

Quiz 10 will cover the following topics: all topics from Quizzes 1-9, Exams 1, 2, 3, and integration by substitution (5.2), applications of integrals (5.4), integration by parts (6.1) and improper integrals (6.3)

## Review Problems

1. Compute each of the following integrals.

a) $\int x(4x^2 + 1)^{20} dx$	e) $\int_0^{\infty} xe^{-2x} dx$	i) $\int_1^{\infty} \frac{\ln x}{x^5} dx$	m) $\int_0^{\infty} \frac{x}{5} e^{-x/5} dx$
b) $\int_{-1}^1 x(4x^2 + 1)^{20} dx$	f) $\int x^2 \ln x dx$	j) $\int \frac{1}{5} e^{-x/5} dx$	
c) $\int xe^{-2x} dx$	g) $\int_1^e x^2 \ln x dx$	k) $\int_0^{\infty} \frac{1}{5} e^{-x/5} dx$	
d) $\int_0^3 xe^{-2x} dx$	h) $\int \frac{\ln x}{x^5} dx$	l) $\int \frac{x}{5} e^{-x/5} dx$	

2. Find the area determined by the graphs of

a)  $f(x) = 2x - 5$  and  $g(x) = x^2 - 5$

b)  $f(x) = 3x - x^2$  and  $g(x) = x^2 - 2x - 3$

3. Find the average value of the function given.

a)  $f(x) = x^3$  on the interval  $[-2, 4]$

b)  $f(x) = e^{2x}$  on the interval  $[0, 5]$

## Review Problems - Answers

1. a)  $\frac{(4x^2 + 1)^{21}}{168} + C$     b) 0    c)  $-\frac{1}{4}e^{-2x} - \frac{1}{2}xe^{-2x} + C$     d)  $\frac{1}{4} - \frac{7}{4e^6}$     e)  $\frac{1}{4}$   
f)  $\frac{1}{3}x^3 \ln x - \frac{1}{9}x^3 + C$     g)  $\frac{2}{9}e^3 + \frac{1}{9}$     h)  $-\frac{1}{16x^4} - \frac{1}{4x^4} \ln x + C$     i)  $\frac{1}{16}$     j)  $-e^{-x/5} + C$   
k) 1    l)  $-5e^{-x/5} - xe^{-x/5} + C$     m) 5
2. a)  $\frac{4}{3}$     b)  $\frac{343}{24}$
3. a) 10    b)  $\frac{1}{10}(e^{10} - 1)$