**1**. [15 points] The table below gives several values of a twice differentiable function $f$ along with its derivative $f'$ and continuous second derivative $f''$

| $x$ | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| $f(x)$ | 1 | 2.4 | 2.5 | 2.2 | 2.6 | 4.3 | 6.7 |
| $f'(x)$ | 2 | 0.7 | $-0.3$ | $-0.1$ | 1.1 | 2.2 | 2.2 |
| $f''(x)$ | $-1$ | $-1.4$ | $-0.5$ | 0.8 | 1.4 | 0.7 | $-0.7$ |

Unless otherwise stated, you do not have to show work, but work shown might be considered for partial credit.

**a**. [3 points] Find the value of $\displaystyle\int_1^4 xf''(x)\,dx$.

**Answer:** $\displaystyle\int_1^4 xf''(x)\,dx =$ _____

**b**. [3 points] Let $H(x) = \displaystyle\int_x^{x^2+1} f'(3t)\,dt$. Compute $H'(1)$.

**Answer:** $H'(1) =$ _____

**c**. [3 points] Use TRAP(3) to approximate $\displaystyle\int_0^6 f(x)\,dx$. Write out each term in your sum.

**Answer:** $\displaystyle\int_0^6 f(x)\,dx \approx$ _____

**d**. [3 points] Find the 2nd degree Taylor polynomial $P_2(x)$ for $f(x)$ centered at $x = 3$.

**Answer:** $P_2(x) =$ _____

**e**. [3 points] Use your answer to part (d) to approximate $\displaystyle\int_0^6 f(x)\,dx$.

**Answer:** $\displaystyle\int_0^6 f(x)\,dx \approx$ _____