

**Instructions:** Show all work. Use exact answers unless otherwise asked to round.

1. Write the function  $f(x) = |x|$  after it has undergone the following transformations:

- Horizontal shift to the right of 2
- Vertical reflection
- Vertical stretch by 3
- Vertical shift down by 5

$$\begin{aligned} p(x) &= |x-2| \\ h(x) &= -|x-2| \\ j(x) &= -3|x-2| \\ k(x) &= -3|x-2|-5 \end{aligned}$$

2. Find an equation of the line with the following properties: Passing through the points  $(-2, -5)$  and  $(6, -5)$ . Write the solution in:

a. Standard form  $y = -5$  or  $0x + y = -5$

b. Slope-intercept form  $y = -5$  or  $y = 0x - 5$

- c. As a function

$$f(x) = -5$$

3. Solve the equation  $3|x-1| = 2|x+1|$ .

$$\begin{aligned} 3(x-1) &= 2(x+1) \rightarrow 3x-3 = 2x+2 \rightarrow x=5 \\ 3(x-1) &= -2(x+1) \rightarrow 3x-3 = -2x-2 \rightarrow 5x=1 \rightarrow x=1/5 \end{aligned}$$

$$\left\{ 5, \frac{1}{5} \right\}$$

4. For the quadratic function  $f(x) = 2x^2 - 4x - 1$ , rewrite the equation in standard (vertex) form.

$$\begin{aligned} &2(x^2 - 2x + 1) - 1 - 2 \\ f(x) &= 2(x-1)^2 - 3 \end{aligned}$$

5. Jeff and Toby take a trip and log their mileage and gallons of gas used. Find the line of best fit for the data. Write the equation of the best-fit line. What does the slope of the line mean in context?

Gasoline Used (Gallons)	0	9.26	19.03	28.25	36.45	44.64	53.57	62.62	71.93	81.09	90.43
Odometer (Miles)	41	356	731	1051	1347	1631	1966	2310	2670	3030	3371

$$Y = 36.80x + 16.39$$

for every gallon of gas, Jeff and Toby can expect to drive 36.8 miles. Or average mpg is 36.8