## 17.9 1)

Είναι

$$y = 4x^2 - 5x + 1 \overset{x=3t-4}{\Rightarrow} y(t) = 4(3t-4)^2 - 5(3t-4) + 1 \Rightarrow$$

$$\Rightarrow y'(t) = 24(3t-4) - 15 \Rightarrow y'(t) = 72t - 111$$

Οπότε

**α)** $y'(1) = 72 \cdot 1 - 111 \Rightarrow y'(1) = -39$

**β)** $y'(2) = 72 \cdot 2 - 111 \Rightarrow y'(2) = 33$

**γ)** Είναι $x = 3t - 4 \overset{x=-4}{\Rightarrow} -4 = 3t - 4 \Rightarrow 3t = 0 \Rightarrow t = 0$

Οπότε

$y'(0) = 72 \cdot 0 - 111 \Rightarrow y'(0) = -111$

**δ)** Είναι $x = 3t - 4 \overset{x=5}{\Rightarrow} 5 = 3t - 4 \Rightarrow 3t = 9 \Rightarrow t = 3$

Οπότε

$y'(3) = 72 \cdot 3 - 111 \Rightarrow y'(3) = 105$

## 17.9 2)

Είναι

$$y = x^2 + 2x - 1 \overset{x=3t-4}{\Rightarrow} y(t) = (3t-4)^2 + 2(3t-4) - 1 \Rightarrow$$

$$\Rightarrow y(t) = 9t^2 - 24t + 16 + 6t - 8 - 1 \Rightarrow y(t) = 9t^2 - 18t + 7 \Rightarrow \boxed{y'(t) = 18t - 18}$$

Οπότε

**α)** $y'(1) = 18 \cdot 1 - 18 \Rightarrow \boxed{y'(1) = 0}$

**β)** $y'(4) = 18 \cdot 4 - 18 \Rightarrow \boxed{y'(4) = 54}$

**γ)** Είναι $x = 3t - 4 \overset{x=-4}{\Rightarrow} -4 = 3t - 4 \Rightarrow 3t = 0 \Rightarrow t = 0$

Οπότε

$y'(0) = 18 \cdot 0 - 18 \Rightarrow \boxed{y'(0) = -18}$

**δ)** Είναι $x = 3t - 4 \overset{x=2}{\Rightarrow} 2 = 3t - 4 \Rightarrow 3t = 6 \Rightarrow t = 2$

Οπότε

$y'(2) = 18 \cdot 2 - 18 \Rightarrow \boxed{y'(2) = 18}$

## 17.9 3)

Είναι

$$y = x^3 + x^2 - 3x + 9 \overset{x=2t-6}{\Rightarrow} y(t) = (2t-6)^3 + (2t-6)^2 - 3(2t-6) + 9 \Rightarrow$$

$$\Rightarrow \boxed{y'(t) = 6(2t-6)^2 + 4(2t-6) - 6}$$

Οπότε

**α)** $y'(2)=6(2\cdot 2-6)^2+4(2\cdot 2-6)-6\Rightarrow \boxed{y'(2)=10}$

**β)** $y'(0)=6(2\cdot 0-6)^2+4(2\cdot 0-6)-6\Rightarrow \boxed{y'(0)=186}$

**γ)** Είναι $x=2t-6\overset{x=-4}{\Rightarrow}-4=2t-6\Rightarrow 2t=2\Rightarrow t=1$

Οπότε

$y'(1)=6(2\cdot 1-6)^2+4(2\cdot 1-6)-6\Rightarrow \boxed{y'(1)=74}$

**δ)** Είναι $x=2t-6\overset{x=2}{\Rightarrow}2=2t-6\Rightarrow 2t=8\Rightarrow t=4$

Οπότε

$y'(4)=6(2\cdot 4-6)^2+4(2\cdot 4-6)-6\Rightarrow \boxed{y'(4)=26}$

## 17.9 4)

Είναι

$$y=4x^2-5x+1\overset{x=t^2+t-1}{\Rightarrow} y(t)=4\left(t^2+t-1\right)^2-5\left(t^2+t-1\right)+1\Rightarrow$$

$$\Rightarrow \boxed{y'(t)=8\left(t^2+t-1\right)(2t+1)-5(2t+1)}$$

Οπότε

**α)** $y'(3)=8\left(3^2+3-1\right)(2\cdot 3+1)-5(2\cdot 3+1)\Rightarrow \boxed{y'(3)=581}$

**β)** Είναι $x=t^2+t-1\overset{x=-1}{\Rightarrow}\cancel{-1}=t^2+t\cancel{-1}\Rightarrow t^2+t=0\Rightarrow t(t+1)=0\Rightarrow$

$\Rightarrow t=0$ ή $t=-1$ απορίπτεται

Οπότε

$y'(0)=8\left(0^2+0-1\right)(2\cdot 0+1)-5(2\cdot 0+1)\Rightarrow \boxed{y'(0)=-13}$

**γ)** Είναι $x=t^2+t-1\overset{x=5}{\Rightarrow}5=t^2+t-1\Rightarrow t^2+t-6=0\Rightarrow (t-2)(t+3)=0\Rightarrow$

$\Rightarrow t=2$ ή $t=-3$ απορίπτεται

Οπότε

$y'(2)=8\left(2^2+2-1\right)(2\cdot 2+1)-5(2\cdot 2+1)\Rightarrow \boxed{y'(2)=175}$

**δ)** Είναι $x=t^2+t-1\overset{x=1}{\Rightarrow}1=t^2+t-1\Rightarrow t^2+t-2=0\Rightarrow (t-1)(t+2)=0\Rightarrow$

$\Rightarrow t=1$ ή $t=-2$ απορίπτεται

Οπότε

$y'(1)=8\left(1^2+1-1\right)(2\cdot 1+1)-5(2\cdot 1+1)\Rightarrow \boxed{y'(1)=9}$