The College Of WILLIAM & MARY

Math 112
Lab 0

Name: _____ Section: _____ Score: _____

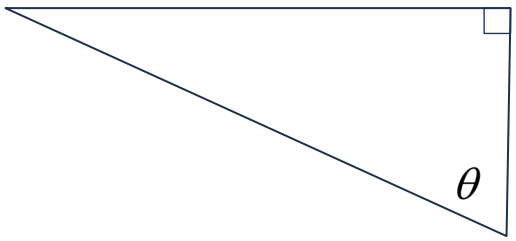
Print and complete all work ON THIS PAPER. Submit your completed Lab 0 at the first lab session.

Part I: Calculus II Readiness Quiz

Work the problems below *without a calculator, reference materials or help*. Show all supporting steps and answer in exact values, not decimal approximations. Answers without accurate supporting work are not accepted. Simplify your final answers.

1. (2 pts.) Find the derivative of $h(x)=\sqrt{2-e^x}$. Final answer should be a fractional expression containing a radical.

2. (2 pts.) Let $x = 7\cos\theta$. Label all three sides of the right triangle with the appropriate constant or expression in x.

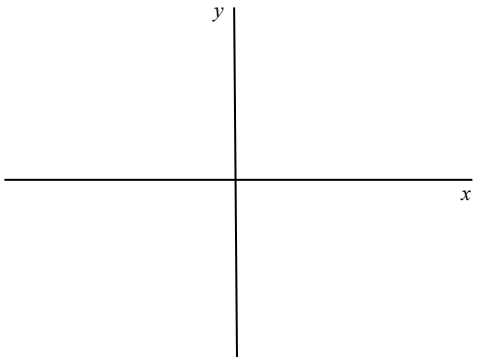


3. (1 pt.) Give the exact value of each. (Remember, no calculator. No supporting work is needed.)

(a) $\cos\left(\frac{7\pi}{6}\right)$ (b) $\sin\left(\frac{3\pi}{4}\right)$

4. (3 pts.) (a) Sketch the curves $y = x$ and $y^2 = x + 2$ on the coordinate plane provided. (b) Calculate the coordinate pair(s) where the curves $y = x$ and $y^2 = x + 2$ intersect.

(Remember, no calculator.)



5. (2 pts.) Calculate each limit.

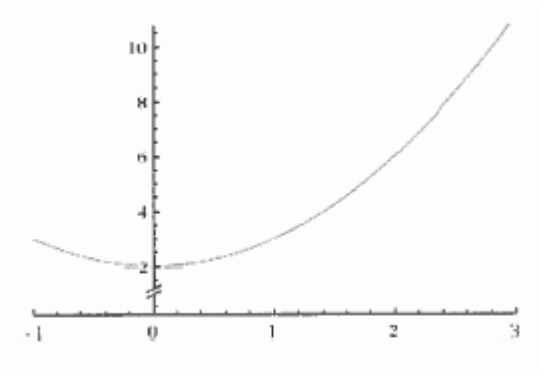
(a) $\lim_{x\to\infty} \frac{5x^2 - 17}{2x^2 + 3 - x}$ (b) $\lim_{b\to\infty} \tan^{-1}\left(\frac{b}{2}\right)$

 Name: _____

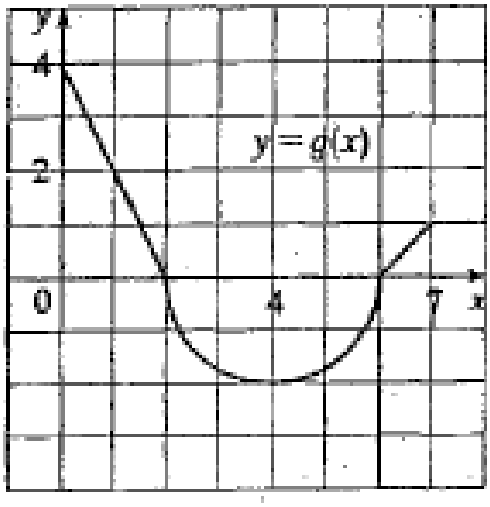
Part II: Review of sections 5.1-5.4

Here, you will review some of the concepts of integration that you learned at the end of Math 111 or similar course. Work the problems in the spaces below, reviewing the material in the book as much as necessary. No other assistance is allowed. A calculator may be used for calculations on problem 1 (a).

1. (2 pts.) (Section 5.1) (a) Approximate the area under $f(x) = 2 + x^2$ on the interval [0, 3] using R_6.
(b) Illustrate this approximation.



2. (2 pts.) (Section 5.2) The graph of *g* consists of two straight lines and a semicircle. Use it to evaluate each integral.



(a) $\int_2^6 g(x)\,dx$

(b) $\int_0^7 g(x)\,dx$

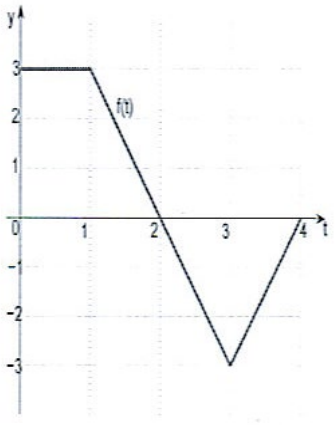
3. (1 pt. each) (Sections 5.3 and 5.4) Evaluate each showing proper intermediate steps or explain why it cannot be evaluated using methods taught in these sections. Definite integrals that can be evaluated must show the proper antiderivative before using the Fundamental Theorem of Calculus to find the final value.

(a) $\int_{-3}^{1}\left(\frac{1}{x}\right)dx$

(b) $\int(1-t)(t-4)\,dt$

(c) $\int_{1}^{4}\frac{1+\sqrt{x}}{x}\,dx$

4. (3 pts.) (Section 5.3) Let $g(x)=\int_{0}^{x} f(t)\,dt$, where f is a continuous function on $[0, 4]$ as shown below.



(a) Evaluate $g(0)$.

(b) Evaluate $g(4)$.

(c) On what interval is g increasing?

(d) Where does g have a global maximum value?

(e) Sketch the graph of $g(x)$ on the same coordinate plane.