Trig Transformations

TrigTransformations.tns

Name ______________________

Class ______________________

Problem 1 – Function Notation with Trigonometric Functions

Function notation is a way of naming functions and then using these names to describe changes. For example, the equation $y = \sin(x)$ can be rewritten as $f(x) = \sin(x)$. The $f(x)$ part is read as the function named f in terms of the variable x.

If $f(x) = \sin(x)$, what would be the function notation of $f(x) + 4$? $f(x + 2) - 6$?

By substitution, $f(x) + 4 = \sin(x) + 4$ and $f(x + 2) - 6 = \sin(x + 2) - 6$.

- If $g(x) = \sin(x) + \cos(x)$, what is the function notation of $g(x - 4) - 12$?

Problem 2 – Transformational Graphing Part I

The top of page 2.2 shows the graph of **f1**(x) = sin (x). Move to the bottom of the page and graph the function **f2**(x) = –**f1**(x).

- Rewrite **f2**(x) using function notation.
- How is the graph on the bottom different from the graph on the top?

Now change **f1**(x) to cos(x) and then to tan(x).

- Overall, what effect does multiplying the function by –1 have on the graphs?

Problem 3 – Transformational Graphing Part II

The top of page 3.2 shows the graph of **f1**(x) = sin (x). Move to the bottom of the page and graph the function **f2**(x) = **f1**(x) + 2.

- Rewrite **f2**(x) using function notation.
- How is the graph on the bottom different from the graph on the top?
- What would happen if you change 2 to –1?

Now change **f1**(x) to cos(x) and then to tan(x).

- What effect does adding or subtracting a constant *outside* of the function have on the graphs?

Problem 4 – Transformational Graphing Part III

The top of page 4.2 shows the graph of **f1**(x) = sin (x). Move to the bottom of the page and graph the function **f2**(x) = **f1**(x – 90).

- Rewrite **f2**(x) using function notation.
- How is the graph on the bottom different from the graph on the top?
- What would happen if you change –90 to +90?

Now change **f1**(x) to cos(x) and then to tan(x).

- What effect does adding or subtracting a constant *inside* the function have on the graphs?

Problem 5– Transformational Graphing Part IV

The top of page 5.2 shows the graph of **f1**(x) = sin (x). Move to the bottom of the page and graph the function **f2**(x) = 2 **f1**(x).

- Rewrite **f2**(x) using function notation.
- How is the graph on the bottom different from the graph on the top?
- What would happen if you change 2 to $\frac{1}{2}$?

Now change **f1**(x) to cos(x) and then to tan(x).

- What effect does multiplying the function by a constant have on the graphs?

Problem 6– Transformational Graphing Part V

The top of page 6.2 shows the graph of **f1**(x) = sin (x). Move to the bottom of the page and graph the function **f2**(x) = **f1**($2x$).

- Rewrite **f2**(x) using function notation.

- How is the graph on the bottom different from the graph on the top?

- What would happen if you change 2 to $\frac{1}{2}$?

Now change **f1**(x) to cos(x) and then to tan(x).

- What effect does multiplying the variable of the function by a constant have on the graphs?

Exercises

Decide what transformations would need to take place for the graph of $f(x) = \cos(x)$ to match each of the following functions.

a. $f(x) = 2\cos(3x)$

b. $f(x) = -4\cos(x-5)$

c. $f(x) = 2\cos(x+4)-3$

d. $f(x) = -3\cos(\frac{1}{5}x)+9$