

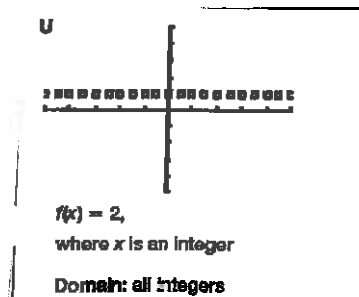
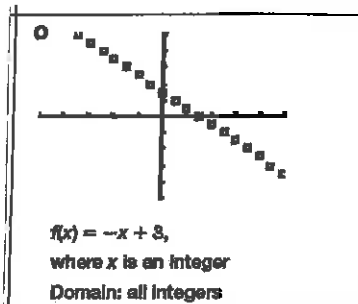
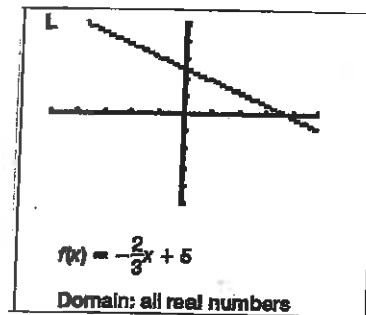
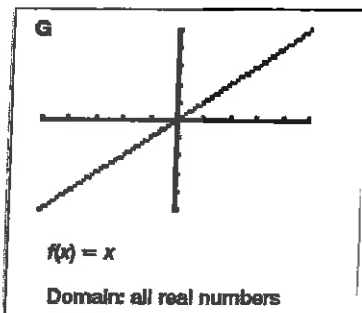
Definition

The family of linear functions includes functions of the form $f(x) = mx + b$, where m and b are real numbers.

Graphical Behavior

- Straight lines.
- always increasing
or
always decreasing
or
always constant.

Linear Functions



Examples

Definition

The family of exponential functions includes functions of the form $f(x) = a \cdot b^x$, where a and b are real numbers, and b is greater than 0 but not equal to 1.

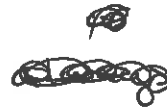
Graphical Behavior

- Curved graph

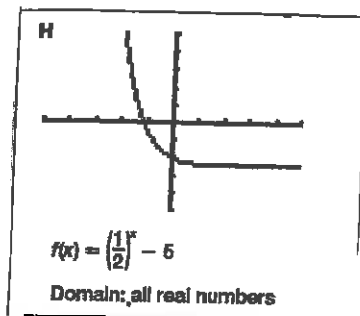
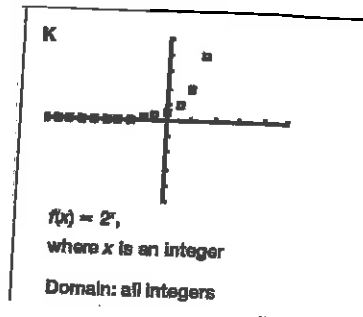
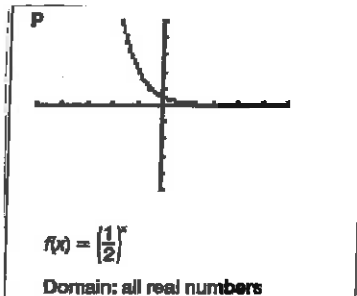
Always increasing

or

always decreasing



Exponential Functions



Examples

Definition

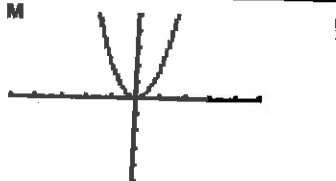
The family of quadratic functions includes functions of the form, $f(x) = ax^2 + bx + c$ where a , b , and c are real numbers, and a is not equal to 0.

Graphical Behavior

- "Smile" or "frown"
has a maximum or minimum value.

Quadratic Functions

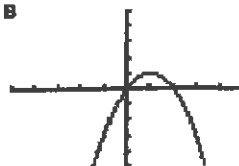
M



$$f(x) = x^2$$

Domain: all real numbers

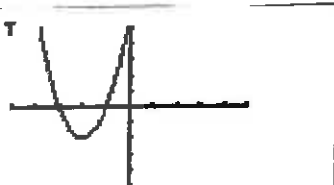
B



$$f(x) = -\frac{1}{2}x^2 + 2x$$

Domain: all real numbers

T



$$f(x) = x^2 + 8x + 12$$

Domain: all real numbers

F



$$f(x) = -3x^2 + 4,$$

where x is an integer

Domain: all integers

Examples

Definition

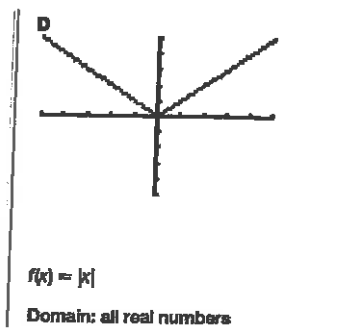
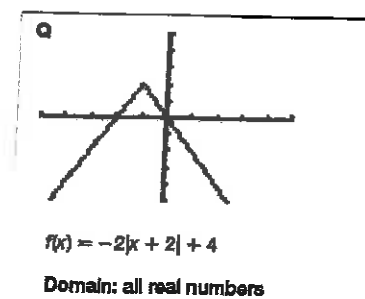
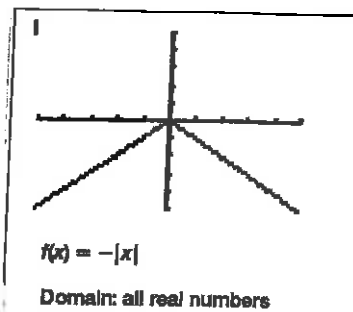
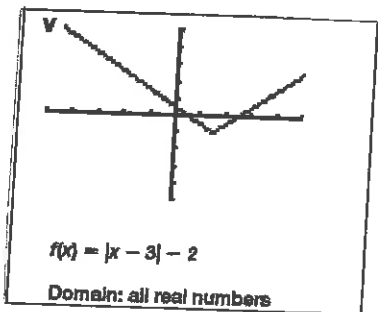
The family of linear absolute value functions includes functions of the form $f(x) = a|x + b| + c$, where a , b , and c are real numbers, and a is not equal to 0.

Graphical Behavior

Shaped like a "V"

Have a max or min value.

Linear Absolute Value Functions



Examples

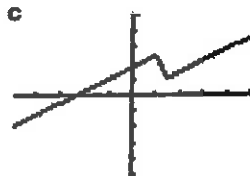
Definition

The family of linear piecewise functions includes functions that have equation changes for different parts, or pieces, of the domain.

Graphical Behavior

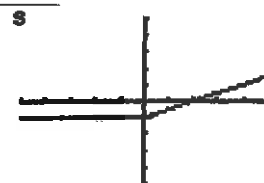
- pieces of lines
stuck together.

Linear Piecewise Functions



$$f(x) = \begin{cases} \frac{1}{2}x + 4, & -\infty < x < 2 \\ -3x + 11, & 2 \leq x < 3 \\ \frac{1}{2}x + \frac{1}{2}, & 3 \leq x < \infty \end{cases}$$

Domain: all real numbers



$$f(x) = \begin{cases} -2, & -\infty < x < 0 \\ \frac{1}{2}x - 2, & 0 \leq x < \infty \end{cases}$$

Domain: all real numbers



$$f(x) = \begin{cases} -2x + 10, & -\infty < x < 3 \\ 4, & 3 \leq x < 7 \\ -2x + 18, & 7 \leq x < \infty \end{cases}$$

Domain: all real numbers

Examples