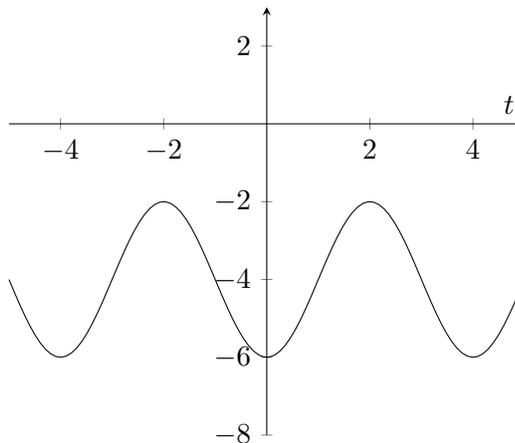

Instructions

1. Write your *Name*, *PID*, *Section*, and *Exam Version* on the front of your Blue Book.
 2. No calculators or other electronic devices are allowed during this exam.
 3. You may use one page of notes, but no books or other assistance during this exam.
 4. Read each question carefully, and answer each question completely.
 5. Write your solutions clearly in your Blue Book.
 - (a) Carefully indicate the number and letter of each question and question part.
 - (b) Present your answers in the same order as they appear in the exam.
 - (c) Start each numbered problem on a new side of a page.
 6. Show all of your work. No credit will be given for unsupported answers, even if correct.
 7. Write Name & PID on this exam sheet and return inside the front cover of your Blue Book.
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0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.
1. (6 points) The function whose graph is plotted below has the form

$$f(t) = A \cos(Bt) + C$$

with constants A , B , and C . Find A , B , and C .



2. (6 points) If your money is invested in an account earning 2% annual interest compounded continuously, the amount in the account is given by the formula $P(t) = P_0 e^{0.02t}$, where t is the number of years after you open the account and P_0 is your initial investment.
 - (a) How long will it take your money to double? Leave your answer in exact symbolic form (since you don't have a calculator).
 - (b) If your interest were compounded annually, the amount in the account would be given by the formula $P(t) = P_0 (1 + r)^t$, where r is the annual interest rate ($0 < r < 1$), with t and P_0 the same as in part (a). What annual interest rate r would you need to match the return from the continuously compounded account?

Exam continues with Problems 3 and 4 on the other side of this sheet.

(This exam is worth 25 points.)

3. (6 points) Let k be a number and let

$$f(x) = \begin{cases} e^{x+k} & \text{if } 0 < x \leq 1, \\ \frac{x^2 + 6}{x + 3} & \text{if } -1 \leq x \leq 0. \end{cases}$$

- (a) Compute $\lim_{x \rightarrow 0^+} f(x)$.
- (b) Compute $\lim_{x \rightarrow 0^-} f(x)$.
- (c) For what value of k is f continuous on $[-1, 1]$?
4. (a) (4 points) Find the number $L = \lim_{h \rightarrow 0} \frac{(3+h)^2 - 9}{h}$.
- (b) (2 points) Find a formula for the function $f(x)$ for which $f'(0) = L$.