

1) Find the domain of each of the following functions:

a) $f(x) = 3x^2 + 5$

\mathbb{R}

b) $f(x) = \sqrt{x+2}$

$x+2 \geq 0$

$x \geq -2$ or
 domain: $[2, \infty)$

c) $f(x) = \frac{2x-5}{x-3}$

$x-3 \neq 0$
 $x \neq 3$
 or $\{3\}$
 domain: $\mathbb{R} \setminus \{3\}$
 or $(-\infty, 3) \cup (3, \infty)$

2) Solve the equation:

$|x-3| = 5$

$x-3 = 5$ or $x-3 = -5$

$x = 8$ or $x = -2$

3) Solve the inequality, using the "Test point" method we learned in class and showing all work to justify your answer: leave numbers in the form of integers or fractions, not decimals. Give your answer as a graph, then in interval and inequality form.

$|4x-1| \leq 7$

$|4x-1| = 7$

$4x-1 = 7$ or $4x-1 = -7$

$4x = 8$ or $4x = -6$

$x = 2$ or $x = -\frac{6}{4} = -\frac{3}{2}$



Test:

$x = -2$?	$x = 0$	$x = 3$
$ 4(-2)-1 \leq 7$	$ 4(0)-1 \leq 7$	$ 4(3)-1 \leq 7$
$ -9 \leq 7$	$ -1 \leq 7$	$ 11 \leq 7$
no	yes	no

Solution:



$[-\frac{3}{2}, 2]$

$-\frac{3}{2} \leq x \leq 2$

4) For the function $f(x) = \sqrt{x-8}$, find the value of each of the following. Simplify your answers as much as possible but do not use decimals.

* a) $f(1) = \sqrt{1-8}$ is not real
 $f(1)$ is undefined

b) $f(0) = \sqrt{0-8}$ is undefined

c) $f(8) = \sqrt{8-8} = 0$

d) $f(a+h) = \sqrt{a+h-8}$

e) $f(a) = \sqrt{a-8}$

f) $f(a+h) - f(a) =$

$$\sqrt{a+h-8} - \sqrt{a-8}$$

g) $\frac{f(a+h)-f(a)}{h} =$

$$= \frac{\sqrt{a+h-8} - \sqrt{a-8}}{h}$$

$$= \frac{(\sqrt{a+h-8} - \sqrt{a-8})(\sqrt{a+h-8} + \sqrt{a-8})}{h(\sqrt{a+h-8} + \sqrt{a-8})}$$

$$= \frac{(a+h-8) - (a-8)}{h(\sqrt{a+h-8} + \sqrt{a-8})}$$

$$= \frac{h}{h(\sqrt{a+h-8} + \sqrt{a-8})}$$

$$= \frac{1}{\sqrt{a+h-8} + \sqrt{a-8}}$$

5) Give the formula for the function $g(x)$ whose graph is the same as the graph of $f(x) = \sqrt{x}$ but shifted to the right by 3 units and down by 5 units.

$$g(x) = \sqrt{x-3} - 5$$