

Unit #1 Assessment

Your school loop grades follows this piece-wise defined curve. Let the total points earned in this question be x , and the school loop grades is $f(x)$, then

$$f(x) = \begin{cases} 2.5x\%, & x < 40 \\ 100\% + \sqrt{\frac{5}{6}}(x-40)\%, & 40 \leq x < 64 \end{cases}$$

1. (4 pts)

Given $A(2,0)$ and a line $L: x + 2y = 7$,

(1) Find a line M so that $M \parallel L$ and a line N so that $N \perp L$, and M and N intersect at the point A ?

(2) Let $B(x_2, y_2)$ be the intersection of L and N .

$C(x_3, y_3)$ is on the line M . What are the coordinates of the B and C ?

2. (4 pts each, pick only 1)

Determine where in the domain will $f(x)$ be decreasing? (use interval notation to write your answers.)

(Following a, b, and c are 3 separate questions)

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

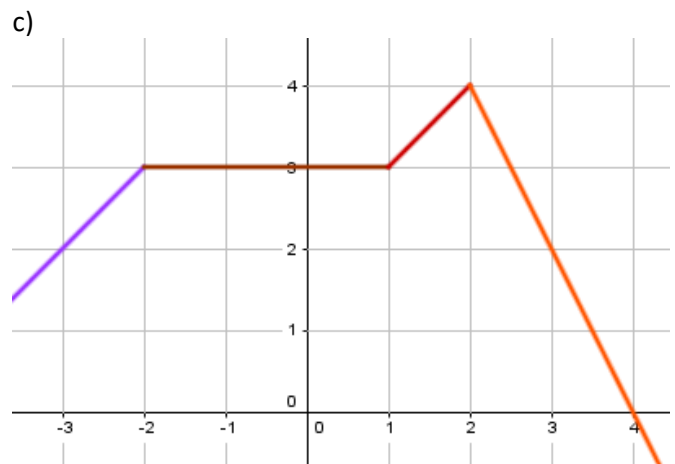
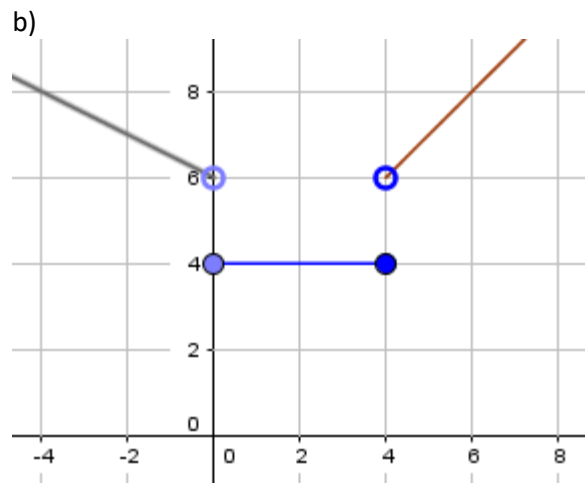
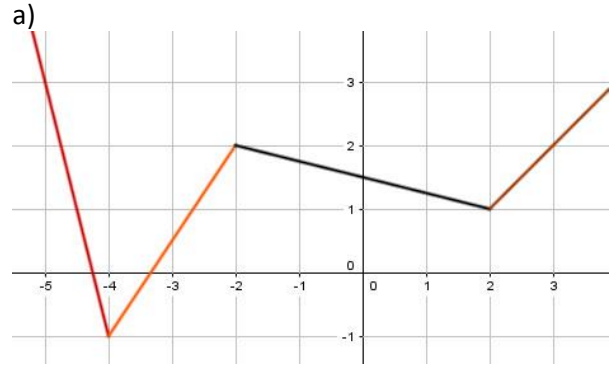
(b) $f(x) = |x-3| - \frac{1}{2}|x+4|$

(c) $f(x) = |2x+2| - |2x-3|$

3. (12 points each, pick only 1)

Given a graph below, write a piecewise defined function (assumed each segment can be represented by a linear function), the entire real number line is the domain.

(Following a, b, and c are 3 separate questions)



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4. (4 points each, pick only 1)

Use transformation to graph each function below.
Identify the transformations between the given function and its parent function.

(Following a, b, and c are 3 separate questions)

a) $f(x) = -(x+2)^2 - 1$

b) $f(x) = 2 - \sqrt{4x+3}$

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

5. (8 points each , pick only 1) For each pair of function $f(x)$ and $g(x)$, find the intersection of $f(x)$ and $g(x)$ algebraically and verify your result graphically.

(Following a and b are 2 separate questions)

a) $f(x) = |x+2| - 1$, $g(x) = x^2 + 1$

b) $f(x) = \frac{1}{x-2}$, $g(x) = x - \frac{1}{2}$

6. (16 points for a and b)

For each pair of function $f(x)$ and $g(x)$,

1) Find and graph $(f \circ g)(x)$

2) Find and graph $(g \circ f)(x)$

Also identify

3) The domain, x and y intercepts, and possible horizontal and vertical asymptotes of the composite functions

(Following a and b are 2 separate questions)

a) $f(x) = \frac{x}{x+2}$, $g(x) = x+1$

b) $f(x) = -1 + \sqrt{x}$, $g(x) = x-2$

7. (16 points)

Given $f(x)$ and its domain,

$$f(x) = \frac{2x+15}{4x+6}, x < -\frac{3}{2}$$

(a) find $f^{-1}(x)$,

(b) Identify the domains and ranges for both $f(x)$ and $f^{-1}(x)$

(c) Graph both $f(x)$ and $f^{-1}(x)$ on the same xy-plane

(d) Find the intersections of f and f^{-1} if possible, algebraically as well as graphically.