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 :

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

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

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

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

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

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

$$g=9x^2+12x+4-(3x+2)(x+4)$$
$$=(3x)^2+2\times3x\times2+2^2-(3x+2)(x+4)$$
$$=(3x+2)^2-(3x+2)(x+4)$$
$$=(3x+2)\left[(3x+2)-(x+4)\right]$$
$$=(3x+2)(3x+2-x-4)$$
$$=(3x+2)(2x-2)$$
$$=(3x+2)\times2(x-1)$$
$$=2(3x+2)(x-1)$$

$$h=27x^2-12+(3x-2)^2$$
$$=3\left(9x^2-4\right)+(3x-2)^2$$
$$=3\left((3x)^2-2^2\right)+(3x-2)^2$$
$$=3(3x-2)(3x+2)+(3x-2)^2$$
$$=(3x-2)\left[3(3x+2)+(3x-2)\right]$$
$$=(3x-2)(9x+6+3x-2)$$
$$=(3x-2)(12x+4)$$
$$=(3x-2)\times4(3x+1)$$
$$=4(3x-2)(3x+1)$$

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

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

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

$$l=9x^2+6\sqrt{2}\,x+2$$
$$=(3x)^2+2\times3x\times\sqrt{2}+\sqrt{2}^2$$
$$=\left(3x+\sqrt{2}\right)^2$$

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

$$n=4x^2-12x+8$$
$$=\left(4x^2-12x+9\right)-1$$
$$=\left[(2x)^2-2\times2x\times3+3^2\right]-1$$
$$=(2x-3)^2-1^2$$
$$=(2x-3-1)(2x-3+1)$$
$$=(2x-4)(2x-2)$$
$$=2(x-2)\times2(x-1)$$
$$=4(x-2)(x-1)$$

$$p=4x^2-6x+2$$
$$=4x^2-4x-2x+1+1$$
$$=\left(4x^2-4x+1\right)-2x+1$$
$$=\left((2x)^2-2\times2x\times1+1^2\right)-(2x-1)$$
$$=(2x-1)^2-(2x-1)$$
$$=(2x-1)(2x-1-1)$$
$$=(2x-1)(2x-2)$$
$$=2(2x-1)(x-1)$$

## 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 :

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

و منه فإن :

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