

Show all work and justify all answers or credit might not be awarded.

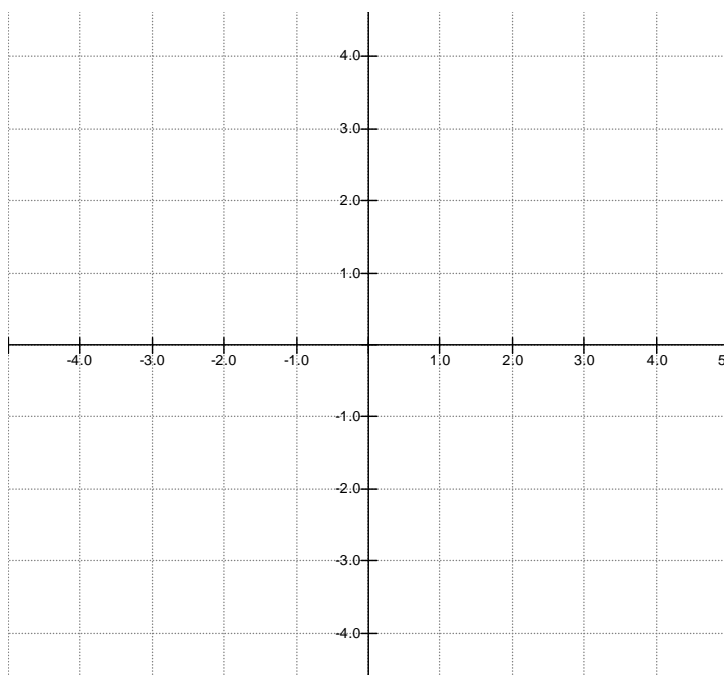
1. **(5 points)** Find the domain of $f(x) = \frac{\sqrt{4x+2}}{x(4x-4)}$.

Answer: _____

2. **(5 points)** Determine algebraically whether $f(x) = 4x^3 - 3x^4$ is even, odd, or neither.

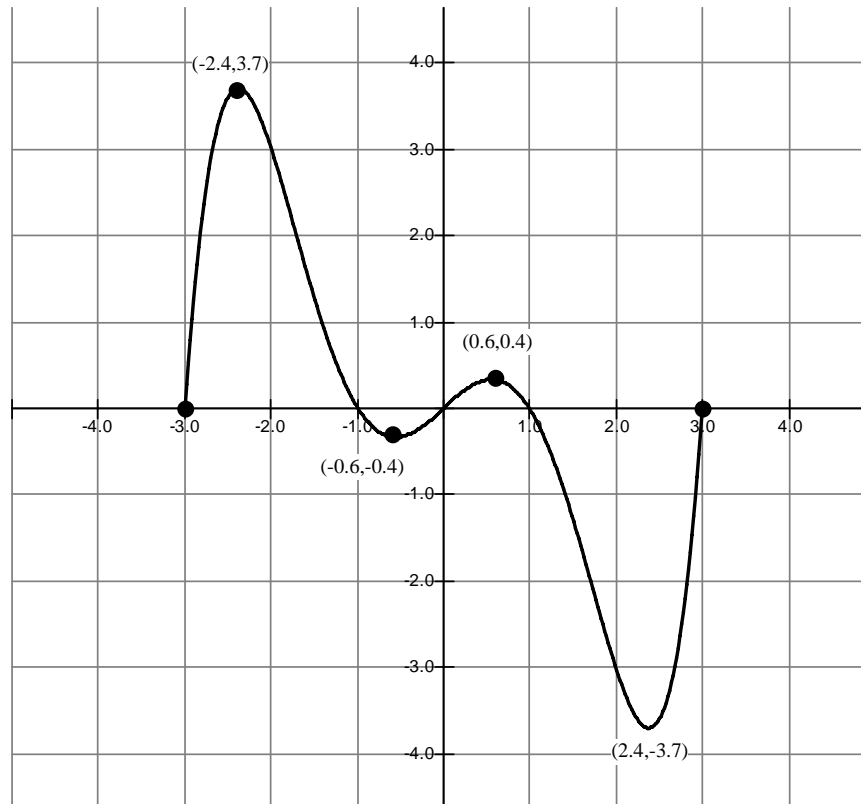
Answer: _____

3. **(5 points)** Graph the function $f(x) = \begin{cases} x + 1 & \text{if } -2 \leq x < 1 \\ -x + 3 & \text{if } 1 \leq x \leq 2 \\ 2x - 3 & \text{if } 2 < x \leq 3 \end{cases}$



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4. (10 points) Use the graph below to answer the questions a) – j).



- a) What is the domain of this function? _____
- b) What is the range of this function? _____
- c) What are the x-intercepts? _____
- d) What are the y-intercepts? _____
- e) List the interval(s) on which f is increasing. _____
- f) List the interval(s) on which f is decreasing. _____
- g) Find the numbers where this function has a local maximum. _____
- h) What are these local maxima? _____
- i) Find the numbers where this function has a local minimum. _____
- j) What are these local minima? _____

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5. **(5 points)** Write the function whose graph is that of $y = x^2 - 3x$ but is:

- a. shifted down 5 units, and
- b. shifted left 4 units, and
- c. reflected about the x-axis.

Answer: _____

6. **(5 points)** A closed box having a square base is required to have a surface area of 40 square centimeters. Express the volume of the box as a function of the length of the edge of the bottom of the box.

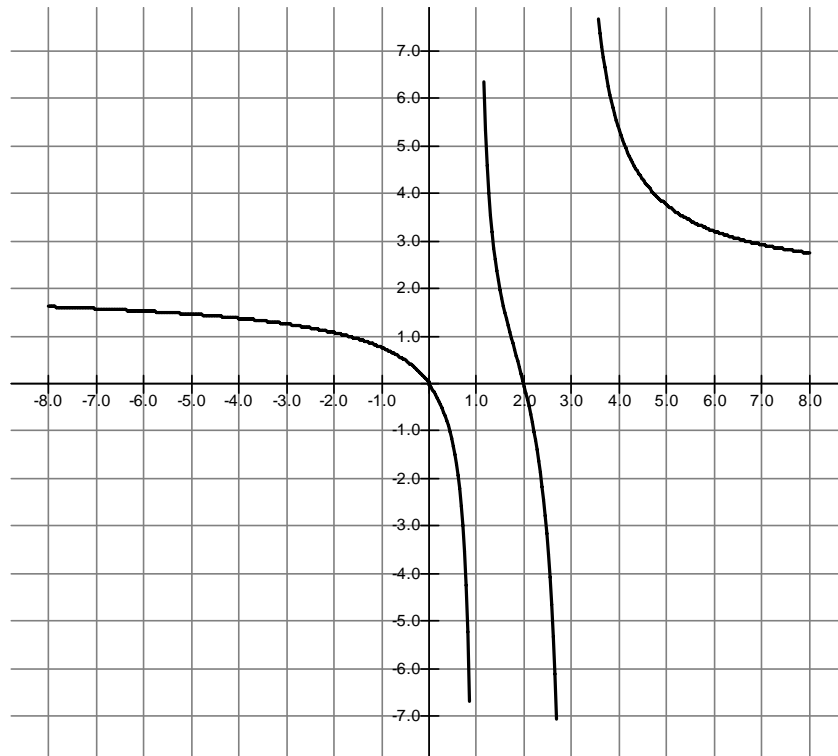
Answer: _____

7. **(5 points)** Form a polynomial whose zeros are -3 , 1 , and 0 , and whose degree is 3. Write your answer in polynomial form.

Answer: _____

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8. (5 points) Consider the following graph.



Write a rational function $R(x) = \frac{p(x)}{q(x)}$ whose graph would be the graph given above.

Answer: _____

9. (5 points) Solve the inequality $(x+6)(x-2) < 0$

Answer: _____

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10. **(5 points)** For the functions $f(x) = \frac{4x-1}{x+1}$ and $g(x) = 2x^2$ find the function $f(g(x))$.

Answer: $f(g(x)) =$ _____

11. **(5 points)** For the function $f(x) = x^2 + 4x$ find $\frac{f(x+h)-f(x)}{h}$ and simplify.

Answer: _____

12. **(5 points)** List the potential rational zeros of the polynomial function $f(x) = 6x^4 - 5x^2 - 3x - 4$.

Answer: _____

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13. (5 points) Consider the following function $f(x) = \sqrt{5x-2}$.

a. Find f^{-1}

Answer: _____

b. What is the domain of f ? _____

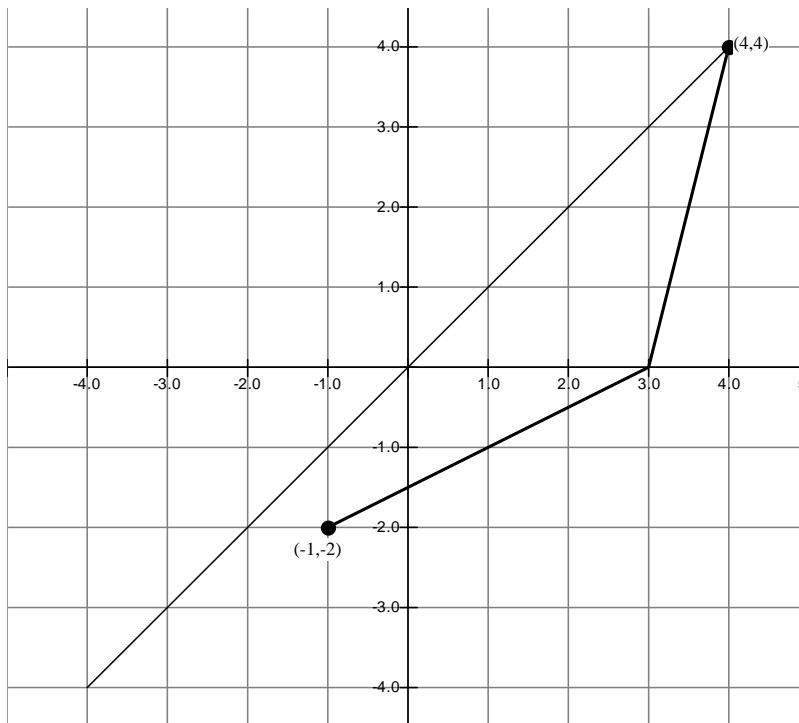
c. What is the range of f ? _____

d. What is the domain of f^{-1} ? _____

e. What is the range of f^{-1} ? _____

14. (5 points) The graph of a one-to-one function is given.

a. Draw the graph of the inverse function f^{-1} . (For convenience, the graph of $y=x$ is also given.)



b. What is the domain of f^{-1} ? _____

c. What is the range of f^{-1} ? _____

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15. **(5 points)** Solve the equation $(27)^{1-x} = \frac{1}{3}$ for x.

Answer: _____

16. **(5 points)** Solve the equation $\log_{3a} 2 = 4$ for a.

Answer: _____

17. **(5 points)** Determine the domain, range and vertical asymptote of $f(x) = 2006\ln(2x-3) + 2005$.

Domain: _____

Range: _____

Asymptote: _____

18. **(5 points)** Solve the inequality $\frac{x-1}{x^2(x+5)} > 0$.

Answer: _____

19. **(5 points)** Solve the equation $x^2 + 8x = a$ by completing the square.

Answer: _____