

Final Exam

Name: (print neatly) _____

Instructor: Joyce Servatius

(sign) _____

Prob	Pts
1	
2	
3	
4	
5	
6	
Total	

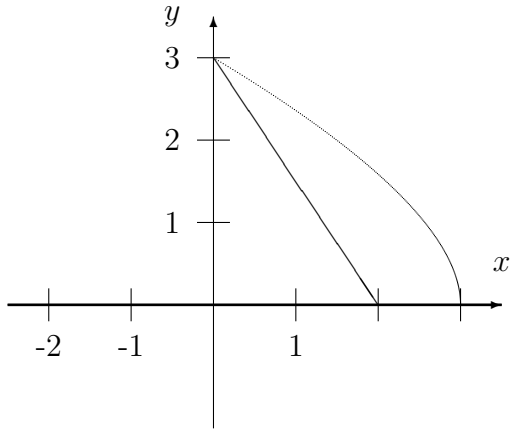
1. (**12 pts**) Suppose a point moves along the x -axis with acceleration $a(t) = \frac{e^{3t} - e^{-3t}}{2}$ meters per second squared. If the point starts at the origin with velocity 30 meters per second, what is its position 5 seconds later.

2. (**16 pts**) Suppose $\int_0^2 (2f(x) + 3g(x)) dx = 5$ and $\int_0^2 (5f(x) + 2g(x)) dx = 4$.

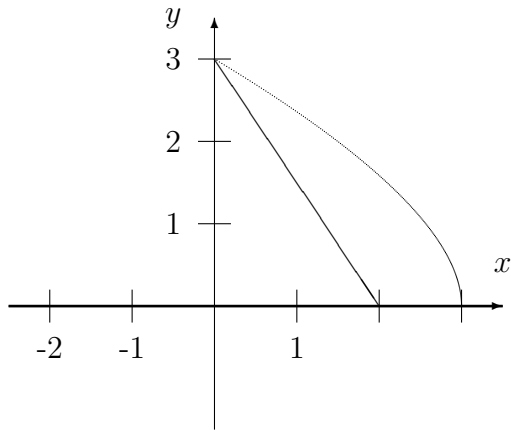
a) Find $\int_0^2 (f(x) - g(x)) dx$.

b) What is the average value of $f(x)$ on the interval $[0, 2]$.

3. (12 pts) Find the area bounded by the curves $y = 0$, $3x + 2y = 6$ and $3x + y^2 = 9$.



4. (12 pts) Give an integral which expresses the volume of the solid of revolution obtained by rotation the region of problem 3 about the x -axis. The integral may be with respect to x or y . You need not evaluate the integral.



5. (16 pts.) Evaluate the following derivatives.

a. $\frac{d}{dx} \left(e^{3x^2+2} \ln(3x^2 + 2) \right) =$

b. $\frac{d}{dx} \left[\frac{\arctan(x)}{1+x^2} \right]$

c. $\frac{d}{dx} \left[\frac{1 + \ln(x)}{x} \right]$

6. (32 pts.) Compute the following integrals:

a) $\int (e^2)^{1+x} dx$

b) $\int \left(\frac{\sin(3x)}{3 + \cos(3x)} \right) dx$

$$c) \int x e^{2x} dx$$

$$d) \int x e^{x^2} dx$$

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