Test 1
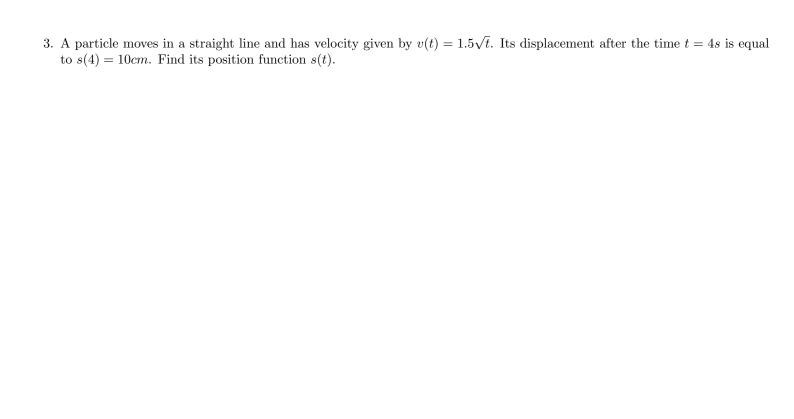
Time: 50 minutes

1. The top and the bottom margins of a poster are each 6 cm and the side margins are each 4 cm. If the area of printed material on the poster is fixed at 384 cm^2, find the dimensions of the poster with the smallest area.

2. Evaluate the integral $\int_2^4 \frac{1+x-x^2}{x^2} dx$.

3. A particle moves in a straight line and has velocity given by $v(t) = 1.5\sqrt{t}$. Its displacement after the time $t = 4s$ is equal to $s(4) = 10cm$. Find its position function $s(t)$.

4. If a cup of coffee has temperature 95^oC in a room where the temperature is 20^oC, then, according to Newton's Law of Cooling, the temperature of the coffee after t minutes is

$$T(t) = 20 + 75e^{-t/50}.$$

What is the average temperature of the coffee during the first half hour?