

Name : _____ ID. # : _____ SER. # : _____

1. Find the value of k if the line $(k + 2)x - 3y - 1 = 0$ is perpendicular to the line $6x - 3ky = 5$ (2 pts)

2. Find the **domain** of $f(x) = \frac{x}{\sqrt{x^2 - 4}}$ and the **range** of $y = g(x) = -2x^2 + 3x + 1$ (4 pts)

3. Graph $y = f(x) = \begin{cases} x + 2 & \text{if } x \geq 1 \\ -x^2 & \text{if } -1 < x < 1 \\ -1 & \text{if } x \leq -1 \end{cases}$, then find the (4 pts)

intervals on which $f(x)$ is increasing.

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1. Graph $y = f(x) = \left[\left[\frac{x}{3} \right] \right] + 1$, $-6 \leq x \leq 6$. Write the range of $f(x)$ (3 pts)

2. Find the **maximum** value and the **interval** on which the function $y = f(x) = -\frac{1}{2}x^2 + 5x + 1$ is **decreasing**. (3 pts)

3. (a) Find the equation of the line through the point $(-1, 0)$ and perpendicular to the line $2x + 3y = 5$ (2 pts)

(b) Let $f(x)$ be a linear function. If $f(1) = 4$ and $f(-2) = 1$, then find the x- and y-intercept of the graph of $f(x)$. (Hint: find $f(x)$ and no need for graph) (2 pts)

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1. Find the equation of the line through the point $(1, -2)$ and perpendicular to the line $\frac{3}{2}x = 5 - \frac{1}{2}y$.
(2 pts)

2. Let $f(x)$ be a quadratic function. If the graph of $f(x)$ has y-intercept at $(0, 6)$ and x-intercepts at $(-1, 0)$ and $(3, 0)$, then find the range of $f(x)$. (Hint: find $f(x)$ and graph it) (4 pts)

3. (a) Find the domain of $y = f(x) = \frac{1}{\sqrt{|x+5|} - 1}$ (2 pts)

- (b) Solve the equation: $3[[2x - 5]] + 7 = 1$ (2 pts)