

Absolute Value Function

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2020

## The absolute value function

The absolute value function is a special function that takes the sign away from the value. For example, if we consider the following numbers,

$$-1, 2, -10, 56, -3, -2.1$$

the sign of each function is,

$$-, +, -, +, +, -, -$$

respectively. The absolute value function removes the signs and leaves the “value”. So we have from the list above,

$$1, 2, 10, 5, 6, 3, 2.1$$

after the absolute value function is applied to each number. Formally, the absolute value function is written and defined as,

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

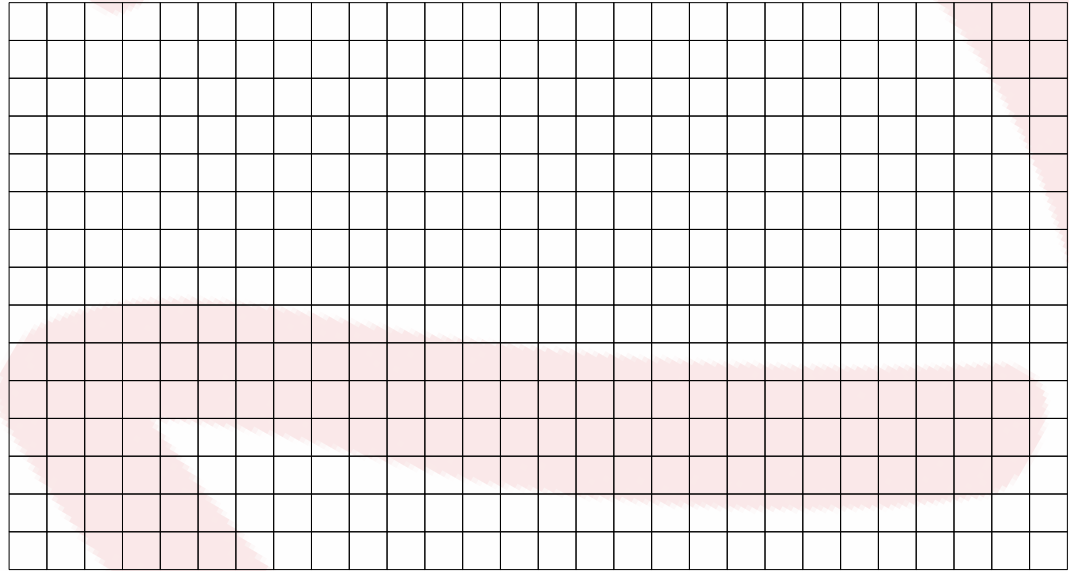
For a specific function  $g(x)$  the absolute function of  $g(x)$  is,

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

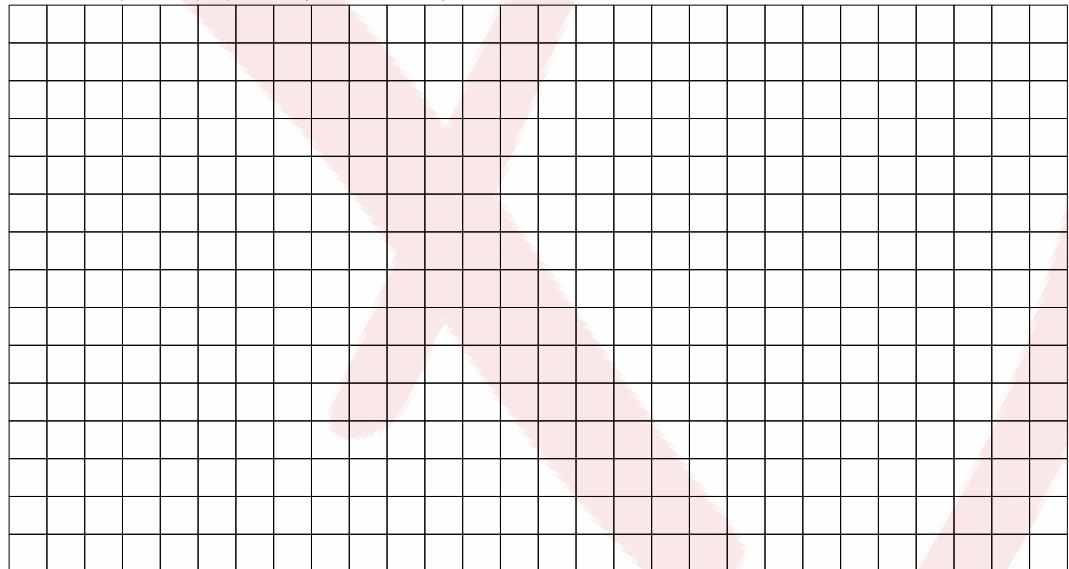
**Exercises**

1. Graph the following.

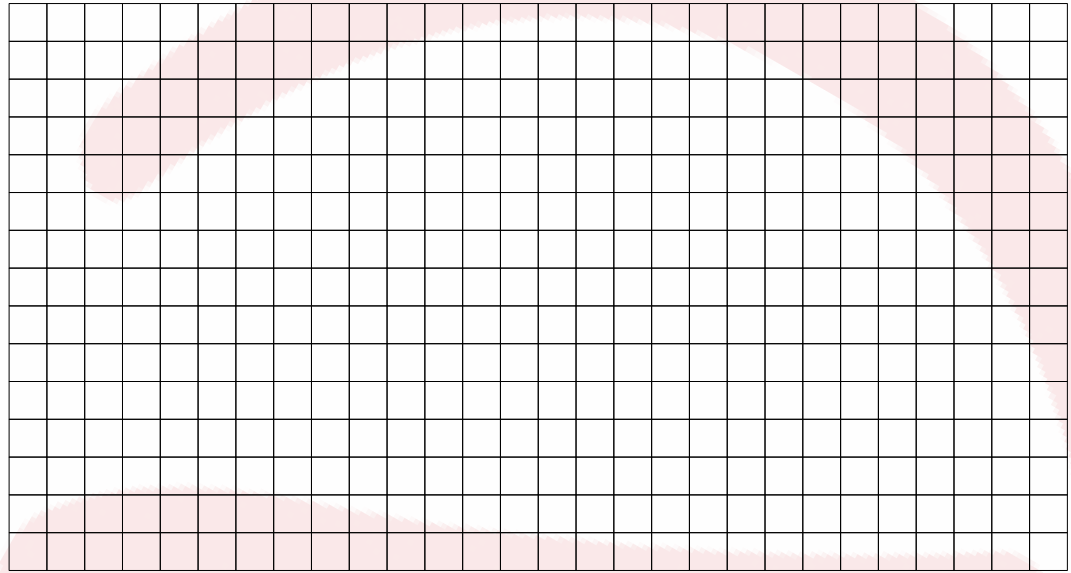
(a) (1 point)  $f(x) = |x - 2|$



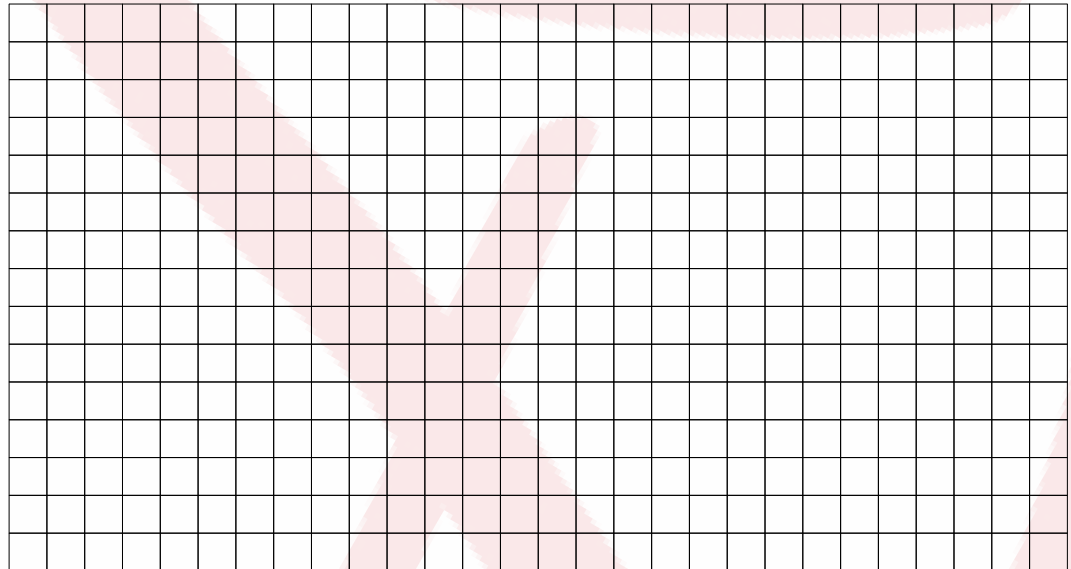
(b) (1 point)  $f(x) = |3x - 1|$



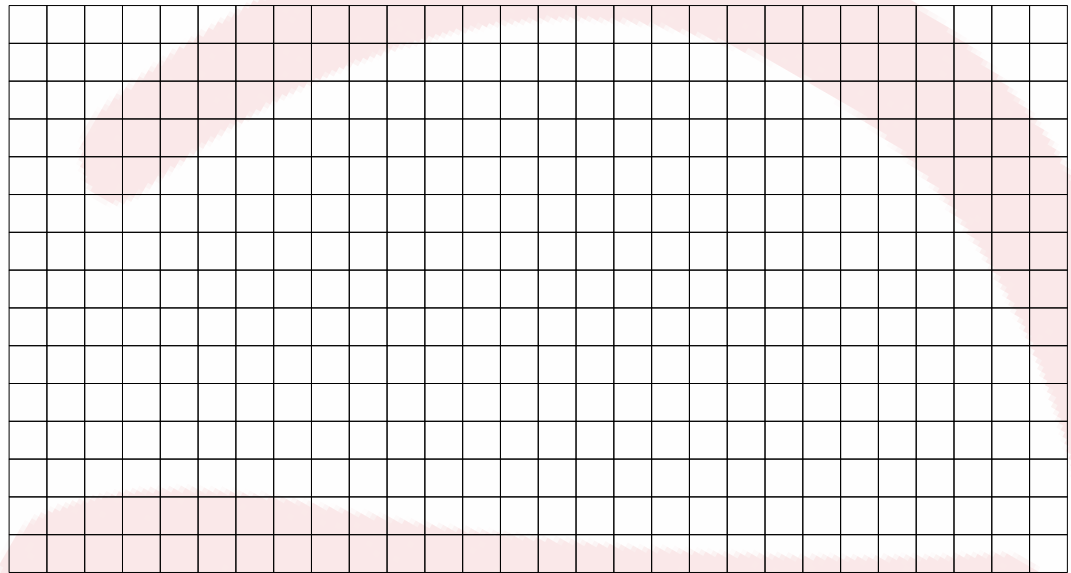
(c) (1 point)  $f(x) = |x + 5|$



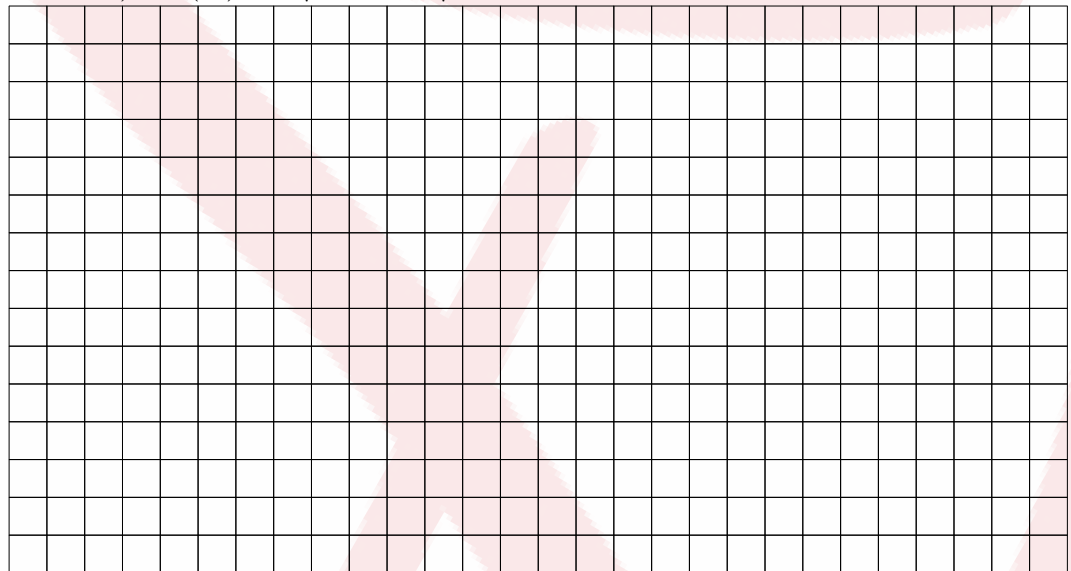
(d) (1 point)  $f(x) = |x^3|$



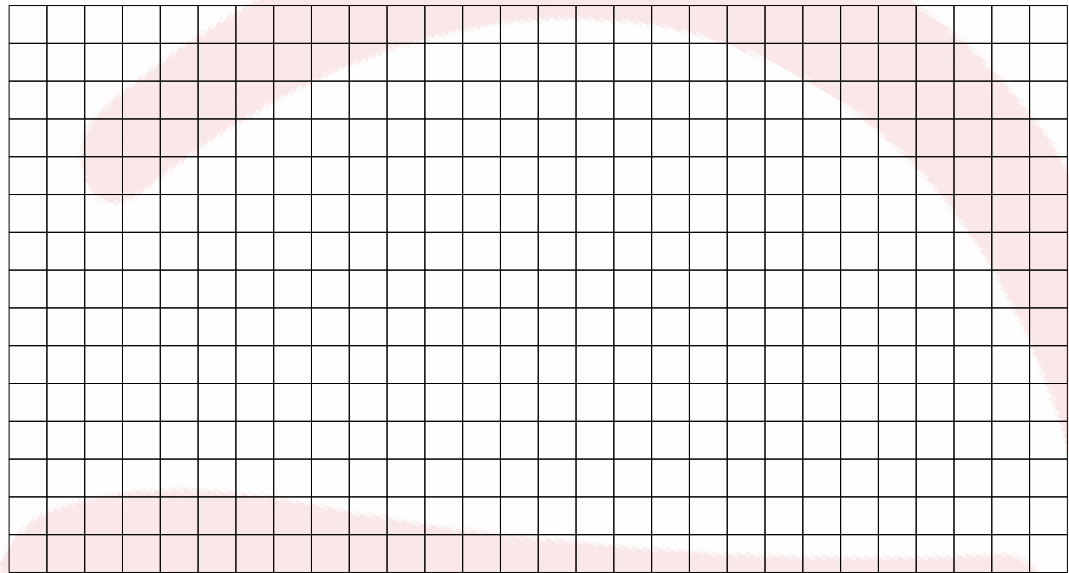
(e) (1 point)  $f(x) = |2x + 5|$



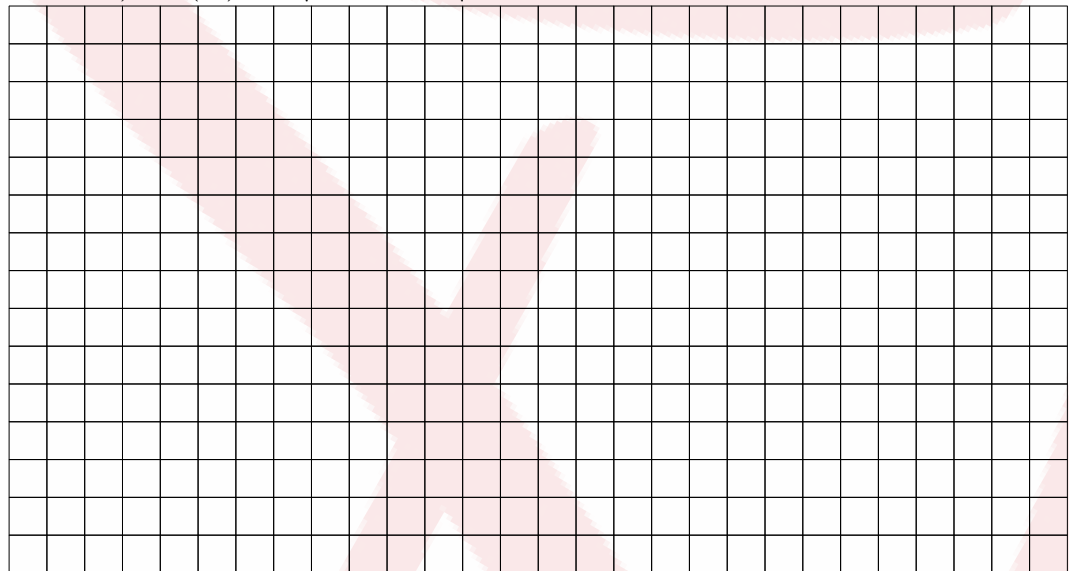
(f) (1 point)  $f(x) = |1 - 2x|$



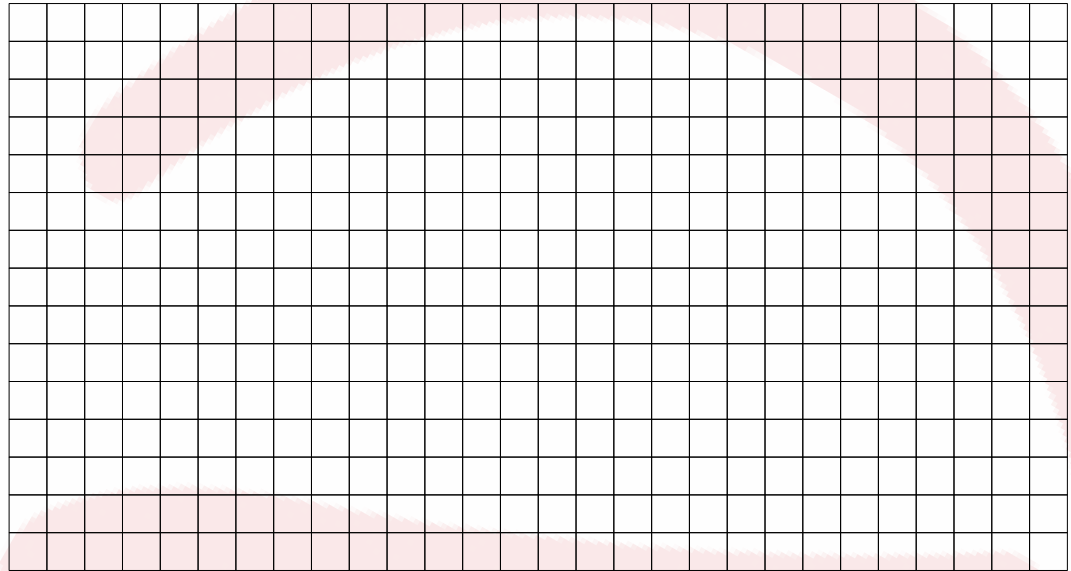
(g) (1 point)  $f(x) = |x^2 - 4|$



(h) (1 point)  $f(x) = |x^2 + 4x|$



(i) (1 point)  $f(x) = |x^2 - 1|$



(j) (1 point)  $f(x) = |x^3 - 1|$

