



Nazareth Academy High School
Calculus Summer Assignment

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Name _____

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 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

| <u>Question</u> | <u>Hint</u> |
|---|--|
| 1. Solve for x: $x^2 + 5x < 0$ | Factor and test intervals |
| 2. Solve for x: $-3 \leq 2 - 5x \leq 12$ | Dividing by negatives |
| 3. Solve for x: $ 2x - 1 \geq 3$ | Rewrite as two inequalities |
| 4. Draw a number line graph of x for the solution to #3. | Determine direction and if graph includes endpoints |
| 5. Solve by completing the square: $x^2 - 8x + 1 = 0$ | Move constant to other side, add new term to both sides |
| 6. Solve using the quadratic formula: $2x^2 + 5x - 12 = 0$ | Use correct signs for a, b, c |

- | | <u>Question</u> | <u>Hint</u> |
|--|---|--------------------------|
| 7. | Write as one fraction: $\frac{4x}{x-1} - \frac{x}{x+2}$ | Find common denominator |
| 8. | Factor: $12x^2(4x+5)^7(2x+1) + 24x(4x+5)^8$ | Use GCF |
| <u>Given the points A (4, -5), B (6, -2), C (3, 0)</u> | | |
| 9. | Find the distance AB | Use distance formula |
| 10. | Name the midpoint of \overline{AB} | Use the midpoint formula |
| 11. | Is $\triangle ABC$ scalene, isosceles, or equilateral? Explain. | Find length of each side |

Question

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

Hint

Perpendicular slopes are negative reciprocals

13. Find the x- and y-intercepts:

$$y = \frac{x-1}{x+3}$$

Set one variable at a time equal to zero.

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

Set of all possible y-values

15. What type of symmetry does the function

$$y = \frac{x^2}{x^2 - 4}$$

If $f(-x) = f(x)$, then y-axis symmetry.

If $f(-x) = -f(x)$, then origin symmetry.

16. Find all points of intersection of:

$$y = -x^2 + 4x$$

$$y = x^2$$

Use substitution or graphing calculator.

Question

Hint

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 . Find slope and y-intercept

18. Estimate the company's gross profits in 2000. Use equation from #17

19. What information does the slope convey to the company? Look at what the units would be

For $f(x) = \begin{cases} |x-7|, & x \leq -2 \\ 2x-3, & x > -2 \end{cases}$

20. Find $f(-5)$ Determine which rule

21. Find $f(4)$ Determine which rule

For the function $f(x) = \frac{3x-5}{x^2-3x-4}$

22. Find the domain

Where denominator is not 0

23. Find the roots (zeroes)

Set $f(x) = 0$

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

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

Substitute

25. Find the inverse of $g(x)$

Switch x and $g(x)$, then solve

26. $\log_5 625 = \underline{\hspace{2cm}}$

Exponent-Log Relationship

27. $\ln 4.56 = \underline{\hspace{2cm}}$

Use Calculator, Round to 3 decimal places.

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

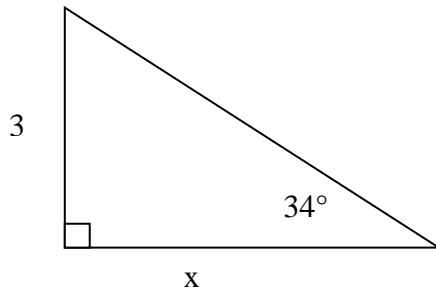
Properties of log, make 1 log

29. $5\log_2 16 - 0.5\log_2 64 = \underline{\hspace{2cm}}$

Exponent-Log Relationship

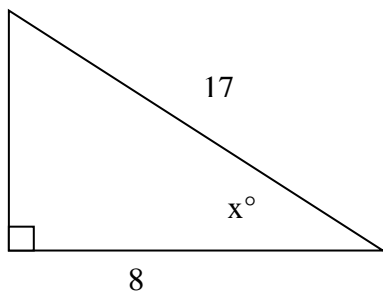
Find x in each right triangle shown below: Round answers to 2 decimal places.

30.



Use trig or inverse trig functions to find sides or angles

31.



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

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

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

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

Let $A = \sin x$, then factor

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

Use Pythagorean or Trig Id.