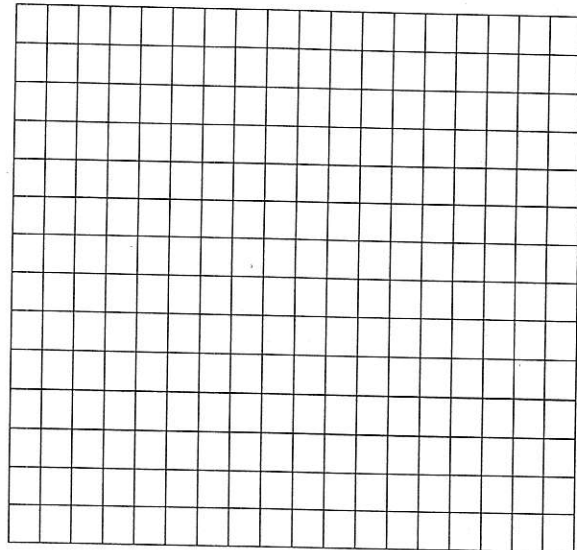


Show all necessary steps clearly, neatly, and systematically to receive full credit.

1. Consider the equation of circle: $x^2 + y^2 + -4x + 8y - 5 = 0$.

a. Find the center and radius of the circle.

b. Graph the circle.



c. Find the equation of tangent line to the circle at the point $(7, -4)$.

2. Show that the points $A = (3, 4)$, $B = (1, 1)$, $C = (-2, 3)$ are the vertices of a right isosceles triangle.

3. Find the difference quotient of $f: f(x) = 3x^2 - 2x$.

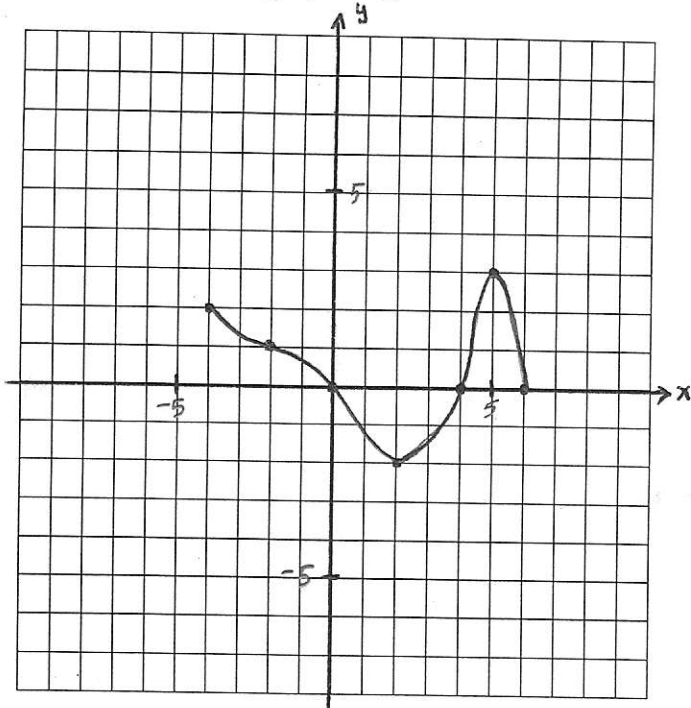
4. Let $f(x) = \frac{x}{x-1}$ and $g(x) = \sqrt{x+1}$.

a. Find $(f+g)(x)$ and domain.

b. Find $(f \cdot g)(x)$ and domain.

c. Find $\left(\frac{f}{g}\right)(x)$ and domain.

5. Consider the graph of g .



a. Find x such that $f(x) = 2$.

b. Find the domain of g .

c. Find the range of g .

d. Find the intercepts of g .
 x-intercept(s) y-intercept(s)

e. Find the increasing interval of g .

f. Find the decreasing interval of g .

g. Find the zeros of g .

h. Find the local maximum and local minimum.

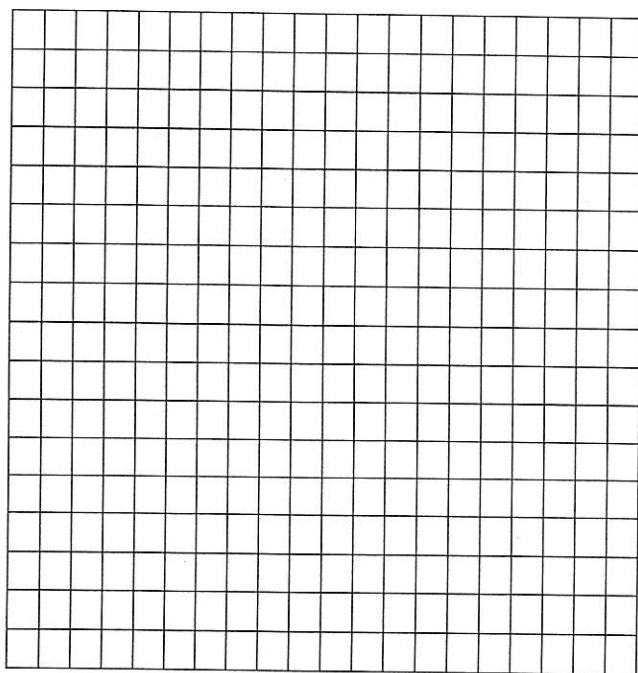
i. Find the absolute maximum and absolute minimum.

6. Let $f(x) = \frac{x}{x^2 - 1}$.

a. Determine whether the function is even, odd, or neither.

b. Find the average rate of change of f from 3 to 5.

7. Sketch by transformation: $f(x) = -\sqrt[3]{x-2} + 4$. Label at least 3 points.

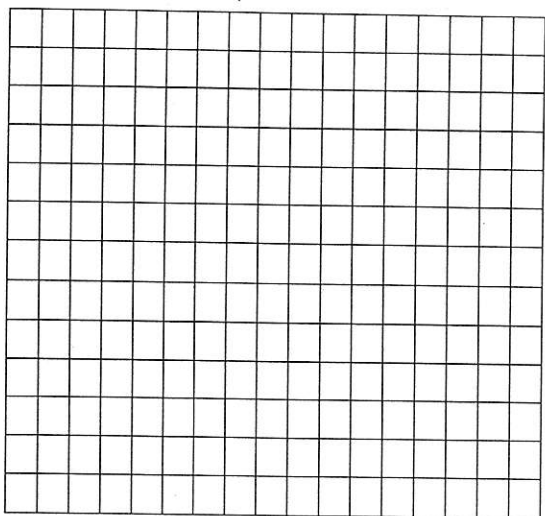


8. Consider the function: $f(x) = \begin{cases} x^3 & \text{if } -2 \leq x < 1 \\ |3x-2| & \text{if } 1 \leq x \leq 4 \end{cases}$.

a. Find $f(-1)$, $f(1)$, $f(-3)$.

c. Find domain of f .

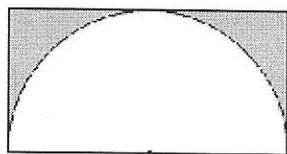
b. Sketch f .



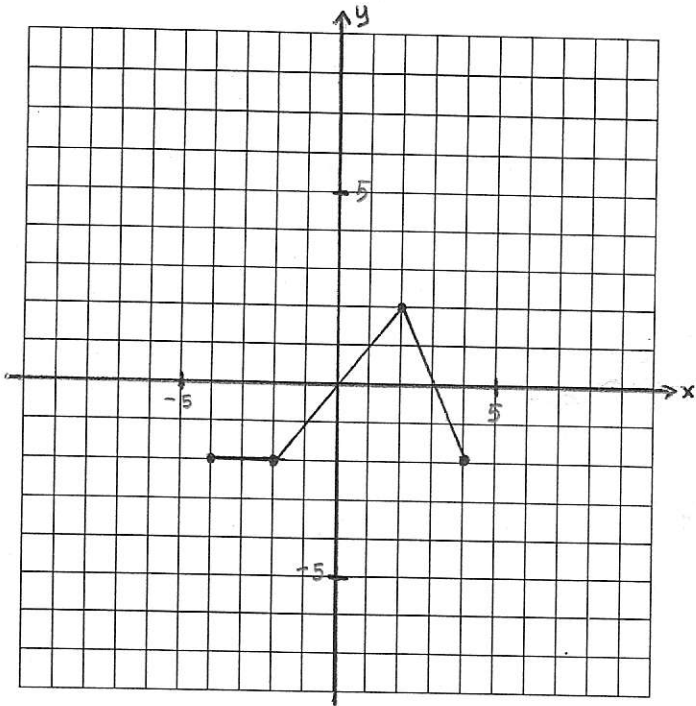
d. Find the range of f .

e. Is f continuous?

9. The following figure is a semicircular inscribed in the rectangle. Express the area of the shaded region as a function of the circumference, C of the semicircle.



10. Consider the graph of f .



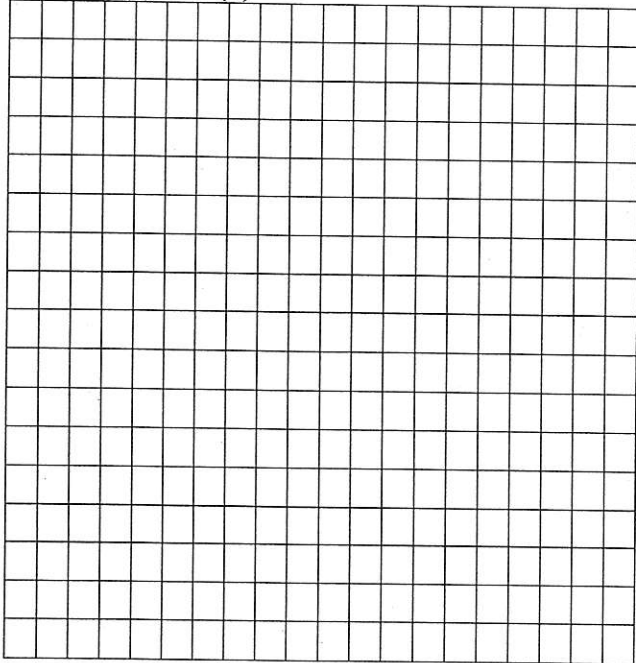
a. Sketch $f(x-5)+4$.

b. Sketch $f(2x)$.

c. Sketch $-f(x)$.

d. Sketch $\frac{1}{4}f(x)$.

Sketch (a) and (b)



Sketch (c) and (d)

