

1. (16 total points) Evaluate the following integrals.

(a) (8 points) $\int x \arcsin x \, dx$

(b) (8 points) $\int \sin^4(3t) \cos^3(3t) \, dt$

2. (8 points) Evaluate the integral

$$\int_{e^2}^{e^3} \frac{(\ln x)^3 + 1}{x((\ln x)^3 - (\ln x)^2)} dx.$$

1. (12 total points) Evaluate the following integrals.

(a) (6 points) $\int \cos^4 x dx$

(b) (6 points) $\int_0^{\pi/4} \frac{\sin t}{\cos^2 t} dt$

2. (12 total points) Evaluate the following integrals.

(a) (6 points) $\int x \ln(x+4) dx$

(b) (6 points) $\int_2^{\infty} \frac{1}{x\sqrt{x-2}} dx$

1. (14 total points) Evaluate the following integrals.

(a) (7 points) $\int_0^{\pi/4} t \cos^2(t) dt$

(b) (7 points) $\int \frac{3x+5}{(x-1)^2(x+1)} dx$

2. (14 total points) Evaluate the following integrals.

(a) (7 points) $\int \frac{x^2}{\sqrt{2x-x^2}} dx$

(b) (7 points) $\int w^5 \sqrt{w^3-1} dw$

1. (14 total points) Evaluate the following integrals.

(a) (7 points) $\int \frac{dx}{x^3 + x^2}$

(b) (7 points) $\int \frac{(x+7)dx}{x^2 + 6x + 13}$

2. (14 total points) Evaluate the following integrals. Leave your answers in exact form: do not use decimal expansions.

(a) (7 points) $\int_0^{\sqrt{5}} \frac{x^3 dx}{\sqrt{9-x^2}}$

(b) (7 points) $\int_1^4 \frac{\tan^{-1}(\sqrt{t})}{\sqrt{t}} dt$ (Recall that $\tan^{-1} = \arctan$.)

3. (7 points) Evaluate the following integral.

$$\int \frac{x}{(x^2 + 2x - 3)^{3/2}} dx$$

1. (12 total points) Evaluate the following integrals.

(a) (6 points) $\int x^3 \cos(x^2) dx$

(b) (6 points) $\int \frac{(\sqrt{\ln(x)} + 1)^3}{x\sqrt{\ln(x)}} dx$

2. (12 total points) Evaluate the following integrals.

(a) (6 points) $\int \frac{2x-1}{x^2-3x+2} dx$

(b) (6 points) $\int \frac{\sqrt{3-2x-x^2}}{x+1} dx$

1. (14 total points) Evaluate the following integrals.

(a) (7 points) $\int \sec^4(3x) dx$

(b) (7 points) $\int_3^{4.5} \sqrt{6x - x^2} dx$

2. (14 total points) Evaluate the following integrals.

(a) (7 points) $\int \frac{\sin x \cos x}{\sin^2 x + 5 \sin x + 6} dx$

(b) (7 points) $\int_4^{\infty} \frac{\ln x}{x^{3/2}} dx$