## 2.8 1)

$$(f\circ g)(x)=x^2+2x+2\Rightarrow f\left(g(x)\right)=x^2+2x+2\Rightarrow f\left(x+1\right)=x^2+2x+2\Rightarrow$$

θέτουμε $x+1=y\Rightarrow x=y-1$

$$\Rightarrow \quad f\left(y\right)=\left(y-1\right)^2+2\left(y-1\right)+2\Rightarrow f\left(y\right)=y^2-2y+1+2y-2+2\Rightarrow$$

$$\Rightarrow f\left(y\right)=y^2-\cancel{2y}+1+\cancel{2y}-\cancel{2}+\cancel{2}\Rightarrow f\left(y\right)=y^2+1\Rightarrow \boxed{f\left(x\right)=x^2+1}$$

## 2.8 2)

$$\left(f\circ g\right)(x)=x^2-4x+1\Rightarrow f\left(g(x)\right)=x^2-4x+1\Rightarrow f\left(3x+2\right)=x^2-4x+1\Rightarrow$$

θέτουμε $3x+2=y\Rightarrow x=\frac{y-2}{3}$

$$\Rightarrow \quad f\left(y\right)=\left(\frac{y-2}{3}\right)^2-4\left(\frac{y-2}{3}\right)+1\Rightarrow f\left(y\right)=\frac{y^2-4y+4}{9}-\frac{4y-8}{3}+1\Rightarrow$$

$$\Rightarrow f\left(y\right)=\frac{y^2-4y+4-12y+24+9}{9}\Rightarrow \boxed{f\left(y\right)=\frac{y^2-16y+37}{9}}$$

## 2.8 3)

$$(f\circ g)(x)=\sqrt{1+x^2}\Rightarrow f\left(g(x)\right)=\sqrt{1+x^2}\Rightarrow f\left(-x^2\right)=\sqrt{1+x^2}\Rightarrow$$

θέτουμε $-x^2=y\Rightarrow x^2=-y$

$$\Rightarrow \quad f\left(y\right)=\sqrt{1-y}\Rightarrow \boxed{f\left(x\right)=\sqrt{1-x}}$$