You must justify your answers to receive full credit.

Some antiderivatives you may find useful:

$$\int \sec^2 x\,dx = \tan x + C, \qquad \int \csc^2 x\,dx = -\cot x + C,$$
$$\int \sec x \tan x\,dx = \sec x + C, \qquad \int \csc x \cot x\,dx = -\csc x + C,$$
$$\int \frac{1}{\sqrt{1-x^2}}\,dx = \sin^{-1} x + C, \qquad \int \frac{1}{1+x^2}\,dx = \tan^{-1} x + C,$$

$$\int \sin^2 x\,dx = \frac{1}{2}(x - \sin x \cos x) + C,$$
$$\int \sin^3 x\,dx = -\cos x + \frac{1}{3}\cos^3 x + C.$$
$$\int \sin^4 x\,dx = \frac{1}{8}(3x - 3\sin x \cos x - 2\sin^3 x \cos x) + C,$$

$$\int \cos^2 x\,dx = \frac{1}{2}(x + \sin x \cos x) + C,$$
$$\int \cos^3 x\,dx = \sin x - \frac{1}{3}\sin^3 x + C.$$
$$\int \cos^4 x\,dx = \frac{1}{8}(3x + 3\sin x \cos x + 2\cos^3 x \sin x) + C.$$

- 6.5: Q9, 12, 15, 22: $\displaystyle\int_0^{\pi/2} \frac{\cos x}{(1-\sin x)^{2/3}}\,dx$, $\displaystyle\int_0^{\infty} \frac{x}{1+2x^2}\,dx$, $\displaystyle\int_0^{\pi/2} \tan x\,dx$, $\displaystyle\int_{-\infty}^{\infty} e^{-|x|}\,dx$.
- 14.3 Q4, 12
- 12.2 Q3, 5, 11, 12
- 12.3 Q11, 36.
- 12.4 Q4 ,5, 17
- 12.6 Q2, 4
- 12.6 Q18, 19.

- 12.5 Q1, 2, 6, 17

The following two questions are to prepare you for the following week's class, and is unrelated to the material from recent classes.

1. Let $\mathbf{v}$ be the vector $4\mathbf{i} - \mathbf{j}$.

   a) Calculate the dot product $\mathbf{v} \bullet (3\mathbf{i} + 2\mathbf{j})$.

   b) Find a vector that is perpendicular to $\mathbf{v}$.

   c) Find a unit vector in the same direction as $\mathbf{v}$.

2. Consider the function

$$f(x) = \frac{x^2}{x^2 + 1}$$

   a) Find and classify the critical points of f.

   b) Find the minimum and maximum values of f on the interval $[1, 2]$.

   c) Find the second order Taylor polynomial of f about the point $x = 2$.

— END —