LINEAR FUNCTION

A function f defined by $f(x) = ax + b$, where a and b are constants, is a **linear function**.

"a" is the _____ ~ _____ of the linear function.

"b" is the _____ _____ when $x = $ ___.

For linear functions, the increase for each unit of x is _____.

① Use each table of values to determine whether $f(x)$ could represent a linear function. If f could be linear, write a formula for f in the form $f(x) = ax + b$.

(a)

x	0	1	2	3
$f(x)$	10	15	20	25

(b)

x	-2	0	2	4
$f(x)$	4	2	0	-2

(c)

x	0	1	2	3
$f(x)$	1	2	4	7

Graphing linear functions is very straightforward. Just like 3-2.

② **Modeling car sales**

Table 8.9 shows numbers of Toyota vehicles sold in the United States. (Refer to the introduction to this chapter.)

TABLE 8.9 Toyota Vehicles Sold (millions)

Year	1998	1999	2000	2001	2002
Vehicles	1.4	1.5	1.6	1.7	1.8

Source: Autodata.

(a) What were the sales in 1998?
(b) What was the annual increase in sales?
(c) Find a linear function f that models these data. Let $x = 0$ correspond to 1998, $x = 1$ to 1999, and so on.
(d) Use f to predict sales in 2004.

③ At your job you earn a base salary of $200 per week, and 8% comission on the amount of sales you make. Model this with a linear function.

Absolute value functions

$f(x) = |x|$

    ⌐ the input always comes out _____.

The definition of absolute value is, "distance from _____ "

④ For $f(x) = |x|$, find

a) $f(12)$

b) $f(-3)$

c) $f(0)$

d) $f(-1.4)$

Note!

$f(x) = |x-3|$ ✗

Test it

⑤ Graph $f(x) = |x-2|$, and write domain & range
in interval notation.

Polynomial functions

$$f(x) = ax^n + bx^{n-1} + \ldots + cx + d$$

Basically, positive integer powers of x being added or subtracted.

⑥

Identifying polynomial functions

Determine whether $f(x)$ represents a polynomial function. If possible, identify the type of polynomial function and its degree.

(a) $f(x) = 5x^3 - x + 10$

(b) $f(x) = x^{-2.5} + 1$

(c) $f(x) = 1 - 2x$

(d) $f(x) = \dfrac{3}{x - 1}$

⑦ Graph $f(x) = x^3 - 2x^2 + 3x - 2$ on graphing calc.
& evaluate $f(2), f(5), f(-1)$

⑧

Evaluate $f(x)$ at the given value of x.

(a) $f(x) = -3x^4 - 2, \quad x = 2$

(b) $f(x) = -2x^3 - 4x^2 + 5, \quad x = -3$