(3) c) $y=x+\frac{6}{x},\left(2, \frac{x}{2}\right) \quad m=\frac{-1}{2}$
(1) Find Derivative (3) Find the equation:

$$
\begin{aligned}
& y=x+6 x^{-1} \\
& y^{\prime}=1-6 x^{-2} \\
& y^{\prime}=1-\frac{6}{x^{2}}
\end{aligned}
$$

$$
y-y_{1}=m\left(x-x_{1}\right)
$$

$$
y-5=-\frac{1}{2}(x-2)
$$

$$
2 y-10=-1(x-2)
$$

$$
2 y-10=-x+2
$$

(2) Sub in $x$-value $(x=2) \quad x+2 y-12=0$

$$
\begin{aligned}
& y^{\prime}=1-\frac{6}{(2)^{2}} \\
& y^{\prime}=\frac{4}{4}-\frac{6}{4} \\
& y^{\prime}=-\frac{2}{4}=-\frac{1}{2}
\end{aligned}
$$

slope of
the tangent
"m"
(4) a)

$$
\begin{array}{lll}
y=x^{5} & x=2 & \operatorname{Point}(2,32) \\
y=(2)^{5} & & m=80 \\
y=32 & &
\end{array}
$$

(1) Find Der native

$$
y^{\prime}=5 x^{4}
$$

(3) Find the equation:

$$
y-y_{1}=m\left(x-x_{1}\right)
$$

$$
\begin{array}{lr}
\text { (2) Sub in } x \text {-value }(x=2) & y-32=80(x-2) \\
y^{\prime}=5(2)^{4} & y-32=80 x-160 \\
y^{\prime}=5(16) & -80 x+y+128=0 \\
y^{\prime}=\frac{80}{\uparrow} & 80 x-y-128=0
\end{array}
$$

Slope
(8)
$\therefore$ The point is

$$
y=x \sqrt{x}
$$

$$
\begin{array}{ll}
(16,64) & y=(16) \sqrt{16} \\
y=16(4) \\
y=64
\end{array}
$$

$$
\begin{aligned}
& y=x \sqrt{x} \quad \text { parallel to: } 6 x-y=4 \\
& y=(x)\left(x^{1 / 2}\right) \\
& y=x^{3 / 2} \\
& -y=-6 x+4 \\
& y=6 x-4 \\
& m=6 \\
& y^{\prime}=\frac{3}{2} x^{1 / 2} \\
& y^{\prime}=\frac{3 \sqrt{x}}{2} \\
& \begin{array}{l}
\frac{12}{3}=\frac{3 \sqrt{x}}{3} \\
(4)^{2}=(\sqrt{x})^{2}
\end{array} \\
& 16=x
\end{aligned}
$$

(1) 9

$$
\begin{aligned}
& \begin{array}{l}
y=\frac{x+1}{\sqrt{x}}=\frac{x+1}{x^{1 / 2}}=x^{-1 / 2}(x+1) \\
\\
=x^{1 / 2}+x^{-1 / 2} \\
\begin{array}{l}
y^{\prime}=\frac{1}{2} x^{-1 / 2}-\frac{1}{2} x^{-3 / 2}
\end{array} \\
y^{\prime}=\frac{1}{2 x^{1 / 2}}-\frac{1}{2 x^{3 / 2}}
\end{array}
\end{aligned}
$$

(1) a)

$$
\begin{aligned}
& f(x)=x^{2}+4 x \\
& f^{\prime}(x)=2 x+4
\end{aligned}
$$

d)

$$
\begin{aligned}
& g(x)=x^{2}-\frac{2}{x^{2}}=x^{2}-2 x^{-2} \\
& g^{\prime}(x)=2 x+4 x^{-3} \\
& g^{\prime}(x)=2 x+\frac{4}{x^{3}}
\end{aligned}
$$

g)

$$
\begin{aligned}
& \begin{aligned}
y=\frac{x+1}{\sqrt{x}}=\frac{x+1}{x^{1 / 2}} & =x^{-1 / 2}(x+1) \\
& =x^{1 / 2}+x^{-1 / 2}
\end{aligned} \\
& y^{\prime}=\frac{1}{2} x^{-1 / 2}-\frac{1}{2} x^{-3 / 2}
\end{aligned}
$$

or $y^{\prime}=\frac{1}{2 x^{1 / 2}}-\frac{1}{2 x^{3 / 2}}$
or $y^{\prime}=\frac{1}{2 \sqrt{x}}-\frac{1}{2 \sqrt{x^{3}}}$
e)

$$
\begin{aligned}
h(x) & =\sqrt{x}-5 x^{4} \\
& =x^{1 / 2}-5 x^{4} \\
h^{\prime}(x) & =\frac{1}{2} x^{-1 / 2}-20 x^{3} \\
& =\frac{1}{2 x^{1 / 2}}-20 x^{3}
\end{aligned}
$$

(4) b) $y=2 \sqrt{x} ;(\underline{9}, 6) ; m=\frac{1}{3}$
(1) Find Derivative
(3) Find the Equation

$$
\begin{aligned}
& y=2 x^{1 / 2} \\
& y^{\prime}=1 x^{-1 / 2} \\
& y^{\prime}=\frac{1}{x^{1 / 2}}=\frac{1}{\sqrt{x}}
\end{aligned}
$$

(2) Sub in $x$-value $(x=9)$

$$
y^{\prime}=\frac{1}{\sqrt{9}}=\frac{1}{3}
$$



Slope of the tangent
"m"

$$
-x+3 y-9=0
$$

$$
x-3 y+9=0
$$

(7)

$$
\begin{array}{ll}
y=3 x^{2} & 24=6 x \\
y^{\prime}=6 x & 4=x \\
& y=3(4)^{2} \\
y=3(16) \\
& y=48
\end{array}
$$

$\therefore$ The point is $(4,48)$

From Review
(7) c)

$$
\begin{aligned}
& g(x)=4 x^{3}-\frac{6}{x^{2}}+14 x \\
& g(x)=4 x^{3}-6 x^{-2}+14 x \\
& g^{\prime}(x)=12 x^{2}+12 x^{-3}+14 x^{0} \\
& g^{\prime}(x)=12 x^{2}+\frac{12}{x^{3}}+14
\end{aligned}
$$

(9) a)

$$
\begin{aligned}
& f(x)=3 x^{5}+\sqrt[3]{x} \\
& f(x)=3 x^{5}+x^{1 / 3} \\
& f^{\prime}(x)=15 x^{4}+\frac{1}{3} x^{-2 / 3} \\
& f^{\prime}(x)=15 x^{4}+\frac{1}{3 x^{2 / 3}}
\end{aligned}
$$

or $f^{\prime}(x)=15 x^{4}+\frac{1}{3 \sqrt[3]{x^{2}}}$
(4) $F^{\prime}(x)=\lim _{h \rightarrow 0} \frac{\sqrt[F(x+h)]{h}-\sqrt[F(x)]{h}}{h}$

$$
\begin{aligned}
& \text { b) } f(x)=\frac{2 x-1}{4 .} \quad f(x+h)=\frac{2(x+h)-1}{4(x+h)} \\
& =\frac{2 x+2 h-1}{4 x+4 h} \\
& f^{\prime}(x)=\lim _{h \rightarrow 0} \frac{\frac{\partial x+2 h-1}{(4 x+4 h}-\left(\frac{\partial x-1}{(4 x)}\right)}{h} \\
& =\lim _{h \rightarrow 0} \frac{4 x(2 x+2 h-1)-(2 x-1)(4 x+4 h)}{h(4 x)(4 x+4 h)} \\
& =\lim _{h \rightarrow 0} \frac{8 x^{2}+8 x h-4 x-\left(8 x^{2}+8 x h-4 x-4 h\right)}{h(4 x)(4 x+4 h)} \\
& =\lim _{h \rightarrow 0} \frac{8 x^{2}+8 x h-4 x-8 x^{2}-8 x h+4 x+4 h}{h(4 x)(4 x+4 h)} \\
& =\lim _{h \rightarrow 0} \frac{4 h}{\ln (4 x)(4 x+4 h)}=\frac{4}{(4 x)^{2}}=\frac{4}{16 x^{2}}=\frac{1}{4 x^{2}}
\end{aligned}
$$

