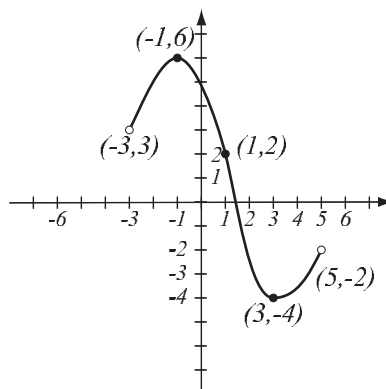**1.** (8pts) Use the graph of the function f at right to answer the following questions.

a) Find: $f(-1) =$ $f(5) =$

b) What is the domain of f?

c) What is the range of f?

d) What are the solutions
of the equation $f(x) = -3$?

2. (12pts) Use your calculator to accurately sketch the graph of $f(x) = -x^2 + 2x + 4$.

a) Draw the graph on paper and indicate units on the axes.

b) Find all the $x-$ and $y-$intercepts (accuracy: 6 decimal points).

c) State the range of the function in interval notation.

3. (6pts) Find the equation of the line (in form $y = mx + b$) that passes through the points $(-2, 1)$ and $(1, -2)$. Draw the requested line.

4. (9pts) Find the equation of the line (in form $y = mx + b$) that is parallel to the line $3x + 2y = 8$ and contains the point $(1, -6)$. Draw both lines.

5. (7pts) In a coordinate system, draw the triangle with vertices $A = (-1, 1)$, $B = (3, 0)$, and $C = (0, 5)$.
a) Compute the slopes of the sides.
b) Use slopes to determine if this is a right triangle.

6. (10pts) Let $f(x) = \dfrac{1}{x^2 - 7x + 10}$. Find the following (simplify where appropriate).

$f(1) =$

$f(2) =$

$f(a^3) =$

$f(t - 2) =$

7. (5pts) Find the domain of the function below and write it using interval notation.

$f(x) = \dfrac{4}{5 - 3x} - \dfrac{7}{3x + 4}$

8. (7pts) Solve and write the solution in interval notation.

$3 - x \geq 4$ or $5 - 2x < 1$

9. (10pts) The endpoints of a diameter of a circle are $(1, -3)$ and $(5, 1)$.
a) Find the equation of the circle.
b) Draw the circle in the coordinate plane.

10. (12pts) A water company offers two plans to pay for water:
A) $25 flat fee plus $3 per cubic meter of water.
B) $35 flat fee that includes 2 cubic meters, and then $2.50 per cubic meter for usage beyond 2 cubic meters.
Assuming a customer always uses at least 2 cubic meters of water per month, for which amount of water usage is plan A better? Solve as an inequality.

11. (14pts) Mike drives from Paducah to Owensboro in 2 hours. On the same road, Steve drives from Owensboro to Paducah 7mph slower than Mike, so it takes him 2 and a quarter hours.

a) How fast does Mike drive?

b) What is the distance from Paducah to Owensboro along this road?

Bonus (10pts) Maria has a total of $3500 invested in two accounts, one bearing 3% and the other 4% interest. The account bearing 4% gives $12 more in interest in one year than the account bearing 3%. How much is invested in each account?