

MATH 120A - Winter 2003
Exam 2, Version 1 - Hints and Answers

1. ANSWER: $A(4.69, 8.83)$, $B(-1.99, -9.80)$
2. HINTS: The angular speed of the front sprocket is 170π radians per minute. The linear speed of the front sprocket is 850π inches per minute. This is also the linear speed of the rear sprocket. The angular speed of the rear sprocket is 340π radians per minute. This is also the angular speed of the rear wheel.

ANSWER: 17.80 inches

3. ANSWER: $h(x) = \begin{cases} 1 - x & \text{if } x < -1 \\ 2 - x^2 - x & \text{if } -1 \leq x \leq 0 \\ 2 - x^2 + x & \text{if } 0 \leq x \leq 1 \\ 2x & \text{if } x > 1 \end{cases}$

4. (a) HINT: Set $f(x) = 5$ and solve for x .

ANSWER: $a = 2$

- (b) HINT: The domain of $f^{-1}(x)$ is the range of $f(x)$. We're only considering $f(x)$ on the interval $2 \leq x \leq 10$ and $f(x)$ is decreasing on this interval. Thus, the range of $f(x)$ goes from $f(10)$ to $f(2)$.

ANSWER: The domain of $f^{-1}(x)$ is $\frac{200}{104} \leq x \leq 5$.

5. (a) HINT: Draw a picture!!! The hard part is finding the period B . Notice in your picture that there are ten-quarters of a period between the minimum at 10 minutes and the maximum at 90 minutes. So, $\frac{10}{4}B = 80$.

ANSWER: $A = 25$, $B = 32$, $C = 18$, $D = 400$

- (b) HINTS: Set $T(t) = 390$ and solve for t . This gives the principal solution $t = 15.90$. The symmetry solution is $t = 4.10$. Further solutions will be $t = 36.10$, $t = 47.90$, $t = 68.10$, and $t = 79.90$.

ANSWER: 54.6 minutes