## Unit 1A Test Review

Find the domain of the given function.

1) $f(x)=\frac{\sqrt{x+3}}{(x+8)(x-2)}$
2) $f(x)=\frac{4}{x^{2}}$
3) $f(x)=\sqrt{9-x}$

Find the range of the function.
4) $f(x)=(x-2)^{2}+2$
5) $f(x)=(x+5)^{2}+8$
6) $f(x)=\frac{13}{3-x}$
7) Use the graph of $f$ to estimate the local maximum and local minimum. Determine where the function is increasing and decresing.


Find the zeros of the polynomial function and state the multiplicity of each.
8) $f(x)=(x+2)^{2}(x-1)$
9) $f(x)=3(x+8)^{2}(x-8)^{3}$

Find the zeros of the function. (show work)
13) $f(x)=x^{3}-49 x$
14) $f(x)=3 x^{3}-12 x^{2}-15 x$
15) $f(x)=x^{3}-9 x^{2}+8 x+60$

## Unit 1A Test Review

Graph the piecewise-defined function.
$f(x)=\left\{\begin{array}{l}2 x-2, \text { if } x<0 \\ -2 x+1, \text { if } x \geq 0\end{array}\right.$


$$
y(x)=\left\{\begin{array}{l}
9 x+8, \text { if } x<0 \\
x^{2}-2, \text { if } x \geq 0
\end{array}\right.
$$



$$
f(x)=\left\{\begin{array}{llc}
x-1 & \text { if } & x \leq-2 \\
2 x-1 & \text { if } & -2<x \leq 4 \\
-3 x+8 & \text { if } & x>4
\end{array}\right.
$$



## Unit 1A Test Review

Given $f(x)=2 x^{2}-x$, find the following and simplify. $\frac{f(x+h)-f(x)}{h}$

Given $C(x)=2 x^{2}-4 x+3$, find and simplify $\frac{C(x+h)-C(x)}{h}$

Write the equation of a quadratic function that has the following transformations: expand horizontally by a factor of 2
translate right 1 unit
translate up 3 units

Write the equation of an absolute value function that has the following transformations:
compress vertically by a factor of 3
reflect across the x -axis
translate right 2 units
translate down 3 units
Describe the transformations present to the following parent functions

$$
h(x)=-(x-3)^{2}+1 \quad g(x)=-2(x+1)^{2}+3
$$

## Unit 1A Test Review

Sketch the graph of the polynomial: $g(x)=x^{4}-4 x^{2}$

- State End Behavior
- Max \# of Turns
- Factor the Polynomial to find the zeros
- Graph the polynomial

|  |  |
| :--- | :--- |
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Sketch the graph of the polynomial: $f(x)=-x^{4}+9 x^{2}-20$

- State End Behavior
- Max \# of Turns
- Factor the Polynomial to find the zeros
- Graph the polynomial



## Unit 1A Test Review

## Concepts/Short Answer

1. Explain the difference between a rational number and an irrational number. Provide an example of each
2. Why is it that a quadratic function can have no real zeros but a cubic function must have at least one real zero? Use a sketch of each function to support your position.
3. Explain what it means for a value to be excluded from the domain of a function. Provide examples of a function that has excluded values.
4. In the quadratic formula, what is the discriminant and how does it help us determine the number of real zeros a quadratic function has?
