AP Calculus Summer Packet Form #1

1. Rationalize the denominator of the expression. Then simplify the answer.

$$\frac{\sqrt{x}}{\sqrt{x}+\sqrt{3}}$$

[1] _____

2. Evaluate the expression for the given value of x.

$2x^2 + 3x - 9$ for $x = -3$

[2] _____

3. Verify the identity.

$$\frac{\cos x}{1-\sin x} = \sec x + \tan x$$

[3] _____

4. Factor the trinomial.

$24x^2 - 14x - 20$

[4] _____

5. $M(-1, -1)$ is the midpoint of $\overline{RS}$. If S has coordinates $(4, 2)$, find the coordinates of R.

[5] _____

6. Use inverse functions where needed to find all solutions of the equation in the interval $[0, 2\pi)$.

$$10\sin^2 x - \left(-2 - 5\sqrt{3}\right)\cos x - \sqrt{3} - 10 = 0$$

[6] _____

7. Find the domain of the expression.

$$\frac{x^2+11x+28}{x^2+14x+45}$$

[7] _____

8. Use inverse functions where needed to find all solutions of the equation in the interval $[0, 2\pi)$.

$\tan^2 x + \sec x - 5 = 0$

[8] _____

9. Convert all of the terms to sines and cosines and simplify.

$$\frac{\sec x}{\cot x \csc x}$$

[9] _____

10. Use the fundamental identities to write the expression in terms of a single trigonometric function.

$$\frac{1}{1+\sin x}+\frac{1}{1-\sin x}$$

[10] _____

11. Determine the volume of a rectangular prism with dimensions $5a$ cm, $(2a-9)$ cm, and $(a+4)$ cm. Write the result as a polynomial in standard form.

[11] _____

12. Identify the numbers that are *not* integers.

$$23,\ \sqrt{3},\ 3.34,\ 0,\ -2.7777,\ \frac{7}{9},\ -3$$

[12] _____

13. Find the domain of the expression.

$$\sqrt{x+16}$$

[13] _____

14. Find all solutions in the interval $[0,\ 2\pi)$.

$$\cos^2 9x-\cos^2 5x=0$$

[14] _____

15. Simplify the expression.

$$\frac{\left(9^3x^{-3}y\right)^{-4}}{\left(9^5xy^3\right)^{-5}}$$

[15] _____

16. Express $\cos 8\theta \cos \theta$ as a sum containing only sines or cosines.

[16] _____

17. Simplify the expression.

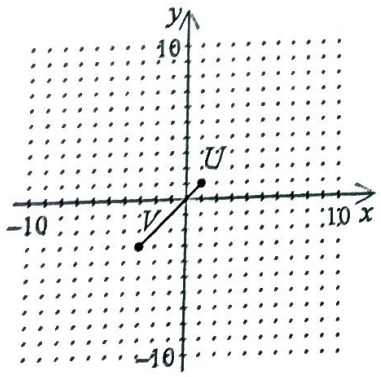
$$\frac{(x+4)^{3/4}(x+3)^{-2/3} - (x+3)^{1/3}(x+4)^{-1/4}}{\left[(x+4)^{3/4}\right]^2}$$

[17] _____

18. Which fundamental identities could be used to verify the identity?
$\tan\theta\cos\theta = \sin\theta$

[18] _____

19. Find the midpoint of the line segment connecting the two points. Then show that the midpoint is the same distance from each point.



[19] _____

20. Write the polynomial in standard form.
$2x^4 + 4x - 4x^6 + 1$

[20] _____

21. Perform the operation(s) and simplify.

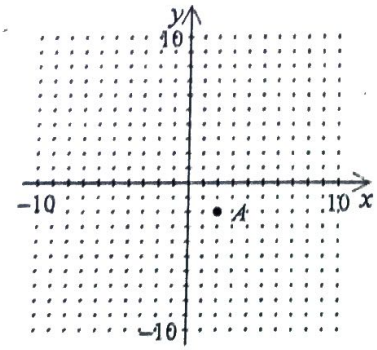
$$\frac{3x^2 - 8x + 4}{3x^2 - 11x + 6} \div \frac{x^2 + x - 6}{2x^2 - 18}$$

[21] _____

22. Verify that the triangle with vertices $R(-4, 0)$, $S(0, 0)$, and $T(-2, -3)$ is an isosceles triang le.

[22] _____

23. Name the coordinates of point A and the quadrant in which A is located.



[23] _____

24. Factor by grouping.
$9x^7 + 8x^6 - 45x - 40$

[24] _____

25. Perform the operations and identify the result written in standard form.
$(6a^3 + 6) - (5a^2 + 2) - (8a^3 - a^2)$

[25] _____

26. Find all solutions of the equation in the interval $[0, 2\pi)$.
$\tan^2 2x - 1 = 0$

[26] _____

27. Lena made a sketch of a circular pool on a graph grid. On the graph the diameter of the pool has endpoints at $(-6, -7)$ and $(-2, 0)$. What are the coordinates of the center of the pool?

[27] _____

28. Find all solutions in the interval $[0, 2\pi)$.

$$\tan\frac{x}{2} + \cot x - 1 = 0$$

[28] _____

29. Multiply or find the special product.

$$[(x+6)+7][(x+6)-7]$$

[29] _____

30. Verbally describe the subset of real numbers represented by the inequality. Then sketch the subset on the real number line. State whether the interval is bounded or unbounded.

$x < 7$

[30] _____

31. Simplify the expression.

$$4\sqrt{3} - 2\sqrt{64} - 5\sqrt{27}$$

[31] _____

32. Factor by grouping.

$$5x^6 - 25x^4 + 2x^3 - 10x$$

[32] _____

33. Write the number in scientific notation.

In 1995, Hungary had a population of about 10,120,000 people.

[33] _____

34. Write the radical form of one of the Pythagorean trigonometric identities.

[34] _____

35. Verify the identity.

$$\sin(x + 2\pi) = \sin x$$

[35] _____

36. Use the power-reducing formulas to find the exact value of the trigonometric function.

$\sin^2 \frac{17\pi}{8}$

[36] _____

37. Find all solutions of the equation in the interval $[0, 2\pi)$.

$-3\cos x + 3 = 2\sin^2 x$

[37] _____

38. Factor out the common factor.

$5x(x-6) - 9(x-6)$

[38] _____

39. Perform the operation(s) and simplify.

$\frac{x-4}{x^2-25} - \frac{x-6}{x^2-x-30}$

[39] _____

40. Find the coordinates of the point that is located 3 units to the right of the y-axis and 4 units below the x-axis.

[40] _____

41. Give an example of the Multiplicative Identity Property.

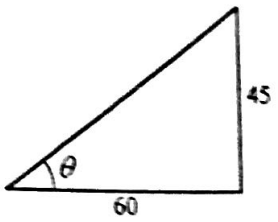
[41] _____

42. Factor the trinomial.

$a^5 + 3a^4 - 10a^3$

[42] _____

43. Use the figure to find the exact value of the trigonometric function.
$\cos 2\theta$



[43] _____

44. Multiply or find the special product.
$\left(5x - \frac{2}{7}y\right)\left(5x + \frac{2}{7}y\right)$

[44] _____

45. Find all solutions of the equation in the interval $[0, 2\pi)$.
$\sin 2x = \cos x$

[45] _____

46. Find the exact value of the expression.
$\cos\frac{\pi}{12}\cos\frac{11\pi}{12} - \sin\frac{\pi}{12}\sin\frac{11\pi}{12}$

[46] _____

47. Completely factor the expression.
$-9x^4 + 225x^2$

[47] _____

48. Simplify the complex fraction.
$$\frac{\frac{4}{x} + \frac{3}{2x}}{\frac{1}{3x} + \frac{3}{4x}}$$

[48] _____

49. Rationalize the numerator of the expression. Then simplify the answer.

$$\frac{5\sqrt{3}}{2}$$

[49] _____

50. Use a double angle formula to rewrite the expression.

$8 \sin x \cos x$

[50] _____

51. Solve the equation.

$3 \csc x + 2\sqrt{3} = 6 \csc x$

[51] _____

52. Simplify the complex fraction.

$$\frac{\dfrac{x^2 - 18x + 81}{40x}}{\dfrac{x - 9}{8x}}$$

[52] _____

53. Is the equation a valid form of one of the Pythagorean trigonometric identities? $1 - \tan^2 \beta = \sec^2 \beta$

[53] _____

54. Find all solutions of the equation in the interval $[0, 2\pi)$.

$\sin x \cos x + \cos x = 0$

[54] _____

55. Find all solutions of the equation.

$$\sin 3x = \frac{\sqrt{3}}{2}$$

[55] _____

56. Simplify the expression.
$\sqrt{48} + \sqrt{12}$

[56] _____

57. Use the power-reducing formulas to find the exact value of the trigonometric function.
$\tan^2 105°$

[57] _____

58. Find the exact value of $\sin 75°$.

[58] _____

59. Write the fraction as a sum of two or more terms.
$\dfrac{2x^6 - 3x^5 + 3x^2 - 6}{x^4}$

[59] _____

60. Write the rational expression in simplest form.
$\dfrac{x^2 - x - 42}{7 - x}$

[60] _____

AP Calculus Summer Packet

Form #2

1. Factor the trinomial.
$r^3 + 2r^2 - 3r$

[1] _____

2. Simplify the complex fraction.
$$\frac{\frac{1}{2x} - \frac{3}{2x}}{\frac{4}{x} + \frac{3}{4x}}$$

[2] _____

3. Give an example of the Additive Inverse Property.

[3] _____

4. Verify the identity.
$\sin(x - 2\pi) = \sin x$

[4] _____

5. Express $\sin 6\theta \sin 2\theta$ as a sum containing only sines or cosines.

[5] _____

6. Simplify the expression.
$$\frac{(4^4 x^4 y^3)^{-3}}{(4^5 x^{-3} y^4)^{-4}}$$

[6] _____

7. Multiply or find the special product.
$[(x-2)+1][(x-2)-1]$

[7] _____

8. Verbally describe the subset of real numbers represented by the inequality. Then sketch the subset on the real number line. State whether the interval is bounded or unbounded.
$x < 2$

[8] _____

9. Use a double angle formula to rewrite the expression.
$6\cos^2 x - 3$

[9] _____

10. Write the number in scientific notation.
In 1995, Egypt had a population of about 65,980,000 people.

[10] _____

11. Write the polynomial in standard form.
$5x^2 - 5x - 3x^3 + 4$

[11] _____

12. Factor out the common factor.
$9x(x-2) - 4(x-2)$

[12] _____

13. Verify that the triangle with vertices $Q(0,\ 0)$, $R(-\sqrt{3},\ -1)$, and $S(-\sqrt{3},\ 1)$ is an equilateral triangle.

[13] _____

14. Use the fundamental identities to write the expression in terms of a single trigonometric function.
$\cot x(\cos x \tan x + \sin x)$

[14] _____

15. Write the fraction as a sum of two or more terms.
$\dfrac{9x^6 + 9x^5 - 4x^2 - 6}{x^4}$

[15] _____

16. Perform the operations and identify the result written in standard form.
$(3p^4-3)-(6p^3-5)-(4p^4+5p^3)$

[16] _____

17. Find the exact value of cos 15°.

[17] _____

18. Patrick made a sketch of a circular pool on a graph grid. On the graph the diameter of the pool has endpoints at $(2,\ 0)$ and $(-8,\ -6)$. What are the coordinates of the center of the pool?

[18] _____

Find all solutions of the equation in the interval $[0,\ 2\pi)$.

19. $2\sin x\cos x+\cos x=0$

[19] _____

20. $4\cos^2 6x-3=0$

[20] _____

21. Determine the volume of a rectangular prism with dimensions $3j$ cm, $(2j-9)$ cm, and $(j-4)$ cm. Write the result as a polynomial in standard form.

[21] _____

22. Find the exact value of the expression.
$\sin\frac{\pi}{12}\cos\frac{7\pi}{12}+\cos\frac{\pi}{12}\sin\frac{7\pi}{12}$

[22] _____

23. Find the domain of the expression.
$\sqrt{x-16}$

[23] _____

24. Use the power-reducing formulas to find the exact value of the trigonometric function.

$\sin^2 \frac{19\pi}{8}$

[24] _____

25. Perform the operation(s) and simplify.

$\frac{x-4}{x^2-25} - \frac{x-6}{x^2-x-30}$

[25] _____

26. Rationalize the denominator of the expression. Then simplify the answer.

$\frac{\sqrt{x}}{\sqrt{x}-\sqrt{7}}$

[26] _____

27. Which fundamental identities could be used to verify the identity?

$\frac{\sin^2\theta}{\sec^2\theta - 1} = \cos^2\theta$

[27] _____

28. Rationalize the numerator of the expression. Then simplify the answer.

$\frac{12\sqrt{7}}{5}$

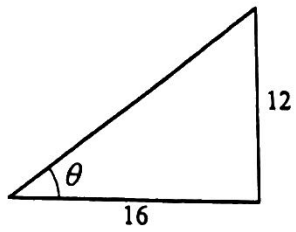
[28] _____

29. Find all solutions of the equation in the interval $[0, 2\pi)$.

$-3\cos x + 3 = 2\sin^2 x$

[29] _____

30. Use the figure to find the exact value of the trigonometric function.
$\tan 2\theta$



[30] _____

31. Completely factor the expression.
$-4x^4 + 64x^2$

[31] _____

32. Use inverse functions where needed to find all solutions of the equation in the interval $[0, 2\pi)$.
$6\sin^2 x - \cos x - 5 = 0$

[32] _____

33. Evaluate the expression for the given value of x.
$3x^2 + 3x - 4$ for $x = -5$

[33] _____

34. Find the coordinates of the point that is located 4 units to the right of the y-axis and 2 units below the x-axis.

[34] _____

35. Write the rational expression in simplest form.
$$\frac{x^2 - x - 42}{7 - x}$$

[35] _____

36. Factor by grouping.
$2x^7 - 10x^5 + 5x^3 - 25x$

[36] _____

37. Use inverse functions where needed to find all solutions of the equation in the interval $[0, 2\pi)$.

$$\sqrt{3}\tan^2 x + \left(2 + 5\sqrt{3}\right)\sec x + 10 + \sqrt{3} = 0$$

[37] _____

38. Find all solutions in the interval $[0, 2\pi)$.

$$\cos^2 5x - \cos^2 x = 0$$

[38] _____

39. $M(-3, 4)$ is the midpoint of $\overline{RS}$. If S has coordinates $(5, 8)$, find the coordinates of R.

[39] _____

40. Simplify the complex fraction.

$$\frac{\dfrac{x^2 + 6x + 9}{-12x}}{\dfrac{x + 3}{-4x}}$$

[40] _____

41. Factor by grouping.

$$9x^8 + 7x^7 - 45x - 35$$

[41] _____

42. Factor the trinomial.

$$30x^2 - 5x - 75$$

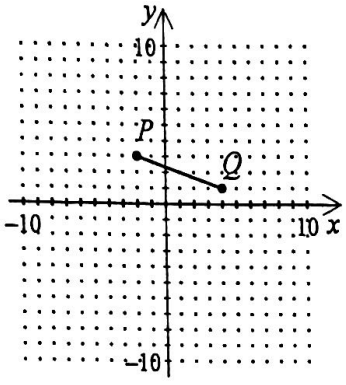
[42] _____

43. Verify the identity.

$$\frac{\tan x}{\csc x} = \frac{1}{\cos x} - \cos x$$

[43] _____

44. Find the midpoint of the line segment connecting the two points. Then show that the midpoint is the same distance from each point.



[44] _____

45. Use the power-reducing formulas to find the exact value of the trigonometric function.
$\tan^2 75°$

[45] _____

46. Solve the equation.
$4\csc x + 3\sqrt{2} = 7\csc x$

[46] _____

47. Multiply or find the special product.
$\left(12x - \frac{2}{5}y\right)\left(12x + \frac{2}{5}y\right)$

[47] _____

48. Identify the numbers that are *not* whole numbers.
$25,\ \sqrt{3},\ 3.06,\ 0,\ -3.7777,\ \frac{7}{9},\ -5$

[48] _____

49. Convert all of the terms to sines and cosines and simplify.
$\cot x \sec x$

[49] _____

50. Simplify the expression.
$9\sqrt{6}-2\sqrt{25}+5\sqrt{54}$

[50] _____

51. Find the domain of the expression.
$\frac{x^2-7x+10}{x^2+3x-28}$

[51] _____

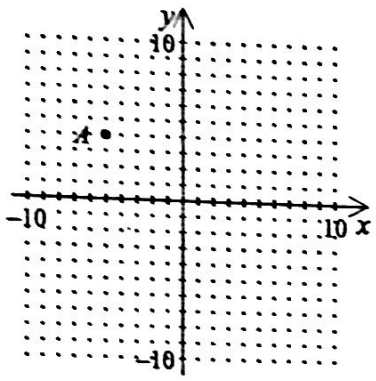
52. Simplify the expression.
$\sqrt{112}+\sqrt{28}$

[52] _____

53. Perform the operation(s) and simplify.
$\frac{2x^2-9x+10}{2x^2-7x+5} \div \frac{x^2-x-2}{2x^2-2}$

[53] _____

54. Name the coordinates of point A and the quadrant in which A is located.



[54] _____

55. Is the equation a valid form of one of the Pythagorean trigonometric identities? $1-\sin^2\beta=\cos^2\beta$

[55] _____

56. Find all solutions in the interval $[0, 2\pi)$.

$$\tan\frac{x}{2} + \cot x - 1 = 0$$

[56] _____

57. Simplify the expression.

$$\frac{(x+4)^{3/4}(x+2)^{-2/3} - (x+2)^{1/3}(x+4)^{-1/4}}{\left[(x+4)^{3/4}\right]^2}$$

[57] _____

58. Find all solutions of the equation.

$$\sin 3x = \frac{\sqrt{3}}{2}$$

[58] _____

59. Write the radical form of one of the Pythagorean trigonometric identities.

[59] _____

60. Find all solutions of the equation in the interval $[0, 2\pi)$.

$$\sec^2 x + \tan x = 1$$

[60] _____