

MATH 141 WORKSHEET 8

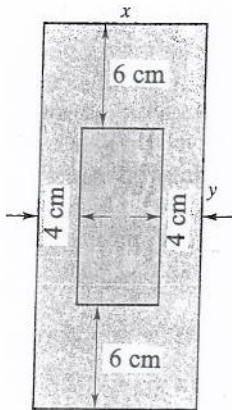
Show all work for full credit.

1. A box with a square base and open top must have a volume of $32,000 \text{ cm}^3$. Find the dimensions of the box that minimize the amount of material used. Prove your answer.

2. If 1200 cm^2 of material is available to make a box with a square base and open top, find the largest possible volume of the box. Prove your answer.

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3. The top and bottom margins of a poster are 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.



4. Evaluate the integral.

$$\int (3x^2 + 4)(x^3 + 5x) dx$$

5. Evaluate the integral.

$$\int \frac{3x + 6}{x^2 + 4x + 5} dx$$

6. Evaluate the integral.

$$\int \frac{2x^4 + 1}{\sqrt{2x^5 + 5x + 1}} dx$$

7. Evaluate the integral.

$$\int x^2 \sin(x^3) \cos(x^3) dx$$

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8. Evaluate the integral.

$$\int x \sec(x^2 + 4) \tan(x^2 + 4) dx$$

9. Evaluate the integral.

$$\int \frac{\cos x}{1 + \sin^2 x} dx$$

10. Evaluate the integral.

$$\int \frac{\cos x}{(1 + \sin x)^2} dx$$