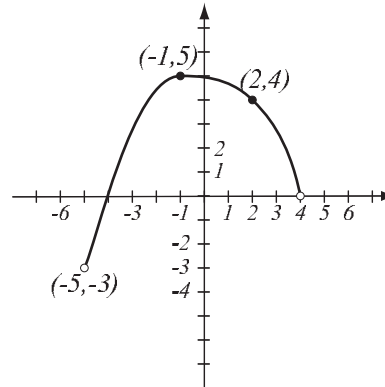


1. (8pts) Use the graph of the function f at right to answer the following questions.

- Find: $f(-1) =$ $f(6) =$
- What is the domain of f ?
- What is the range of f ?
- What are the solutions of the equation $f(x) = 4$?



2. (10pts) Use your calculator to accurately sketch the graph of $y = x^3 - 4x^2 + x + 15$.

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

3. (5pts) A line contains the point $(1, -2)$. If you start at any point on the line, go right 3 units and then down 2 units, you wind up back on the line. Write the equation of the line.

4. (10pts) Find the equation of the line (in form $y = mx + b$) that is perpendicular to the line $3x - y = 2$ and passes through $(6, -3)$. Draw both lines.

5. (7pts) Draw the points $A = (3, 4)$, $B = (-1, 5)$ and $C = (-2, 0)$ in the coordinate plane. Use the distance formula to determine which of A and B is closer to C .

6. (9pts) Let $f(x) = x^2 - \sqrt{3x - 11} + 3$. Find the following (simplify where appropriate).

$$f(9) =$$

$$f(2) =$$

$$f(u^2) =$$

$$f(t + 4) =$$

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

$$f(x) = \sqrt{4x - 3}$$

$$f(x) = \frac{27x + 3}{x^2 - 2x - 15}$$

8. (6pts) Solve and write the solution in interval notation.

$$5 - 2x < 1 \text{ or } 9 - 4x > 6$$

9. (10pts) A circle centered at $(-3, 1)$ contains the point $(2, -1)$.

a) Find the equation of the circle.

b) Draw the circle in the coordinate plane.

10. (12pts) Cassandra is choosing a cell-phone provider on the basis of data plans, since service already includes unlimited talk and texting. Penny Phone charges \$7.50 per month plus \$6 per gigabyte of data. Data Boss charges \$29 per month, which includes 3 gigabytes of data, plus \$4.50 per gigabyte for data above 3 gigabytes. If Cassandra always uses more than 3 gigabytes a month, for which amounts of data is Penny Phone cheaper? Solve as an inequality.

11. (14pts) A steer and rodeo Steve's horse are running in the same direction. At start, the steer is 35 feet away and running at speed 9 feet per second. Steve is following on horse at 14 feet per second.

- a) How long until Steve catches up with the steer?
- b) How far do Steve and horse go until that moment?

Bonus (10pts) How many milliliters of a 40% solution of isopropyl alcohol must be mixed with 120 milliliters of an 80% solution of isopropyl alcohol in order to get a 65% solution of isopropyl alcohol?