Functions & Interval Notation

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1. Arrange these values in order, from least to greatest:

$|-5|, |20|, |-15|, |12|, |-25|$

$= |-5|, |12|, |-15|, |20|, |-25|$

$= 5,\ 12,\ 15,\ 20,\ 25$

2. Evaluate.

a) $|-22|$

$= 22$

b) $-|-35|$

$= -35$

c) $|-5-13|$

$= 18$

d) $|4-7|+|-10+2|$

$|-3|+|-8|$

$= 11$

e) $\frac{|-8|}{-4}$

$= -2$

f) $\frac{|-22|}{|-11|} + \frac{-16}{|-4|}$

$= 2 + -4$

$= -2$

3. Express using absolute value notation.

a) $x < -3 \text{ or } x > 3$

$|x| > 3$

b) $-8 \leq x \leq 8$

$|x| \leq 8$

c) $x \leq -1 \text{ or } x \geq 1$

$|x| \geq 1$

d) $x \neq \pm 5$

$|x| \neq 5$

4. Graph on a number line.

a) $|x| < 8$

b) $|x| \geq 16$

c) $|x| \leq -4$

d) $|x| > -7$

5. Rewrite using absolute value notation.

a)

$|x| \leq 3$

b)

$|x| > 2$

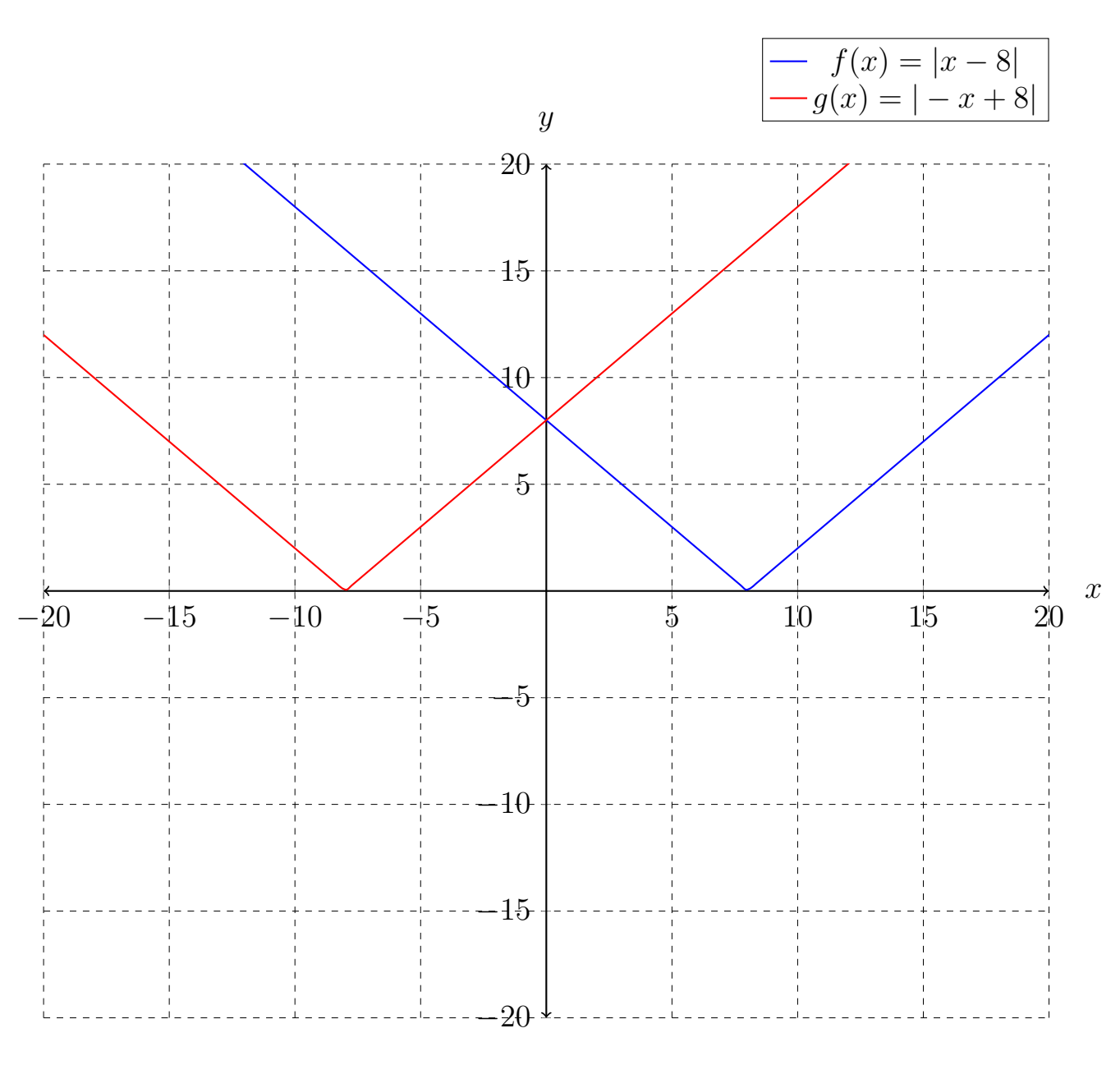
c)

$|x| \geq 2$

d)

$|x| < 4$

6. Graph $f(x) = |x-8|$ and $g(x) = |-x+8|$.



a) What do your notice?

$g(x)$ is just $f(x)$ mirrored in the y-axis.

b) How could you have predicted this?

by factoring out -1 from $g(x)$ to make it $g(x) = |-(x-8)|$, the -1 behaves like the k value on any other function, simply mirroring the graph in the y-axis.

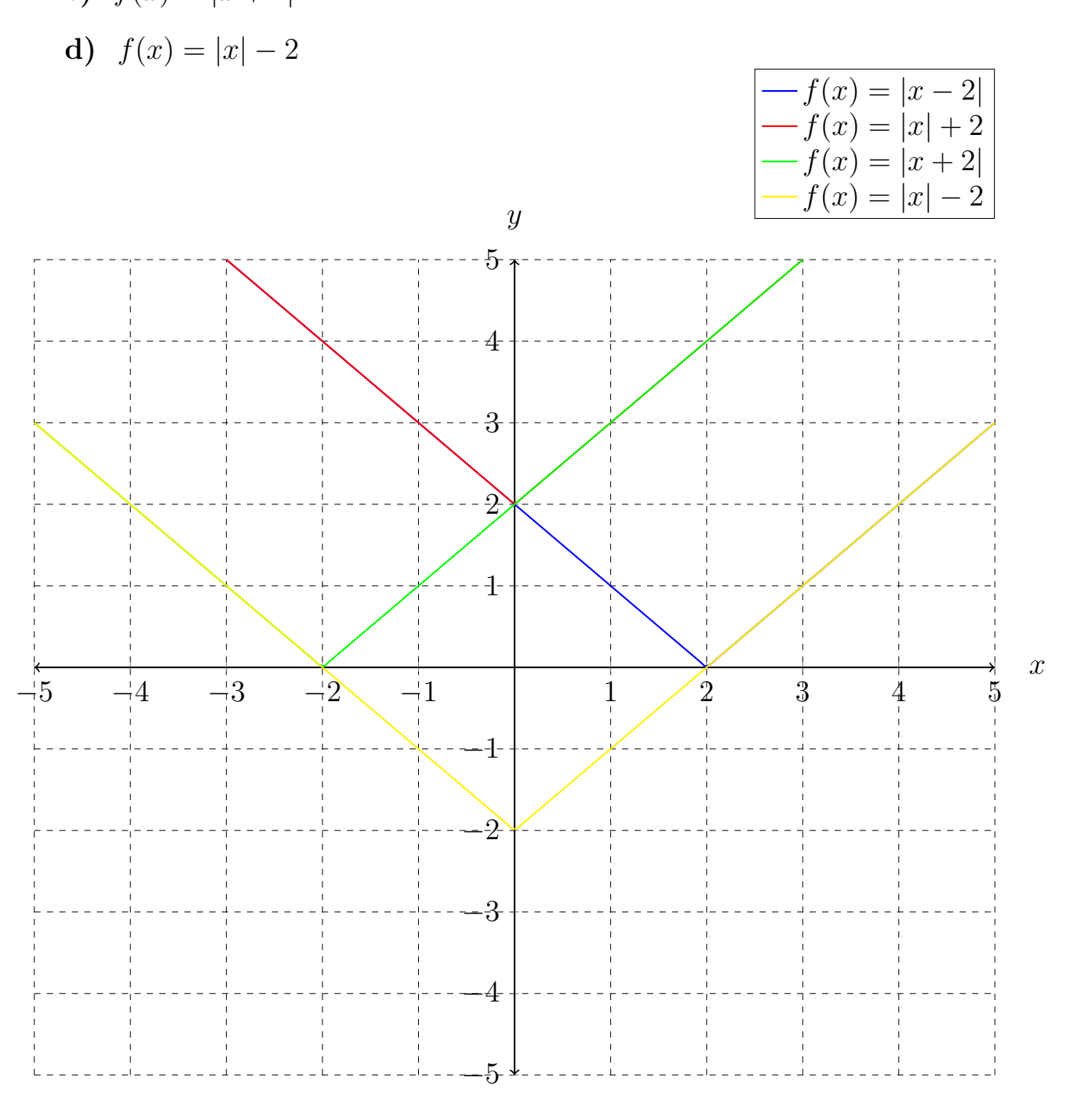
7. Graph the following functions.

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

b) $f(x) = |x|+2$

c) $f(x) = |x+2|$

d) $f(x) = |x|-2$



8. Compare the graphs you drew in question 7. How could you use transformations to describe the graph of $f(x) = |x+3|-4$?

translate left 3 units

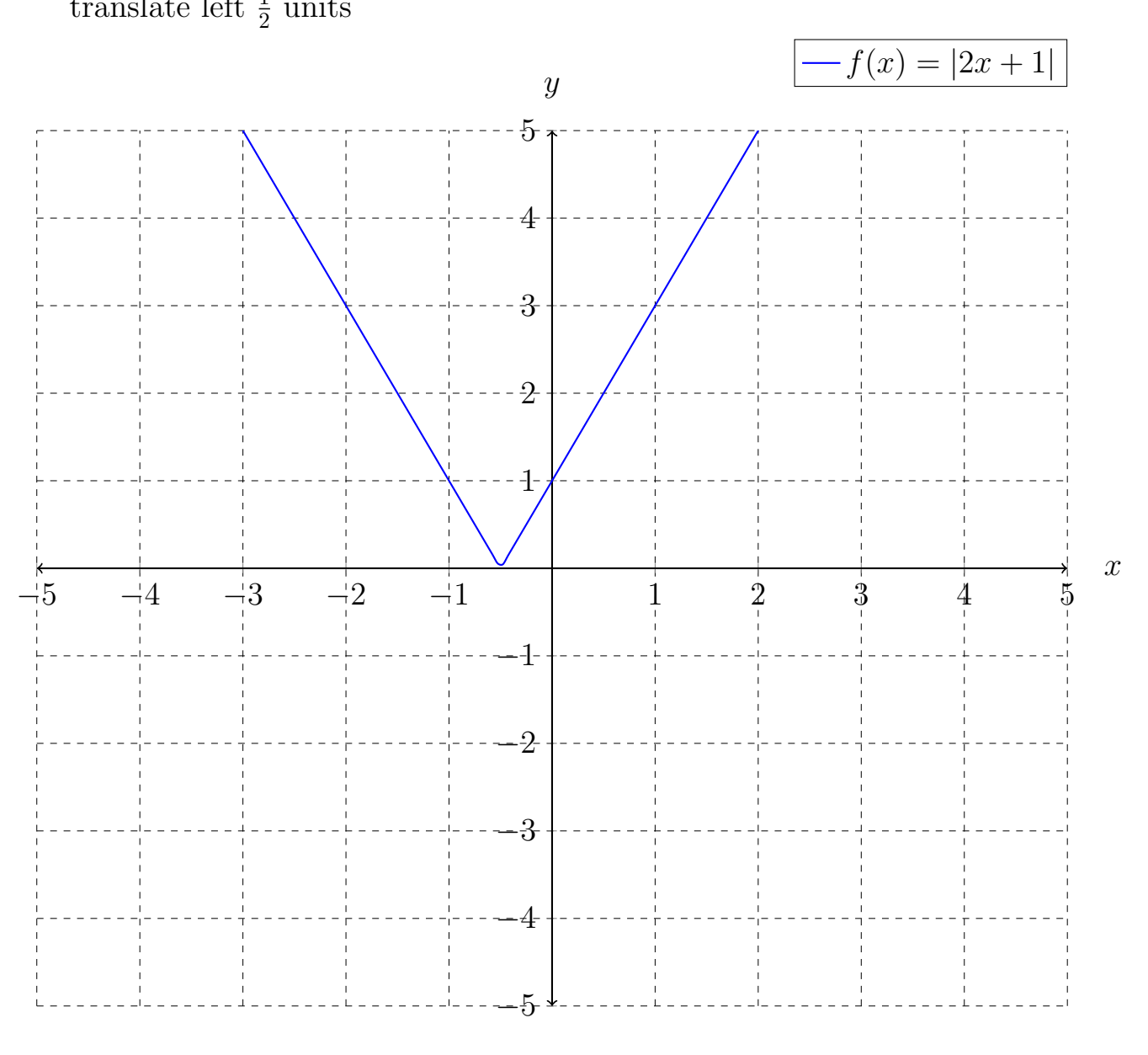
translate down 4 units

9. Predict what the graph of $f(x) = |2x+1|$ will look like. Verify your prediction using graphing technology.

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

h. compression by a factor of $\frac{1}{2}$

translate left $\frac{1}{2}$ units



10. Predict what the graph of $f(x) = 3-|2x-5|$ will look like. Verify your prediction using graphing technology.

$f(x) = 3-|2(x-\frac{5}{2})|$

$f(x) = -|2(x-\frac{5}{2})|+3$

reflected in x-axis

h. compression by a factor of $\frac{1}{2}$

translate right $\frac{5}{2}$ units

translate up 3 units