

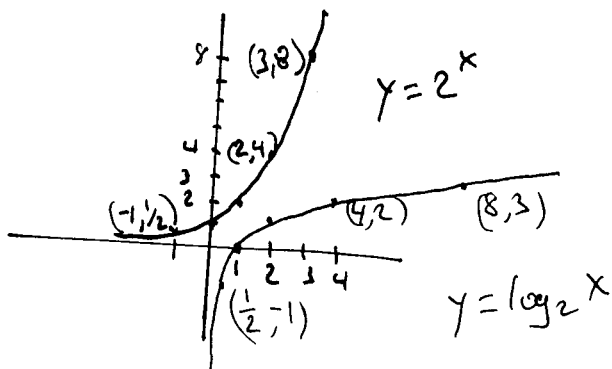
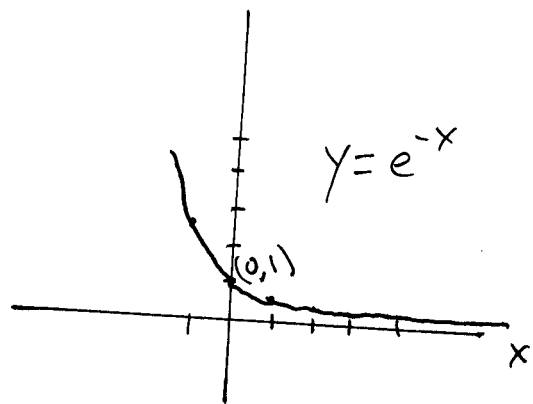
1.4 Examples of functions (cont'd)

Exponential functions

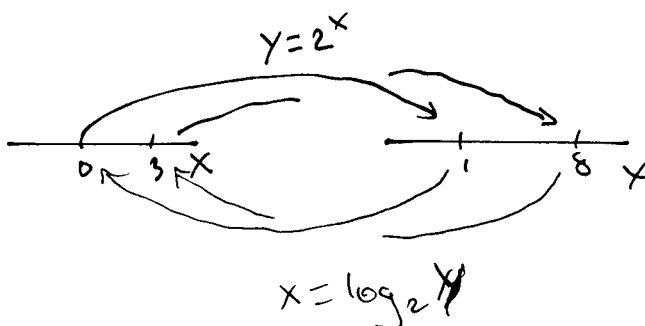
$$f(x) = 2^x \quad \text{or} \quad g(x) = e^{-x}$$

x	2^x
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	$2^0 = 1$
1	2
2	4
3	8
4	16

x	$\log_2 x$
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2
8	3
16	4



x	e^{-x}
-1	2.718
0	1
1	.368
2	.135
3	.050

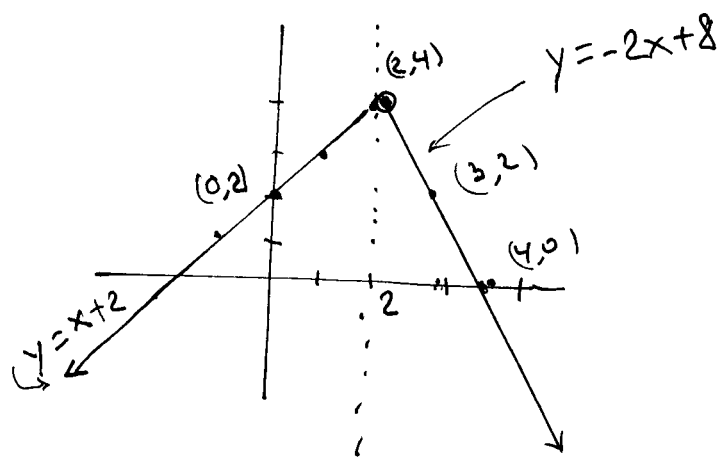


ex. Piecewise-defined functions

(2)

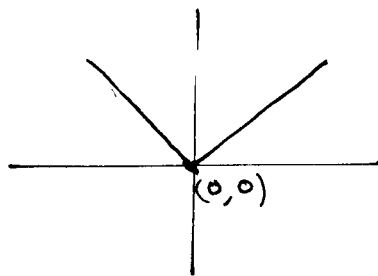
1.4 28) Graph $f(x) = \begin{cases} 8-2x & \text{if } x \geq 2 \\ x+2 & \text{if } x < 2 \end{cases}$
[6th ed.]

x	y
-1	1
0	2
1	3
2	4
3	2
4	0

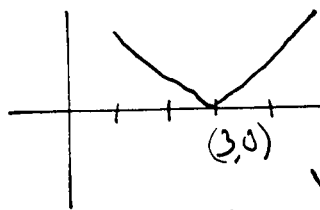


Shifting functions

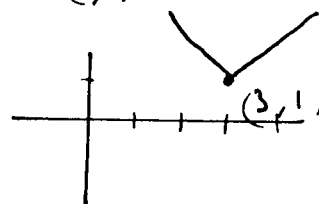
ex. ① $y = |x|$



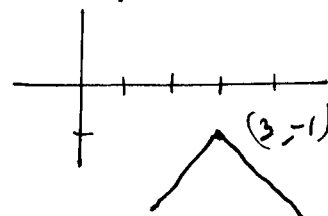
② $y = |x-3|$



③ $y = |x-3| + 1$



④ $y = -(|x-3| + 1)$
 $= -|x-3| - 1$



Difference Quotient: Find and simplify $\frac{f(x+h) - f(x)}{h}$.

1.4 66) $f(x) = 3x^2 - 5x + 2 = (x-1)(3x-2)$

because $(1,0)$

and $(\frac{2}{3}, 0)$ are
x-intercepts

To make this vivid, let's say

$x = \text{time (minutes)}$ and

$f(x) = \text{temperature (degrees C)}$

so $x+h = h$ minutes after x

$f(x+h) = \text{temp at time } x+h$

(Step 1)

$$f(x+h) = 3(x+h)^2 - 5(x+h) + 2$$

(to be
continued)