1. Give a formula for the Cumulative distribution function of the density function

\[ p(t) = \begin{cases} \frac{1}{4} t^4, & 0 \leq t < 2\sqrt{2} \\ 0, & \text{otherwise} \end{cases} \]

and sketch its graph using a window of xmin = -1, xmax = 4, ymin = -1, ymax = 1. Be sure and label your axes.

2. Find the mean and median of \( p(t) \) given above.

\[
\bar{X} = \frac{2\sqrt{2}}{\frac{1}{4} \int_0^{2\sqrt{2}} t^4 \, dt} = \frac{1}{\frac{1}{3} \cdot 2\sqrt{2}^3} \approx 1.8856
\]

Median = \( T \) where

\[
0.5 = \frac{1}{\frac{1}{4}} \int_0^T t \, dt \Rightarrow \frac{1}{8} T^2 = 0.5 \Rightarrow T^2 = 4 \Rightarrow T = 2
\]
3. Let $C$ be the cost of renting a car from a company which charges $25$ a day and 20 cents a mile, so $C = f(d,m) = 25d + 0.2m$. Make a table of values for $C$, using $d = 1, 2, 3, 4$ and $m = 100, 150, 200, 250.$

<table>
<thead>
<tr>
<th>$d$</th>
<th>100</th>
<th>150</th>
<th>200</th>
<th>250</th>
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<tr>
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<td>4</td>
<td>120</td>
<td>130</td>
<td>140</td>
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4. (a) Find $f(3,150)$ and interpret it. $f(3,150)=105$

The cost of renting a car for 3 days and 150 miles is $105.

(b) Explain the significance of $f(3,m)$ in terms of rental car costs. Graph the function with $C$ as a function of $m$.

5. For the function $h(c,p) = c^2 + p^2$, sketch a contour diagram with three labelled contours for levels $z = 1, 4, 9$. Make the horizontal axis the $c$-axis, and the vertical axis the $p$-axis and use the window $-5 \leq c \leq 5$, $-5 \leq p \leq 5$. 

\begin{align*}
C^2 + P^2 &= 1 \\
C &= \sqrt{1-P^2}
\end{align*}