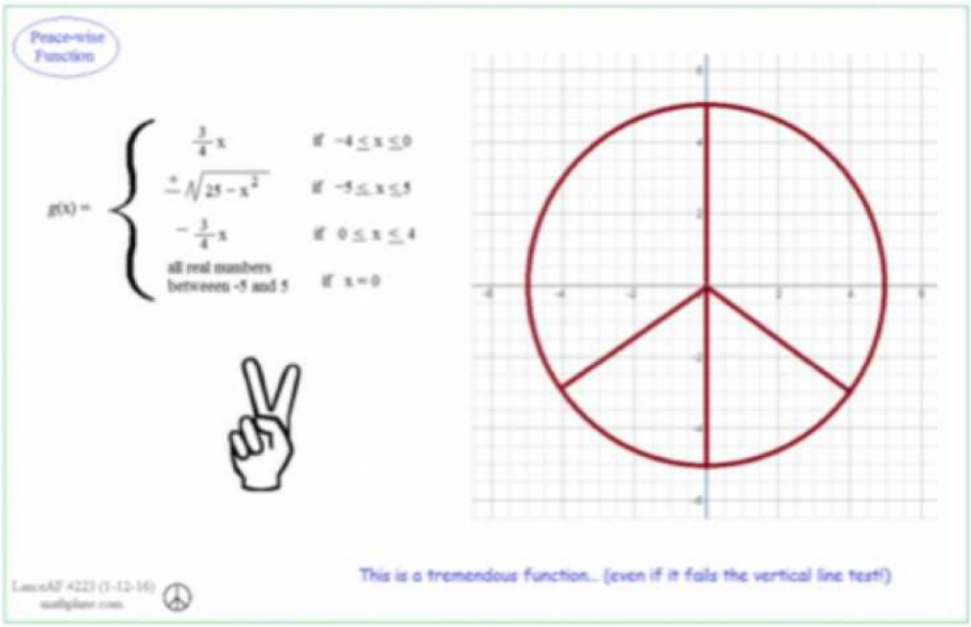
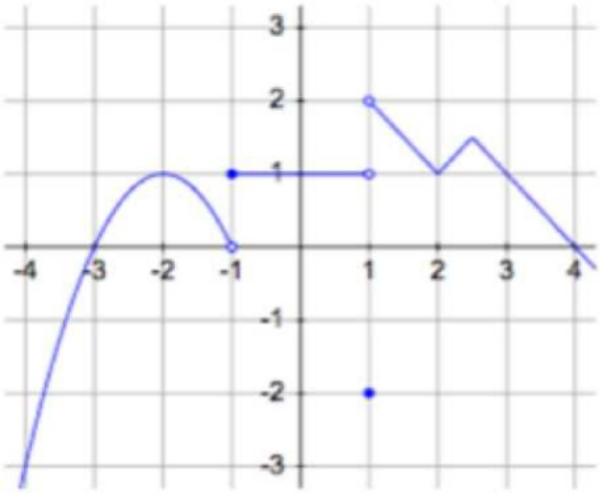
Piecewise Functions



*See printout.

Piecewise Functions

A piecewise function is a function defined by multiple sub-functions.



ex. Evaluate.

$$f(x) = \begin{cases} -2, & x < 4 \\ \frac{3}{5}x - 5, & 4 \le x < 6 \\ x, & x \ge 6 \end{cases}$$

a) f(0) $= -2$

c) f(6) $= 6$

b) f(5) $= \frac{3}{\cancel{5}}(\cancel{5}) - 5 = -2$

d) f(-1) $= -2$

ex. Evaluate.

$$f(x) = \begin{cases} x+2, & x \le 1 \\ -3x+1, & x > 1 \end{cases}$$

a) f(-6) $= -6 + 2$

$= -4$

b) f(1) $= 3$

c) f(2)

$-3(2)+1$

$-6+1 = -5$

d) f(4) $-3(4)+1$

-11

ex: Evaluate.

$x^{-n} = \frac{1}{x^n}$

$$f(x) = \begin{cases} 8x - 1, & x < 0 \\ -18, & 0 \le x < 5 \\ 3x^{-2}, & x \ge 5 \end{cases}$$

$6^2 = 36$

a) $f(-3)$

1ST piece

$8(-3) - 1$

-25

$f(6) = 3 \cdot 6^{-2}$

$= 3 \cdot \frac{1}{6^2}$

$= \frac{3}{36} = \frac{1}{12}$

c) $f(0) = -18$

ex: Evaluate.

$$g(x)=\begin{cases}|2x-1|, & x>6\\ \dfrac{1}{x}, & 1<x\le 6\\ x^3, & x=1\end{cases}$$

a) $g(5) = \frac{1}{5}$

b) $g(1) = 1^3 = 1$

c) $g(0)$ undefined

d) $g(10)$ $|2\cdot 10-1|$

19

ex. Evaluate.

$$f(x)=\begin{cases}\sqrt{1-(x+4)^2}, & -5\le x<-4\\ x+3, & -4\le x\le 0\\ -|x-4|, & x>0\end{cases}$$

a) f(-5)

1st $\sqrt{1-(-5+4)^2}$

$\sqrt{1-1}=0$

b) f(-4) $=-4+3$

2nd -1

c) f(-1) $-1+3=2$

2nd

d) f(2) $-|2-4|$

3rd $-|-2|=-2$

$$\frac{\cancel{8}^{2}}{1} \cdot \frac{3}{\cancel{4}_{1}}$$

$$6$$

$$\frac{8}{1} \cdot \frac{3}{4}$$

$$\frac{24}{4}$$

$$6$$

$$8 \div \frac{4}{3}$$

$$8 \cdot \frac{3}{4}$$

$$\frac{24}{2}$$

$$24 \div 2$$

$$24 \cdot \frac{1}{2}$$

$$\frac{5}{1} - \frac{3}{4}$$

4

4

$$\frac{20 - 3}{4}$$

$$\frac{17}{4} = 4\frac{1}{4}$$

$$11 - \frac{3}{7}$$

$$10\frac{4}{7}$$

$$10 - \frac{1}{4}$$

$$9\frac{3}{4}$$

$$3 - \frac{1}{3}$$

$$2\frac{2}{3}$$