

Name _____

- You have 20 minutes
- No calculators
- Show sufficient work

1. (2 points) A town currently has a population of 8000 people. Suppose the town's population grows by $6t^2$ people per year where t is measured in years from now. What will the town's population be in 10 years?

2. (2 points) Rounded off to one place after the decimal, the given definite integral is equal to one of the choices below. Circle the correct choice and show sufficient work to justify your answer. Hint: Obtain an approximation without finding an antiderivative or a limit.

$$\int_1^3 \sqrt{16 + 9 \cos^6(e^x + 3)} dx$$

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|----------|----------|----------|----------|----------|
| (a) 1.4 | (b) 3.6 | (c) 5.2 | (d) 6.1 | (e) 8.7 |
| (f) 11.0 | (g) 12.5 | (h) 15.3 | (i) 16.9 | (j) 19.8 |

3. (2 points) Evaluate the following indefinite integral.

$$\int \frac{\cos(2\theta) + \sin^2 \theta}{\cos \theta} d\theta$$

4. (2 points) Evaluate the following definite integral. Simplify your answer.

$$\int_1^8 \frac{\sqrt[3]{x} - 6x}{3x} dx$$

5. (2 points) Suppose $w(x) = \int_{\ln x}^4 \frac{6}{t^3 + 8} dt$. Find $w'(x)$.