Nazareth Academy High School
Honors Calculus Summer Assignment

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Name _____

Honors Calculus is an advanced-level mathematics course which utilizes certain aspects of previous math courses that you have taken. In order to ensure your success in the course, there is a mandatory summer assignment packet.

Most topics should be a review. You should not only be familiar with the topics but should know them well enough to be tested on them.

Study your unit circle! You need to know this well for Honors Calculus.

On the first day of class, you should have your completed summer assignment with you. The assignment will be graded as your first test grade for the year. No work, no credit. Please circle or box your final answers. If the assignment is late, you will lose 20% of your grade each day until it is handed in.

If you have any questions during the summer, please email me.

This is a very challenging course. You should be prepared to work to the best of your ability. Success in the course will be a result of your desire to work hard, both in class and independently.

Have a great summer!

Ms. Souyack

1. Solve for x: $x^2 + 5x < 0$

2. Solve for x: $-3 \leq 2 - 5x \leq 12$

3. Solve for x: $|2x - 1| \geq 3$

4. Draw a number line graph of x for the solution to #3.

5. Solve by completing the square: $x^2 - 8x + 1 = 0$

6. Solve using the quadratic formula:

   $2x^2 + 5x - 12 = 0$

7. Write as one fraction:

$$\frac{4x}{x-1} - \frac{x}{x+2}$$

8. Factor: $12x^2 (4x+5)^7 (2x+1) + 24x(4x+5)^8$

Given the points A (4, -5), B (6, -2), C (3, 0)

9. Find the distance AB

10. Name the midpoint of $\overline{AB}$

11. Is $\triangle ABC$ scalene, isosceles, or equilateral? Explain.

12. Write the equation in slope-intercept form
for the line perpendicular to line AC through A.

13. Find the x- and y-intercepts:
$$y = \frac{x-1}{x+3}$$

14. What is the range of the function in #13?

15. What type of symmetry does the function
$$y = \frac{x^2}{x^2 - 4}$$

16. Find all points of intersection of:
$$y = -x^2 + 4x$$
$$y = x^2$$

For Problems # 17-19

According to company records, in 1980 the company earned $3.2 million in earnings and in 1985 earned $4.7 million. Assume a linear model for earnings in millions of dollars, E, versus time in years, t. Let 1980 be year $t = 0$.

17.   Write an equation for E as a function of t.

18.   Estimate the company's gross profits in 2000.

19.   What information does the slope convey to the company?

For $f(x) = \begin{cases} ||x - 7|, & x \le -2 \\ 2x - 3, & x > -2 \end{cases}$
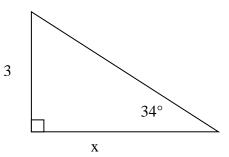
20.   Find $f(-5)$

21.   Find $f(4)$

For the function $\quad f(x) = \dfrac{3x-5}{x^2-3x-4}$
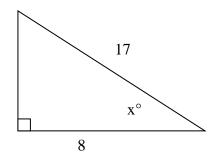
22.   Find the domain

23.   Find the roots (zeroes)

Given the functions $\quad f(x) = x^2 + 4 \quad$ and $\quad g(x) = \sqrt{x-5}$

24.   Find $f(g(x))$

25.   Find the inverse of g(x)

26. $\log_5 625 =$ _____

27.   ln 4.56 = _____

28.   Solve this equation: $2\log(x+3) - \log(5-x) = \log 1$

29. $5\log_2 16 - 0.5\log_2 64 =$ _____

Find x in each right triangle shown below: Round answers to 2 decimal places.
30.

```
     |\
     | \
   3 |  \
     |   \   34°
     |_____
        x
```

31.

```
     |\
     | \
     |  \  17
     |   \
     |  x°\
     |____\
        8
```

32. Name these values. Note all angles must be in radians. Use the unit circle! If it is not on the
     unit circle then you may use a calculator to round to 3 decimal places.

a. $\sin \dfrac{\pi}{6} =$ _____   b. $\tan \dfrac{2\pi}{3} =$ _____   c. $\sec \pi =$_____

d. $\cot \dfrac{5\pi}{3} =$ _____   e. $\cos(-1.16) =$ _____   f. $\csc(-4) =$ _____

g. $\arcsin \dfrac{\sqrt{2}}{2} =$ _____   h. $\arctan(12) =$ _____   i. $\text{arcsec}(-2) =$ _____

33.   Solve for x, $0 \leq x \leq 2\pi$:
$$\sin^2 x - 2\sin x = 3$$

34.   Prove the following identity
$$\tan^2 x - \sin^2 x = \left(\sin^2 x\right)\left(\tan^2 x\right)$$