Sections 1.1-1.2

Wednesday, May 27, 2009
7:18 AM

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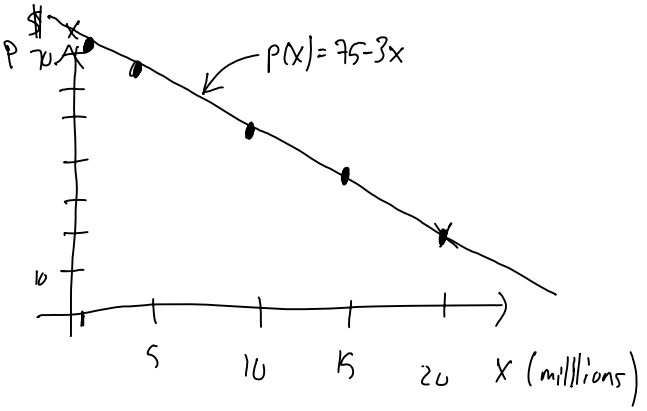


name
$p(x) = 75 - 3x$
rule
↑ independent variable

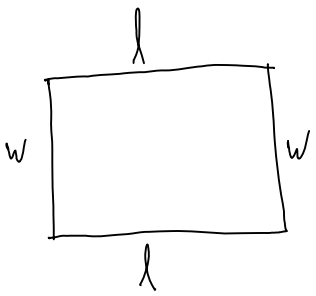
data

x	p
1	72
4	63
9	48
14	33
20	15

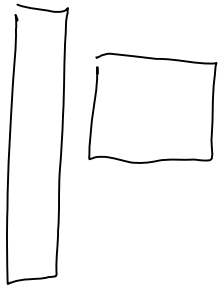
$p(0) = 75 - 3(0) = 75$ at $x=0$, $p=75$
$p(20) = 75 - 3(20) = 15$ at $x=20$, $p=15$

at $x = 7$ million chips, the price is $p(7) = 75 - 3(7) = \$54$ per chip.

#77



$2l + 2w = 100$
solve for w in terms of l
(use the constraint to eliminate a variable)



$2w = 100 - 2l$

$w = \frac{100 - 2l}{2} = \frac{100}{2} - \frac{2l}{2}$
$= 50 - l$

$A = lw$

$A = l(50-l)$

$A(l) = l(50-l)$

$l > 0$, $l < 50$

$0 < l < 50$

or l is in $(0, 50)$

Q7 $Q(x) = x^2 - 5x + 1$

$$\frac{Q(2+h)-Q(2)}{h} = \frac{\left((2+h)^2 - 5(2+h)+1\right) - \left(2^2 - 5(2)+1\right)}{h}$$

$$= \frac{4+4h+h^2-10-5h+1-4+10-1}{h}$$

$$= \frac{4h+h^2-5h}{h} = \frac{h^2-h}{h} = \frac{h(h-1)}{h} = \frac{h}{h}(h-1)$$

$$= h-1$$

Ex. $f(x) = \frac{1}{x}$

$$\frac{f(7+h)-f(7)}{h} = \frac{\left(\frac{1}{7+h}\right)\frac{7}{7} - \left(\frac{1}{7}\right)\frac{(7+h)}{(7+h)}}{h} = \frac{\frac{7}{(7+h)7} - \frac{7+h}{(7+h)7}}{h} = \frac{\frac{7-(7+h)}{7(7+h)}}{h}$$

Common denominator

$$= \frac{\frac{-h}{7(7+h)}}{\frac{h}{1}} = \frac{-h}{7(7+h)} \cdot \frac{1}{h} = \frac{-1}{7(7+h)}$$

$$\frac{\frac{1}{3}}{\frac{1}{2}} = \frac{1}{3} * \frac{2}{1} = \frac{2}{3}$$

$$\frac{f(7+h)-f(7)}{h} = \frac{\left(\frac{1}{7+h} - \frac{1}{7}\right)7\cdot(7+h)}{(h)\quad 7\cdot(7+h)} = \frac{\frac{1}{7+h}\cdot 7\cdot(7+h) - \frac{1}{7}\cdot 7(7+h)}{h\cdot 7(7+h)}$$

Clearing out fractions

$$= \frac{7-(7+h)}{h(7)(7+h)} = \frac{-h}{h(7)(7+h)} = \frac{-1}{7(7+h)}$$

Ex. ① domain of $f(x) = \frac{1}{\sqrt{x}}$ is $x > 0$

(2) $g(t) = \frac{1}{t^2-4t} = \frac{1}{t(t-4)}$ domain is all t except $t=0,4$.

(3) $r(x) = \sqrt{x^2-4}$ need $x^2-4 \geq 0$

$(x-2)(x+2) \geq 0$

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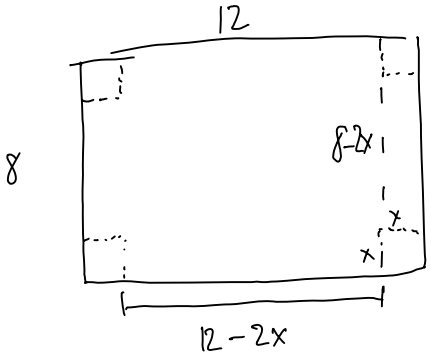
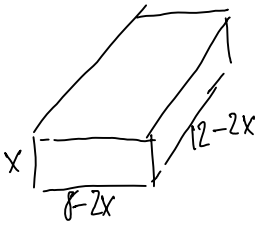
domain is $(-\infty, -2]$ and $[2, \infty)$

(or $x \leq -2$ and $x \geq 2$)

§1.1 #85





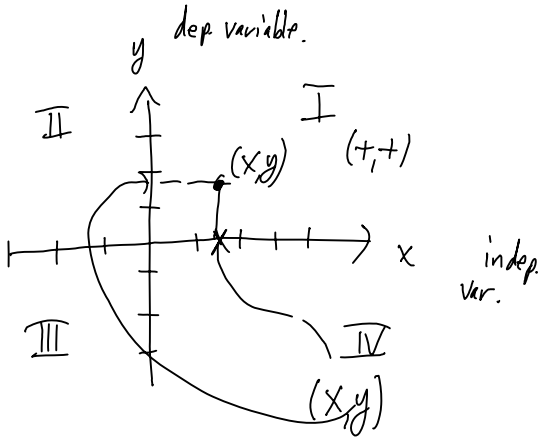
$V(x) = l \cdot w \cdot h$

$= (12-2x)(8-2x)x$

domain is $0 \leq x \leq 4$

§1.2 Graphs of functions

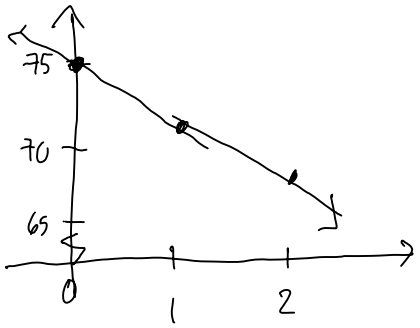
rectangular coordinate system



One way to graph is to plot a few points & connect the dots

e.g $p(x) = 75 - 3x$

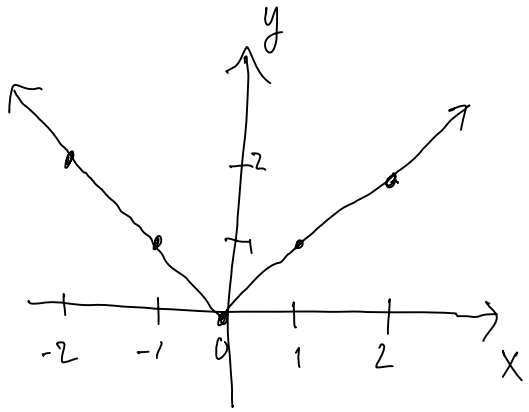
x	p
0	75
1	72
2	69



★ Know the graphs of 6 basic functions inside front cover ★

e.g. $f(x) = |x|$

x	$y = f(x) = \|x\|$
-2	2
-1	1
0	0
1	1
2	2



$$f(x) = |x| = \begin{cases} x, & \text{if } x \geq 0 \\ -x, & \text{if } x < 0 \end{cases}$$

$f(-3)$