You may need to give 4 or 5 significant digits for some (floating point) numerical answers in order to have them accepted by the computer.

1. ( 1 pt ) If

$$
f(x)=\frac{\sqrt{x}-3}{\sqrt{x}+3}
$$

find $f^{\prime}(x)$.
Find $f^{\prime}(4)$.
2. (1 pt) If $f(x)=4+\frac{2}{x}+\frac{4}{x^{2}}$, find $f^{\prime}(x)$.

Find $f^{\prime}(3)$.
3. ( 1 pt ) Find the $x$ coordinate of the point on the curve $y=x+3 x^{-1}, x>0$ where the tangent line has slope -3 .
4. $(1 \mathrm{pt})$ If $f(t)=\frac{13}{t^{5}}$, find $f^{\prime}(t)$.
[NOTE: Your answer should be a function in terms of the variable ' $t$ ' and not a number! ]

$$
\text { 5. (1 pt) If } f(x)=\frac{5 x+7}{4 x+4} \text {, find } f^{\prime}(x)
$$

Find $f^{\prime}(3)$.
6. $\left(1\right.$ pt) Let $f(x)=\frac{1-2 x}{1+2 x}$. Then $f^{\prime}(4)$ is
and $f^{\prime \prime}(4)$ is $\qquad$ and $f^{\prime \prime \prime}(4)$ is
7. ( 1 pt ) The angle of elevation to the top of a building is found to be $9^{\circ}$ from the ground at a distance of 4500 feet from the base of the building. Find the height of the building.
8.(1 pt) A survey team is trying to estimate the height of a mountain above a level plain. From one point on the plain, they observe that the angle of elevation to the top of the mountain is $28^{\circ}$. From a point 2000 feet closer to the mountain along the plain, they find that the angle of elevation is $30^{\circ}$.

How high (in feet) is the mountain?
9.(1 pt) Evaluate the limit

$$
\lim _{x \rightarrow 0} \frac{\sin 6 x}{\sin 4 x}
$$

10. (1 pt) Evaluate the limit

$$
\lim _{x \rightarrow 0} \frac{\tan x}{4 x}
$$

11.(1 pt) If

$$
f(x)=\frac{2 \sin x}{2+\cos x}
$$

find $f^{\prime}(x)$.
Find $f^{\prime}(2)$.
12. (1 pt) If $f(x)=\frac{2 \tan x}{x}$, find $f^{\prime}(x)$.

Find $f^{\prime}(3)$.
13. (1 pt) If

$$
f(x)=\frac{\tan x-3}{\sec x}
$$

find $f^{\prime}(x)$.
Find $f^{\prime}(4)$.
14.(1 pt) Let

$$
f(x)=9 x \sin x \cos x
$$

$$
f^{\prime}\left(\frac{\pi}{2}\right)=
$$

$\qquad$
15. (1 pt) If $f(x)=\sin \left(x^{3}\right)$, find $f^{\prime}(x)$.

Find $f^{\prime}(1)$.

| 16. $(1 \mathrm{pt})$ Let $f(x)=\frac{8 \cos (x)+4 \sin (x)}{\cos (x)}$. Find $f^{\prime}(x)$. |
| :--- |
| $f^{\prime}(x)=$ |

