تمارين تطبيقية

تمرين ① :

أنشر ثم بسط إذا كان ممكنا :

$$a=2\sqrt{3}\left(-3\sqrt{2}+\sqrt{3}\right) \quad ;; \quad b=-\sqrt{6}\left(\frac{1}{\sqrt{2}}-2\sqrt{3}\right) \quad ;; \quad c=\left(3\sqrt{2}+4\right)\left(-2\sqrt{5}-1\right)$$

*/ الحل :

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

$$b=-\sqrt{6}\left(\frac{1}{\sqrt{2}}-2\sqrt{3}\right)=-\frac{\sqrt{6}}{\sqrt{2}}+2\sqrt{6}\times\sqrt{3}=-\sqrt{\frac{6}{2}}+2\sqrt{18}=-\sqrt{3}+2\sqrt{3^2\times2}$$

$$=-\sqrt{3}+2\times3\sqrt{2}=-\sqrt{3}+6\sqrt{2}$$

$$c=\left(3\sqrt{2}+4\right)\left(-2\sqrt{5}-1\right)=-6\sqrt{10}-3\sqrt{2}-8\sqrt{5}-4$$

تمرين ② :

أنشر ثم بسط ما يلي إذا أمكن :

$$A=2x\left(-\sqrt{2}x+1\right)-x\sqrt{3}\left(-2x+\sqrt{3}\right) \quad ;; \quad B=3x(1-x)+\left(x-\sqrt{3}\right)\left(2\sqrt{2}+x\right)$$

$$C=\sqrt{5}x(2x-1)\left(\sqrt{5}+\sqrt{3}x\right)$$

*/ الحل :

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

$$=-2\sqrt{2}x^2+2x+2\sqrt{3}x^2-x\sqrt{3}^2$$

$$=-2\sqrt{2}x^2+2\sqrt{3}x^2+2x-3x$$

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

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

$$=3x-3x^2+2x\sqrt{2}+x^2-2\sqrt{6}-x\sqrt{3}$$

$$=-3x^2+x^2+3x+2x\sqrt{2}-x\sqrt{3}-2\sqrt{6}$$

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

$$C=\sqrt{5}x(2x-1)\left(\sqrt{5}+\sqrt{3}x\right)$$

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

$$=2\sqrt{5}^2x^2+2\sqrt{1}\,x^3-\sqrt{5}^2x-\sqrt{1}\,x^2$$

$$=10x^2+2\sqrt{15}x^3-5x-\sqrt{15}x^2$$

$$=2\sqrt{15}x^3+\left(10-\sqrt{15}\right)x^2-5x$$

تمرين ③ :

عمـل ما يلي :

$$A=3\sqrt{2}-15\sqrt{6}+6\sqrt{10} \quad ;; \quad B=\sqrt{75}+2\sqrt{9}$$

*/ الحـل :

$$A=3\sqrt{2}-15\sqrt{6}+6\sqrt{10}=3\sqrt{2}-3\sqrt{2}\times 5\sqrt{3}+3\sqrt{2}\times 2\sqrt{5}=3\sqrt{2}\left(1-5\sqrt{3}+2\sqrt{5}\right)$$

$$B=\sqrt{75}+2\sqrt{3}=\sqrt{5^2\times 3}+2\sqrt{3}^2=5\sqrt{3}+2\sqrt{3}^3=\sqrt{3}\left(5+2\sqrt{3}\right)$$

تمرين ④ :

عمـل ما يلي :

$$A=15a^2bc^3-5abc+25ab^2c \quad ;; \quad B=2x(3x+1)-(3x+1)(x+3)+(3x+1)$$

$$C=(3x-2)^2-3x(3x-2)+(2-3x)$$

*/ الحـل :

$$A=15a^2bc^3-5abc+25ab^2c=5abc\left(3ac^2-1+5b\right)$$

$$\begin{aligned}B&=2x(3x+1)-(3x+1)(x+3)+(3x+1)\\&=(3x+1)\left[2x-(x+3)+1\right.\\&=(3x+1)(2x-x-3+1)\\&=(3x+1)(x-2)\end{aligned}$$

$$\begin{aligned}C&=(3x-2)^2-5x(3x-2)+(2-3x)\\&=(3x-2)(3x-2)-5x(3x-2)-(3x-2)\\&=(3x-2)\left[(3x-2)-5x-1\right.\\&=(3x-2)(3x-2-5x-1)\\&=(3x-2)(-2x-3)\end{aligned}$$

تمرين ⑤ :

1) –أنشر ثم بسط ما يلي إذا كان ممكنا :

$$a=\left(2\sqrt{2}+3\right)^2 \quad ;; \quad b=\left(\sqrt{3}-2\sqrt{5}\right)^2 \quad ;; \quad c=\left(2\sqrt{3}-7\right)\left(2\sqrt{3}+7\right)$$

$$d=\left(2\sqrt{3}x-1\right)^2 \quad ;; \quad e=\left(3x+\sqrt{2}\right)^2 \quad ;; \quad f=\left(3x\sqrt{5}+1\right)\left(3x\sqrt{5}-1\right)$$

2) –عمـل ما يلي :

$$g=\sqrt{9}-\sqrt{2}^2 \quad ;; \quad h=4\sqrt{121}-7 \quad ;; \quad i=5-\sqrt{4}$$

$$j=25x^2+30x+9 \quad ;; \quad k=16x^2-11 \quad ;; \quad l=4x^2-4x\sqrt{3}+3$$

*/ الحـل :

1) –لننشر و نبسط ما يلي :

$$a=\left(2\sqrt{2}+3\right)^2=\left(2\sqrt{2}\right)^2+2\times 2\sqrt{2}\times 3+3^2=8+12\sqrt{2}+9=17+12\sqrt{2}$$

$$b=\left(\sqrt{3}-2\sqrt{5}\right)^2=\sqrt{3}^2-2\times\sqrt{3}\times 2\sqrt{5}+\left(2\sqrt{5}\right)^2=3-4\sqrt{15}+20=23-4\sqrt{15}$$

$$c=\left(2\sqrt{3}-7\right)\left(2\sqrt{3}+7\right)=\left(2\sqrt{3}\right)^2-7^2=12-49=-37$$

$$c=\left(2\sqrt{3}x-1\right)^2=\left(2\sqrt{3}x\right)^2-2\times 2\sqrt{3}x\times 1+1^2=12x^2-4\sqrt{3}x+1$$

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

$$e=\left(3x\sqrt{5}+1\right)\left(3x\sqrt{5}-1\right)=\left(3x\sqrt{5}\right)^2-1^2=45x^2-1$$

2) –لنعمـل ما يلي :

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

$$h=4\sqrt{121}-7=\left(2\sqrt{11}\right)^2-\sqrt{7}^2=\left(2\sqrt{11}-\sqrt{7}\right)\left(2\sqrt{11}+\sqrt{7}\right)$$

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

$$j=25x^2+30x+9=(5x)^2+2\times 5x\times 3+3^2=(5x+3)^2$$

$$k=16x^2-11=(4x)^2-\sqrt{11}^2=\left(4x-\sqrt{11}\right)\left(4x+\sqrt{11}\right)$$

$$l=4x^2-4x\sqrt{3}+3=(2x)^2-2\times 2x\times\sqrt{3}+\sqrt{3}^2=\left(2x-\sqrt{3}\right)^2$$