LEHMAN COLLEGE
DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MAT 172: Sample Final Exam

General Instructions: Answer each question in the blue book provided. Partial credit will be given, so show all of your work and label each of your graphs with at least 3 coordinates. Calculators are NOT Permitted.

Scoring. Problems 1-13 are worth 4 credits each. Problems 14-15 are worth 6 credits each. Problems 16-17 are worth 8 credits each.

1. Let $f(x) = x - 7$ and let $g(x) = x^2 - 49$. Specify the domain of $f(x)/g(x)$.
2. Draw the graph of $y = 2\cos(2x)$ from $x = 0$ to $x = 2\pi$.
3. Draw the graph of $y = 2 - |x - 5|$.
4. Write an equation of the line parallel to the line $y = 2 - \frac{3}{2}x$ at $(4, -2)$ and sketch its graph.
5. Draw the graph of $y = 2x^2 - 16x + 24$ and label its minimum.
6. Draw the graph of $y = \sqrt{x - 7}$.
7. In triangle ABC, side $a = 5$ in., side $b = 10$ in. and $\angle C = 60°$. Find the length of side c. (Leave your answer in radical form.)
8. Write an equation of the line given the graph in Figure A on the back of this page.
9. Write an equation of the parabola given its graph in Figure B on the back of this page.
10. Let $g(x) = 18e^{.07x}$. Write the inverse of g and specify its domain.
11. Let $f(x) = 15x - 1$. Compute and simplify the difference quotient given by $\frac{f(x+h)-f(x)}{h}$.
12. If $\sin(x) = -3/5$ and x is an angle in Quadrant III, find the value of $\tan(x)$.
13. State the formula for $\sin(a + b)$ and use it to show $\sin(a + 3\pi/2) = -\cos(a)$.
14. Draw the graph of $f(x) = \dfrac{2}{9 - x^2}$. Indicate asymptotes.
15. Draw the graph of $F(x) = \begin{cases} 8 - 4x, & \text{for } x \leq 5 \\ 4x - 8, & \text{for } x > 5 \end{cases}$.
16. When a vendor prices key chains at \$5 each, she sells 210 key chains. For each \$1 she raises the price, she sells 10 fewer key chains. USE AN EQUATION to determine what she should charge to maximize her revenue from sales.
17. The population North Oblivion is now 1400 people and is known to double every 12 years.
    (a) Write a function that gives the population, $P(t)$, after t years.
    (b) How many years will it take for the population to reach 4200? (A formula will suffice.)

Figure A.

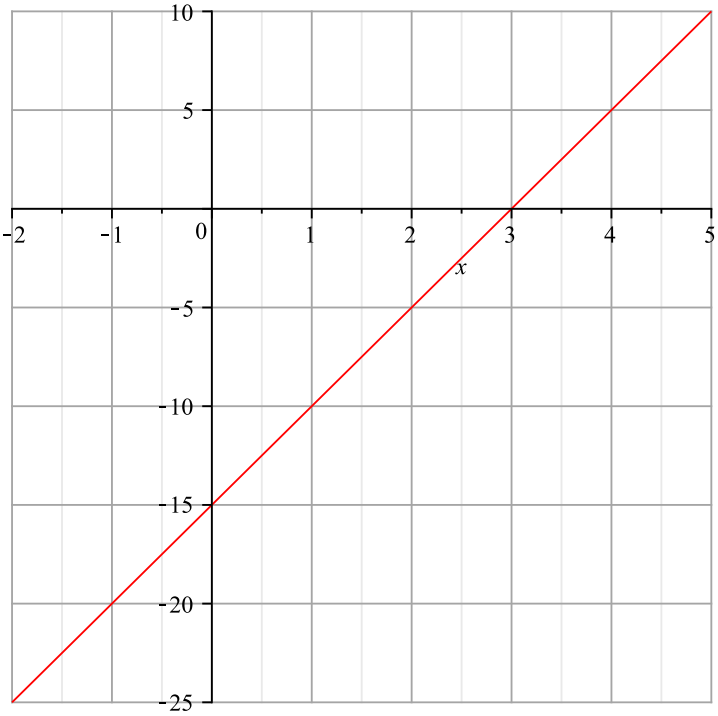

Figure B.