

Math 180
Examples

Express the area of an equilateral triangle as a function of the length of a side.

Sketch the graph of

$$y = \sin x$$

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$$y = \sin |x|$$

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$f(x) = \sqrt{x-1}$
 $g(x) = x^2$ Find $f \circ g, g \circ f, f \circ f, g \circ g$ and their domains.

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Examples

<u>x</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>f(x)</u>	<u>3</u>	<u>1</u>	<u>4</u>	<u>2</u>	<u>2</u>	<u>5</u>
<u>g(x)</u>	<u>6</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>3</u>

$f(g(1))$

$g(f(1))$

$f(f(1))$

$g(g(1))$

$(g \circ f)(3)$

Suppose g is an odd function and f is an odd function. Is the composite function $f \circ g$ even, odd or neither. Use a proof.

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Let $g(x) = |x^2 - 1| - |x^2 - 4|$. Sketch the graph.

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You are in a boat 2 miles from the nearest point on the coast. You are to go to a point Q 3 miles down the coast and 1 mile inland. You can row at 2 miles per hour and walk at 4 miles per hour. Express the total time T of the trip as a function of x .

Find an equation of the line that passes through the point $(2, 1)$ and is perpendicular to the line $4x - 2y = 3$. Graph both lines.

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Let $f(x) = \sqrt{x+3}$. Evaluate and simplify $\frac{f(x+h) - f(x)}{h}, h \neq 0$

Let $f(x) = \frac{1}{x^2 - 3}$. Evaluate and simplify $\frac{f(x+h) - f(x)}{h}, h \neq 0$

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Sketch the graph of $f(x) = \sqrt{9 - x^2}$. State the domain and the range in interval notation.

A right triangle is formed in the first quadrant by the x- and y- axis and the line through the point (3, 2). Write the length of the hypotenuse as a function of x. Write the area as a function of x.

Solve: $\sin(2x) = -\cos(2x)$ on the interval $[0, 2\pi)$

Simplify:
$$\frac{3x^2(x^2 - 1)^{1/3} - \frac{2}{3}x(x^3 - 1)(x^2 - 1)^{-2/3}}{(x^2 - 1)^{2/3}}$$

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Examples

A piece of wire is 8 inches long. The wire is cut into 2 pieces and then one piece is bent into a square and the other piece is bent into a circle. Find a function that will model the total area of the square and the circle. What is the domain of the function?

State whether the following function is even, odd, or neither.

$f(x) = \frac{x}{x^2 - 1}$. State the domain and range. Sketch the graph, labeling the intercepts and the asymptotes.