Name _____ Date _____

Mr. Schlansky Algebra II

Functions Review Sheet

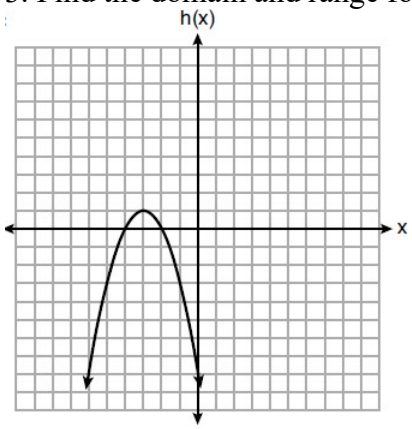
1. The function $f(x)=\sqrt{x}$. Which function represents a shift of the graph left 3 units?

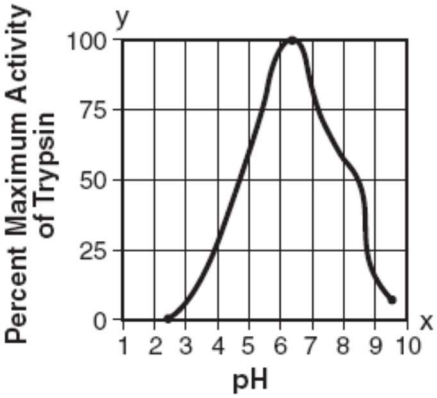
1) $f(x-3)=\sqrt{x-3}$
2) $f(x+3)=\sqrt{x+3}$
3) $f(x)+3=\sqrt{x}+3$
4) $f(x)-3=\sqrt{x}-3$

2. Joey's math class is studying the basic quadratic function, $f(x)=x^2$. Each student is supposed to make two new functions by adding or subtracting a constant to the function. Joey chooses the functions $g(x)=x^2-5$ and $h(x)=x^2+2$. What transformations would map $f(x)$ to $g(x)$ and $f(x)$ to $h(x)$?

1) shift left 5, shift right 2
2) shift right 5, shift left 2
3) shift up 5, shift down 2
4) shift down 5, shift up 2

3. Find the domain and range for the functions below:





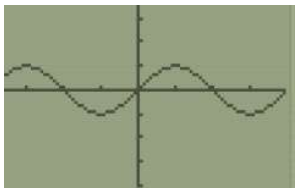
4. What is the inverse of $y=\frac{1}{2}x+2$?

5. For the function $f(x) = (x-3)^3 + 1$, find $f^{-1}(x)$.

6. Determine whether the following are even functions, odd functions, or neither. Explain your answer.

$f(x) = |x| + 4$

$g(x)$

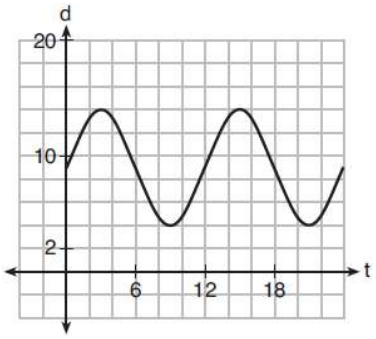


7. Jessica is planning to build a square playing field. She wants to see how long the sides of the field will need to be for different areas. Her results are summarized in the following table. All values are rounded to the *nearest hundredth* when necessary.

What is the average rate of change in the side length as the area increases from 200 square feet to 500 square feet? Explain its meaning in the context of the problem.

Area (square feet)	Side Length (feet)
100	10
200	14.14
300	17.32
400	20
500	22.36
600	24.49
700	26.46
800	28.28
900	30

8. The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below. If the depth, *d*, is measured in feet and time, *t*, is measured in hours since midnight, what is the average rate of change of the depth of the water between 3AM and 9AM? Explain its meaning in the context of the problem.



9. The world population was 2560 million people in 1950 and 3040 million in 1960 and can be modeled by the function $p(t) = 2560e^{0.017185t}$, where *t* is time in years after 1950 and $p(t)$ is the population in millions. Determine the average rate of change of $p(t)$ in millions of people per year, from $4 \le t \le 8$. Round your answer to the *nearest hundredth*. Explain its meaning in the context of the problem.

10. The profit function, $p(x)$, for a company is the cost function, $c(x)$, subtracted from the revenue function, $r(x)$. The cost function for the Acme Corporation is $c(x) = 0.7x^2 - 125x - 250$ and the revenue function is $r(x) = -0.3x^2 + 150x$. Find the profit function.

11. A manufacturing company has developed a cost model, $C(x) = 0.15x^3 + 0.01x^2 + 2x + 120$, where *x* is the number of items sold, in thousands. The sales price can be modeled by $S(x) = 30 - 0.01x$. Therefore, revenue is modeled by $R(x) = x \bullet S(x)$. The company's profit, $P(x) = R(x) - C(x)$, could be modeled by

1) $0.15x^3 + 0.02x^2 - 28x + 120$
2) $-0.15x^3 - 0.02x^2 + 28x - 120$
3) $-0.15x^3 + 0.01x^2 - 2.01x - 120$
4) $-0.15x^3 + 32x + 120$