10350 Tutorial Week 15 - Set 01 Name _____

1. A student wishes to use Newton's method to estimate the value of $\sqrt{3}$ by considering the solution of $x^2 = 3$. If the initial guess $x_0 = 2$, find the values of the next two iterates x_1 and x_2. Fill in your answers below.

Answers: $x_1 =$ _____ $x_2 =$ _____

2. Perform each of the following indefinite integrals. If substitution is needed show all steps carefully.

a. $\displaystyle\int \frac{x^3 - 10x^2 + x - 5}{x^2}\,dx \stackrel{?}{=}$

b. $\displaystyle\int \frac{e^{-x} + e^{x+2}}{e^x}\,dx \stackrel{?}{=}$

3. Solve the differential equation $\dfrac{dy}{dx} = \dfrac{\sqrt{\pi}}{\sqrt{x}} + \sin x$ if $y(\pi) = 3$

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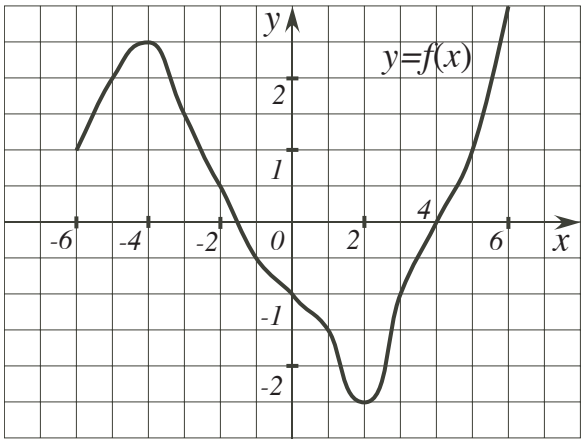
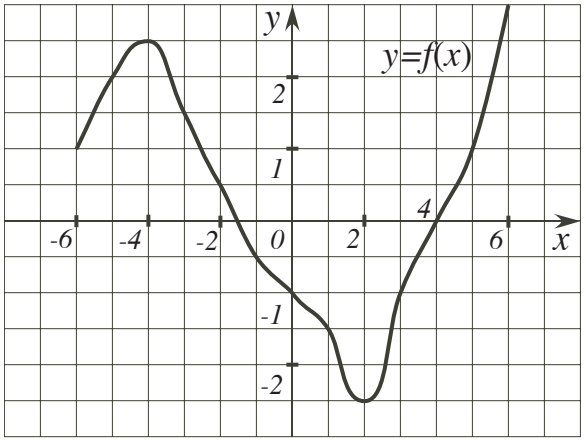
4. Estimate the value of $\int_{-6}^{6} f(x)dx$ using the following method.

a. Right end-point with **6 equal subintervals**.



b. Midpoint Rule with **6 equal subintervals**.



5. A particle on a straight line is moving with acceleration function

$$a(t) = \sin(t) + 12t^2 \qquad \text{m/s}^2$$

If initially the particle's velocity is 3 m/s and position is -1 m, find the velocity function and position function.

6. Given that $\int_0^3 f(x)dx = -2$ and $\int_0^9 f(x)dx = 10$, find

a. $\int_3^9 f(x)dx =$

b. $\int_0^3 [5 - 2f(x)]dx =$