= (3x-2)\times 4(3x+1)$$
$$= 4(3x-2)(3x+1)$$

$$g = 9x^2 + 12x + 4 - (3x+2)(x+4)$$
$$= (3x)^2 + 2\times 3x\times 2 + 2^2 - (3x+2)(x+4)$$
$$= (3x+2)^2 - (3x+2)(x+4)$$
$$= (3x+2)\left[(3x+2) - (x+4)\right]$$
$$= (3x+2)(3x+2-x-4)$$
$$= (3x+2)(2x-2)$$
$$= (3x+2)\times 2(x-1)$$
$$= 2(3x+2)(x-1)$$

$$i = 3x^2 - 11$$
$$= \left(\sqrt{3}\,x\right)^2 - \sqrt{11}^2$$
$$= \left(\sqrt{3}\,x + \sqrt{11}\right)\left(\sqrt{3}\,x - \sqrt{11}\right)$$

$$k = x^2 - 5 + \left(x + \sqrt{5}\right)$$
$$= x^2 - \sqrt{5}^2 + \left(x + \sqrt{5}\right)$$
$$= \left(x + \sqrt{5}\right)\left(x - \sqrt{5}\right) + \left(x + \sqrt{5}\right)$$
$$= \left(x + \sqrt{5}\right)\left[\left(x - \sqrt{5}\right) + 1\right]$$
$$= \left(x + \sqrt{5}\right)\left(x - \sqrt{5} + 1\right)$$

$$j = (2x+1)^2 - 16$$
$$= (2x+1)^2 - 4^2$$
$$= \left[(2x+1) - 4\right]\left[(2x+1) + 4\right]$$
$$= (2x+1-4)(2x+1+4)$$
$$= (2x-3)(2x+5)$$

$$l = 9x^2 + 6\sqrt{2}\,x + 2$$
$$= (3x)^2 + 2\times 3x\times\sqrt{2} + \sqrt{2}^2$$
$$= \left(3x + \sqrt{2}\right)^2$$

$$p = 4x^2 - 6x + 2$$
$$= 4x^2 - 4x - 2x + 1 + 1$$
$$= \left(4x^2 - 4x + 1\right) - 2x + 1$$
$$= \left((2x)^2 - 2\times 2x\times 1 + 1^2\right) - (2x-1)$$
$$= (2x-1)^2 - (2x-1)$$
$$= (2x-1)(2x-1-1)$$
$$= (2x-1)(2x-2)$$
$$= 2(2x-1)(x-1)$$

$$n = 4x^2 - 12x + 8$$
$$= \left(4x^2 - 12x + 9\right) - 1$$
$$= \left[(2x)^2 - 2\times 2x\times 3 + 3^2\right] - 1$$
$$= (2x-3)^2 - 1^2$$
$$= (2x-3-1)(2x-3+1)$$
$$= (2x-4)(2x-2)$$
$$= 2(x-2)\times 2(x-1)$$
$$= 4(x-2)(x-1)$$

$$m = 2x^2 - 2\sqrt{6}\,x + 3$$
$$= \left(\sqrt{2}\,x\right)^2 - 2\times\sqrt{2}\,x\times\sqrt{3} + \sqrt{3}^2$$
$$= \left(\sqrt{2}\,x - \sqrt{3}\right)^2$$

تمرين ④ :

المسألة الأولى :

1) - لننشر ثم نبسط M :

$$M = (2x-5)(x-9) + 4x^2 - 25 - (2x-5)^2$$
$$= 2x^2 - 18x - 5x + 45 + 4x^2 - 25 - 4x^2 + 20x - 25$$
$$= 2x^2 - 3x - 5$$

2) - لنعمل M :

$$M = (2x-5)(x-9) + 4x^2 - 25 - (2x-5)^2$$
$$= (2x-5)(x-9) + (2x)^2 - 5^2 - (2x-5)^2$$
$$= (2x-5)(x-9) + (2x-5)(2x+5) - (2x-5)(2x-5)$$
$$= (2x-5)\left[(x-9) + (2x+5) - (2x-5)\right]$$
$$= (2x-5)(x-9+2x+5-2x+5)$$
$$= (2x-5)(x+1)$$

3) –لنحسب M من أجل $x=-2\sqrt{3}$:

لدينا : $M=2x^2-3x-5$

أي :

$$M=2\left(-2\sqrt{3}\right)^2-3\left(-2\sqrt{3}-5\right)$$
$$=24+6\sqrt{3}+15$$
$$=39+6\sqrt{3}$$

4) –لنحل المعادلة : $M=0$:

لدينا المعادلة $M=0$ تكافئ على التوالي :

$$(2x-5)(x+1)=0$$

$2x-5=0$ أو $x+1=0$

$2x=5$ $x=-1$

$x=\frac{5}{2}$

إذن هذه المعادلة تقبل حلين هما : $\frac{5}{2}$ و -1 .

المسـألـة الثانية :

1) –لنعمـل B :

لدينا :

$$B=(2x-5)^2-36$$
$$=(2x-5)^2-6^2$$
$$=(2x-5-6)(2x-5+6)$$
$$=(2x-11)(2x+1)$$

2) –لنبين أن : $B-2A=3(2x+1)$

$$B-2A=(2x-5)^2-36-2\left(2x^2-13x-7\right)$$

لدينا :

$$=4x^2-20x+25-36-2x^2+26x+14$$
$$=6x+3$$
$$=3(2x+1)$$

إذن : $\boxed{B-2A=3(2x+1)}$

3) –لنستنتج تعميلا للعدد A :

لدينا : $B-2A=3(2x+1)$ يعني أن :

$$-2A=3(2x+1)-B$$
$$=3(2x+1)-(2x-11)(2x+1)$$
$$=(2x+1)\left[3-(2x-11)\right]$$
$$=(2x+1)(3-2x+11)$$
$$=(2x+1)(-2x+14)$$
$$=(2x+1)\times 2(-x+7)$$
$$=2(2x+1)(-x+7)$$

و منه فإن :

$$A=\frac{2(2x+1)(-x+7)}{-2}$$
$$A=-(2x+1)(-x+7)$$
$$A=(-2x-1)(-x+7)$$