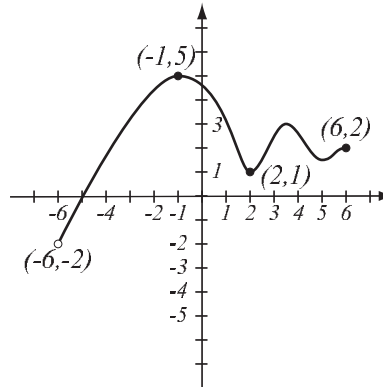


1. (8pts) Use the graph of the function f at right to answer the following questions.

- Find $f(-1)$ and $f(-6)$.
- 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 $y = x^3 - 6x^2 + 6x - 3$. Draw the graph here, and indicate units on the axes. Find all the x - and y -intercepts (accuracy: 6 decimal points).

3. (4pts) Convert to scientific notation or a decimal number:

$$4.171824 \times 10^6 =$$

$$0.0007459 =$$

Use formulas to expand:

4. (3pts) $(x - y^4)(x + y^4) =$

5. (4pts) $(3s + 5t)^2 =$

6. (5pts) Factor: $u^3 + 27 =$

Simplify, showing intermediate steps. Assume variables can be any real numbers.

7. (2pts) $\sqrt{48} =$

8. (5pts) $\sqrt{125x^6y^3} =$

9. (8pts) Simplify.

$$\frac{x-1}{x^2-9} - \frac{4x}{x^2-4x-21} =$$

10. (8pts) Simplify. Express answers first in terms of positive exponents, then convert to radical notation.

$$\frac{\left(x^9y^{-\frac{3}{2}}\right)^{\frac{1}{3}}}{\left(x^{\frac{1}{2}}y^{\frac{3}{2}}\right)^5} =$$

11. (6pts) Rationalize the denominator.

$$\frac{2\sqrt{3}-5}{4+\sqrt{3}}$$

12. (5pts) Solve the equation for t .

$$ct - 5a = t + 1$$

13. (8pts) Find the domains of the functions below and write them using interval notation.

$$f(x) = \frac{x - 13}{x^2 + 6x - 40}$$

$$g(x) = \sqrt[3]{3x - 11}$$

14. (9pts) Let $g(x) = 2x^2 + 3x - 7$. Find the following (simplify where appropriate).

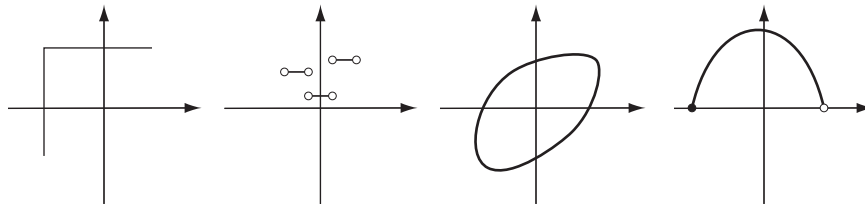
$$g(-2) =$$

$$g(-u) =$$

$$g(\sqrt{x + 5}) =$$

$$g(x + 5) =$$

15. (5pts) Which of the following graphs are graphs of functions? Why?



16. (10pts) The diameter of a circle has endpoints $(-3, -2)$ and $(1, 4)$.

a) Find the equation of the circle.

b) Draw the circle in the coordinate plane.

Bonus (10pts) Find the coordinates (x, y) of at least 4 points in the plane that lie on the curve with the equation $(x - 2)^2 + (y + 4)^2 = 10$. (*Hint: set one variable, and solve for the other; or draw the curve and infer some points from the picture.*)