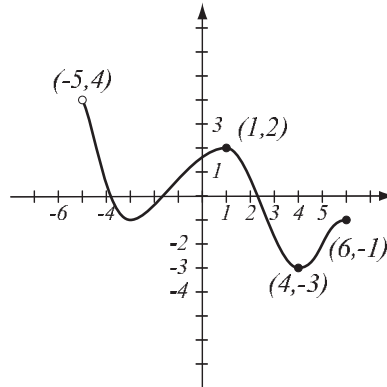


1. (8pts) Use the graph of the function  $f$  at right to answer the following questions.

- Find:  $f(4) =$        $f(1) =$
- What is the domain of  $f$ ?
- What is the range of  $f$ ?
- What are the solutions of the equation  $f(x) = -2$ ?



2. (10pts) Use your calculator to accurately sketch the graph of  $y = x^3 - 8x^2 + 5x - 3$ .

- Draw the graph on paper and indicate units on the axes.
- Find all the  $x$ - and  $y$ -intercepts (accuracy: 6 decimal points).

3. (5pts) Draw the line that passes through points  $(-1, 1)$  and  $(-1, 6)$ . Then write the equation of the line.

4. (10pts) Find the equation of the line (in form  $y = mx + b$ ) that is parallel to the line  $2x - 4y = 5$  and passes through the point  $(4, 1)$ . Draw both lines.

5. (8pts) Draw the quadrangle with vertices  $A = (4, 0)$ ,  $B = (2, 4)$ ,  $C = (-4, 0)$  and  $D = (-2, -3)$ . Use slopes to determine if any two of its sides are perpendicular.

6. (9pts) Let  $f(x) = x^2 - \sqrt{2x - 7}$ . Find the following (simplify where appropriate).

$$f(1) =$$

$$f(8) =$$

$$f(4u) =$$

$$f(x + 3) =$$

7. (9pts) Find the domains of the functions below and write them using interval notation.

$$f(x) = \frac{1}{x^2 - 5x - 36}$$

$$g(x) = \sqrt{2x + 7}$$

8. (5pts) Solve and write the solution in interval notation.

$$4 \leq 7 - 2x < 11$$

9. (10pts) The diameter of a circle has endpoints  $(-2, -3)$  and  $(4, 1)$ .

a) Find the equation of the circle.

b) Draw the circle in the coordinate plane.

10. (12pts) An electric company offers two plans to pay for electricity usage:

A) \$60 flat fee that includes 200 kWh, then 12 cents per kWh for usage beyond 200 kWh.

B) \$10 flat fee plus 16 cents per kWh.

Assuming a customer always uses at least 200 kWh of electricity, for which amounts of electricity is plan A better?

**11.** (14pts) Because she was afraid to be late, Fiona rushed to a concert and got there in 2 hours. On the way back, she drove 9mph slower, so it took her a quarter of an hour longer.

a) How fast did Fiona drive to and from the concert?

b) How far did she drive to the concert?

**Bonus** (10pts) The length of a rectangular field is 40 feet more than the width. A farmer used 470 feet of fencing to enclose the field and divide it into two parts, as in the picture. What are the dimensions of the field?

