Math 120 - Autumn 2007
Final Exam
December 8, 2007
Answers

1. (a) \( C = 16 + \frac{3}{4}(t - 1) \)
   
   \( I = 68 + \frac{7}{6}t \)
   
   (c) 20.54 years after 2001.

2. (a) \( y = 15 \cdot 0.97516913973641^t \)
   
   (b) About 10.55 grams.
   
   (c) 80.13 years after 1982, or the year 2062.

3. Isobel will have 202 pairs of shoes after 11 years of marriage.

4. (a) \( x = 10 - 2t, y = 20 - 4t \); (b) \( x = 30 - 15t, y = 0 \); (c) 1.8378 seconds after they start moving.

5.

\[
D(t) = \begin{cases} 
2t & \text{if } 0 \leq t \leq 3 \\
\sqrt{6^2 + (3(t-3))^2} & \text{if } 3 \leq t \leq 4 \\
\sqrt{(6 + 5(t-4))^2 + 3^2} & \text{if } 4 \leq t \leq 6 
\end{cases}
\]

6. (a) \((31/5, 31)\) (b) 48.05 feet

7. 29/3 seconds

8. (a) \((99.178, 12.796)\) (b) 4.472135955 seconds

9. (a) The graph is an upward opening parabola-like curve, symmetric about the y-axis, lying below the x-axis, passing through \((-1/2, 0), (0, -1), \text{and} (1/2, 0)\).
   
   (b) The domain is \(-1/2 \leq x \leq 1/2\).
   
   (c) The range is \(-1 \leq y \leq 0\).