MATH 120D
Exam 2
Version 1
November 21, 2002

Name ─────────────────────────────

Section ─────────────────

1	8	
2	6	
3	10	
4	8	
5	12	
6	6	
Total	50	

- You are allowed to use a calculator and one sheet of notes.

- Complete all questions.

- Show all your work and clearly indicate your final answer.

- When rounding is necessary, round your **final answer** to two digits after the decimal.

- Give answers with appropriate units.

- Raise your hand if you have a question.

- You have 50 minutes to complete the exam.

GOOD LUCK!

1. (8 points) Two pulleys are connected by a belt as shown. One pulley has radius 50 cm and the other has radius 30 cm. The larger pulley rotates at 12 RPM. Find the angular speed of the smaller pulley in RPM.
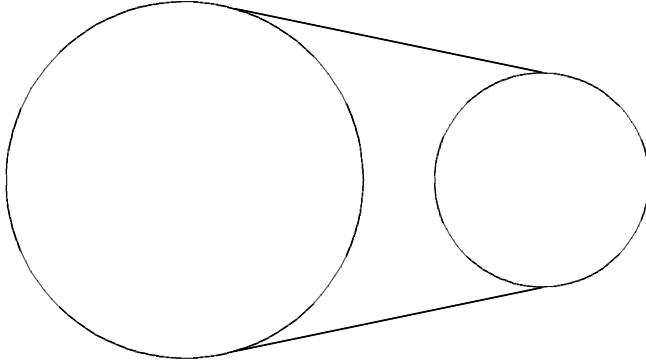
ANSWER: _____ RPM

2. (6 points) Let $f(x) = \dfrac{3x - 1}{x + 4}$. Compute $f^{-1}(5)$.
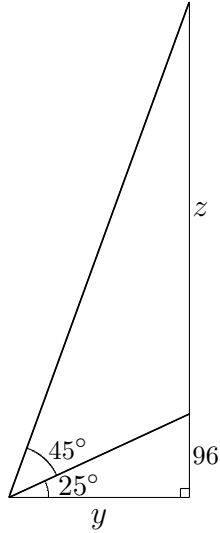
ANSWER: $f^{-1}(5) =$_____

3. (10 points) Let
$$f(x) = \frac{2(x-1)(x+3)}{5(x+2)(x-6)}.$$

Find each of the following:

- the domain of $f(x)$

- the zeros of $f(x)$

- the y-intercept of $f(x)$

- the vertical asymptote(s) of $f(x)$
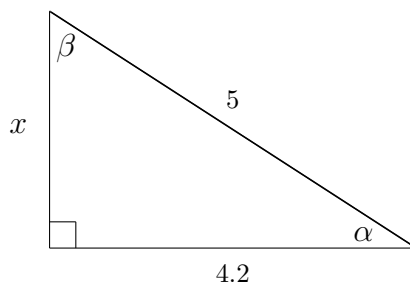
- the horizontal asymptote of $f(x)$

4. (8 points)

   (a) Find y and z.

ANSWER: $y =$_____ $z =$_____

   (b) Find x, α, and β. Give α and β in radians.

ANSWER: $x =$_____ $\alpha =$_____ $\beta =$_____

5. (12 points) Lisa is sick with Sinusoidal Fever. Her temperature is a sinusoidal function of time. Let t be the time in hours since noon on Monday. At 3 p.m. $(t = 3)$, Lisa's temperature is reaching its maximum of 104.6 degrees for the first time. At 3 p.m. on Tuesday (24 hours later), her temperature is reaching its minimum of 98.6 degrees for the second time.

(a) (3 points) The following is a graph (without units) of $T(t)$, Lisa's temperature t hours since noon on Monday. Give the coordinates of the points a, b, and c.
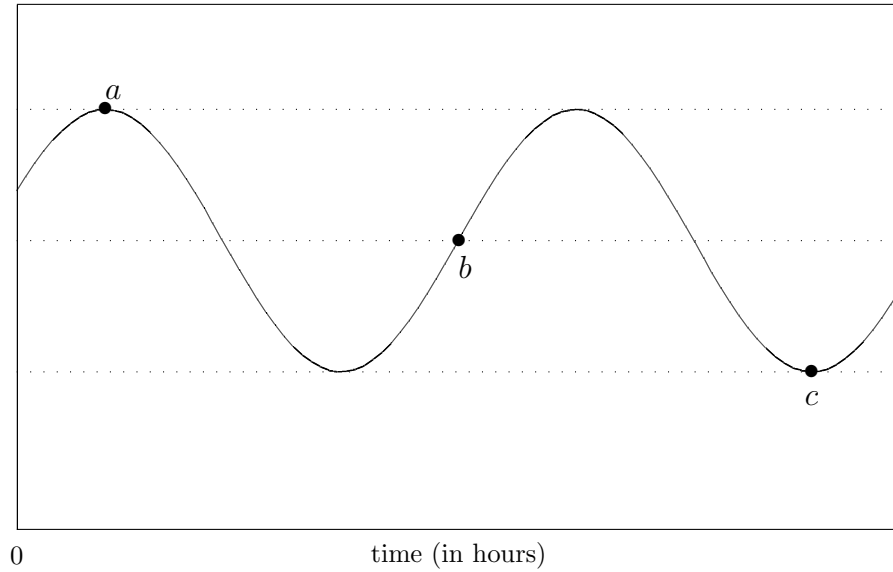
ANSWER: a _____ b _____ c _____

(b) (4 points) In standard form, $T(t) = A \sin\left[\dfrac{2\pi}{B}(t - C)\right] + D$. Give the values of A, B, C, and D.

ANSWER: $A =$_____ $B =$_____

$C =$_____ $D =$_____

(c) (5 points) From noon on Monday to noon on Tuesday (t=24), how many hours is Lisa's temperature more than 100 degrees?

ANSWER: _____ hours

6. (6 points) Let $f(x) = |x|$ and

$$g(x) = \begin{cases} x & \text{if } x < -2 \\ -2 & \text{if } x \geq -2. \end{cases}$$

Give the multi-part rule for $f(x) + g(x)$.