Advanced Math Analysis Summer Work

Directions: Complete all problems either on this packet or on separate paper. Show valid and appropriate work. The use of a scientific or graphing calculator is prohibited. All answers and solutions must be legible and answers easily found (circle, box, or highlight). You are allowed to use your notes from last year or work with others to complete the following problems.

[1 – 3]: Solve for x.

1. $3x - 4 = 15\left(\frac{1}{3}x + \frac{2}{5}\right)$

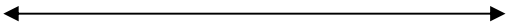
2. $\frac{2}{5}x - \frac{1}{2} = 3 - \frac{3}{10}x$

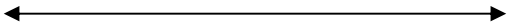
3. $\frac{1}{2}\left(\frac{4}{9}x - 8\right) + \frac{1}{3}\left(\frac{6}{5}x + 18\right) = 4$

[4 – 9]: Solve for x and sketch the solution on a number line.

4. $(4 - 2x) - (4 - x) < (2x - 1) + (x - 3)$

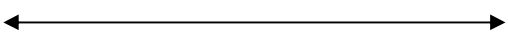
5. $7(2x + 5) - 6(x + 8) > 7$

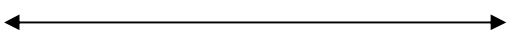




6. $x - 2(5 - 2x) \geq 6x - 3\frac{1}{2}$

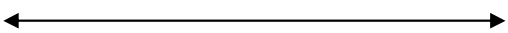
7. $5 + 4(x - 1) > 7x + 13$

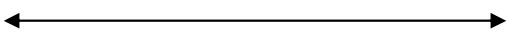




8. $-1 < 2x - 7 < 1$

9. $\frac{x}{2} < 5$ and $3x - 4 + 2x > 6$





Name_____

[10 – 14]: Solve for x.

10. $|8-2x| = 6$

11. $|x+7| = -22$

12. $4|5x| + 8 = 12$

13. $|x-8| < 1$

14. $2|x+6| + 1 > 11$

[15 – 17]: Write the equation of the line in point-slope form: $y - y_1 = m(x - x_1)$

15. Given a slope of $\frac{3}{7}$ and passes through the point (14, 15) .

16. Given that the line is parallel to y = 4x + 1 and passes through the point (2,3).

17. Given that the line is perpendicular to 3x + 5y = 15 and passes through the point (–3,3).

[18 and 19]: Write the equation of the line in slope-intercept form: $y = mx + b$

18. Given that it has an x-intercept of 4 and a y-intercept of 6.

19. Given that the line passes through the points (1,1) and (5, – 11).

[20 – 21]: Convert #15 and #17 into slope-intercept form: $y = mx + b$

20. Convert #15 into slope-intercept form.

21. Convert #17 into slope-intercept form.

[24 – 26]: Simplify each expression. Only positive exponents in final answer.

24. $(3x)^{-3}$

25. $2x^{-4}$

26. $\left(\frac{x^{-1}}{y^2}\right)^0 \bullet (xy^2)^{-1}$

[27 – 41]: Factor completely.

27. $4x^2 + 7x - 36$

28. $100 - 29m + m^2$

29. $25a^2 + 25ab - 14b^2$

30. $9x^4 - 13x^2 + 4$

31. $x(a+b) + y(a+b)$

32. $3(a+b) + (4-x)(a+b)$

33. $2ax + 10a - 5x - 25$

34. $a^2 - b^2c^2$

35. $y^4 - 16$

36. $x^2 + 30 = 11x$

37. $10x^2 - 9x = 1$

38. $x^3 + 4x^2 + 4x = 0$

39. $x^2 = 8x$

40. $2x^3 - 32x = 0$

41. $x^4 = 12x^2$

[42 – 52]: Solve each equation.

42. $(x + 7)^2 = 169$

43. $3x^2 - 4x + 1 = 0$

44. $8x^2 + 10x = 3$

45. $4x^4 - 12x^2 = -9$

46. $(x + 7)^2 - 36 = 0$

47. $\frac{x^2}{6} - \frac{x}{2} = \frac{2}{3}$

48. $\frac{x}{4} - \frac{x+2}{3} + \frac{1}{6} = 0$

49. $(u+3)(u-3) = 8u$

50. $a^2(3a-1) = 0$

51. $x^3 - x^2 = 0$

52. $y^3 + 5y^2 = 24y$

[53 – 60]: Find all x and y intercepts. If there are none, state *none*.

53. $y = x^2 + 7x + 6$

54. $y = 2(x + 1)^2 - 8$

55. $y = x^2 - 6x - 3$

56. $y = x^2 + 7$

57. $y = x^2 - 9x + 20$

58. $y = 4x^2 + 12$

59. $y = x^2 - 10x - 24$

60. $y = 4(x + 5)^2 - 12$

[61 – 64]: Solve for x. Be sure to check your answers.

61. $\sqrt{2x-1}=5$

62. $\sqrt{2x+3}=11$

63. $4\sqrt[3]{x}-1=7$

64. $\sqrt{x+3}=\sqrt{x}+1$

[65 - 72]: Given the function $f(x)=x^2+3x$ and $g(x)=-5x+2$, **evaluate the following:**

65. $f(-2)$

66. $f(a)$

67. $f(x+1)$

68. $g(-11)$

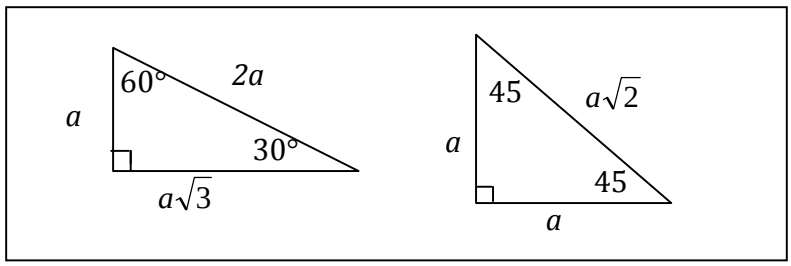
69. $g(5)$

70. $g(x-4)$

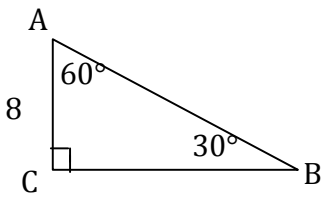
71. $f(g(1))$

72. $g(f(x))$

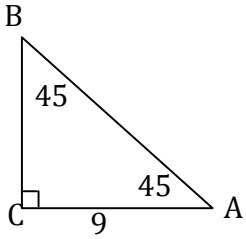
[73 – 78]: Special Right Triangles.



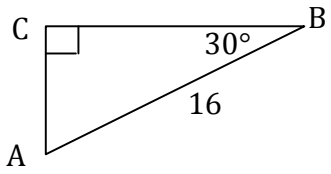
73. Find $\sin 60, \cos 60, \tan 30$



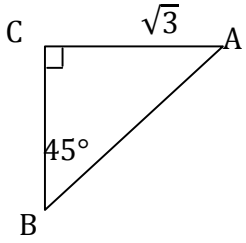
74. Find $\sin 45, \cos 45, \tan 45$



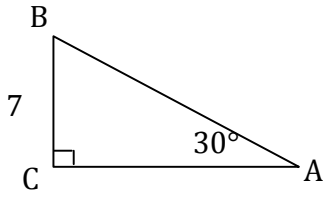
75. Find $\sin 30, \cos 30, \tan 60$



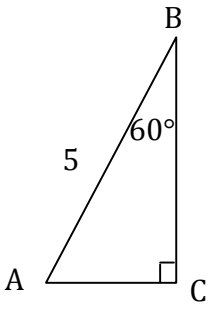
76. Find the lengths of sides AB and AC.



77. Find the lengths of sides AB and BC.



78. Find the lengths of sides AB and BC.



[79 – 82]: Use $\triangle ABC$, with a right angle at angle *C*.

79. Let $\sin A = \frac{4}{5}$, find $\tan A$ and $\cos B$.

80. Let $\cos A = \frac{12}{13}$, find $\sin A$ and $\tan B$.

81. Let $\tan B = \frac{4}{5}$, find $\sin A$ and $\cos B$.

82. Let $\cos A = \frac{\sqrt{3}}{2}$, find $\sin A$ and $\cos B$.

83. Sketch each angle in standard position, identify the quadrant for the terminating ray, and find the reference angle, θ'.

a) $\theta = 320°$ b) $\theta = 165°$ c) $\theta = -400°$ d) $\theta = \frac{17\pi}{12}$ e) $\theta = \frac{13\pi}{5}$ f) $\theta = -\frac{14\pi}{9}$

84. Find one positive angle and one negative angle that are coterminal with each angle:

a) $\theta = 220°$ b) $\theta = \frac{7\pi}{12}$ c) $\theta = -450°$ d) $\theta = -\frac{3\pi}{8}$ e) $\theta = -5\pi$

85. Convert each angle from degrees to radian measure or radians to degrees, whichever is appropriate.

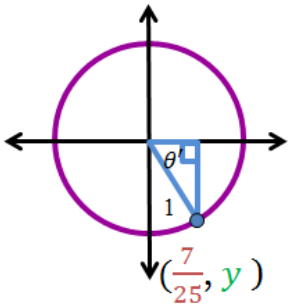
a) $\theta = 128°$ b) $\theta = \frac{17\pi}{9}$ c) $\theta = -50°$ d) $\theta = -\frac{4\pi}{7}$ e) $\theta = 3\pi$

86. Evaluate each trig function for the given angle.

a) $\sin\frac{5\pi}{6}$ b) $\cos\frac{2\pi}{3}$ c) $\tan 120°$ d) $\sin(-225°)$ e) $\cos\left(-\frac{3\pi}{2}\right)$ f) $\tan 5\pi$

g) $\sin\frac{2\pi}{3}$ h) $\cos\frac{11\pi}{6}$ i) $\tan 210°$ j) $\sin(90°)$ k) $\cos\left(-\frac{\pi}{4}\right)$ m) $\tan\frac{5\pi}{4}$

87. Find the missing coordinate for the point on the unit circle. Then find the simplified sine, cosine, and tangent ratios for the angle, θ, by using its reference angle, θ'.



88. Find two solutions of θ in degrees without a calculator such that $0° \leq \theta < 360°$.

a) $12\cos\theta - 6\sqrt{3} = 0$ b) $\sqrt{2}\tan\theta + \sqrt{6} = 0$ c) $4\sqrt{3}\sin\theta + 6 = 0$

89. Find all solutions of θ in degrees without a calculator such that $0° \leq \theta < 2\pi$.

a) $8\sin\theta - 4\sqrt{2} = 0$ b) $18\tan^2\theta - 6 = 0$ c) $2\tan\theta\,(\cos\theta + 1) = 0$

d) $4\cos\theta\left(\tan\theta + \sqrt{3}\right) = 0$ e) $\left(2\sin\theta + \sqrt{3}\right)(\tan\theta - 1) = 0$ f) $4\tan\theta\cos\theta + 4\sqrt{3}\cos\theta = 0$

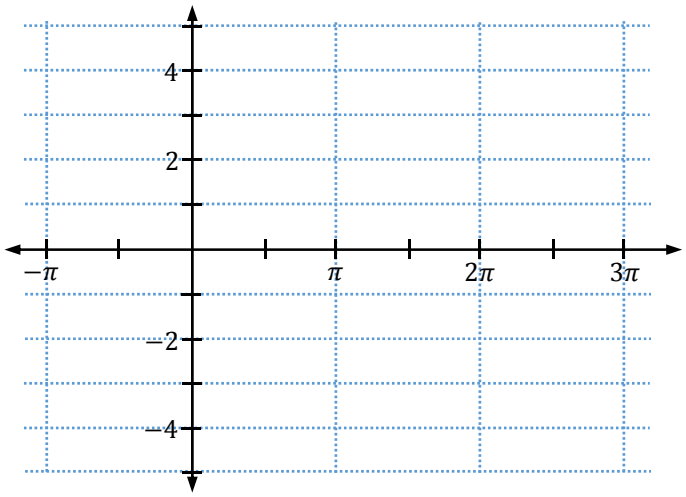
f) $2\sin^2\theta - 3\sin\theta + 1 = 0$

90. Determine if the terminating ray for θ could be in the 2nd quadrant.

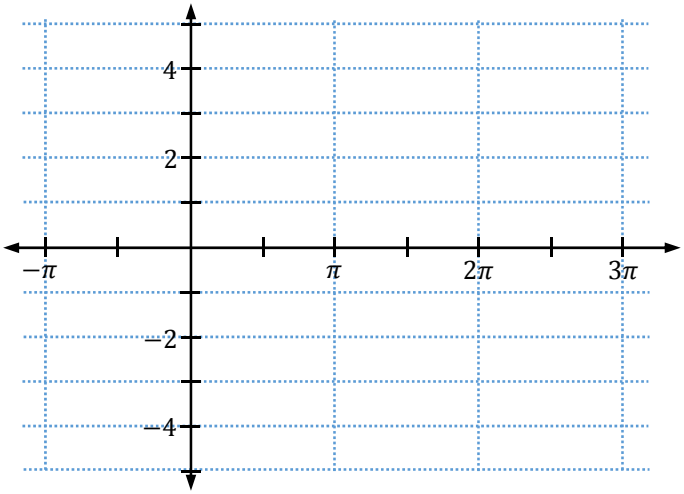
$a)$ $\sin\theta > 0$ b) $\cos\theta < 0$ c) $\tan\theta > 0$

91. Sketch the first period for each of the following functions.

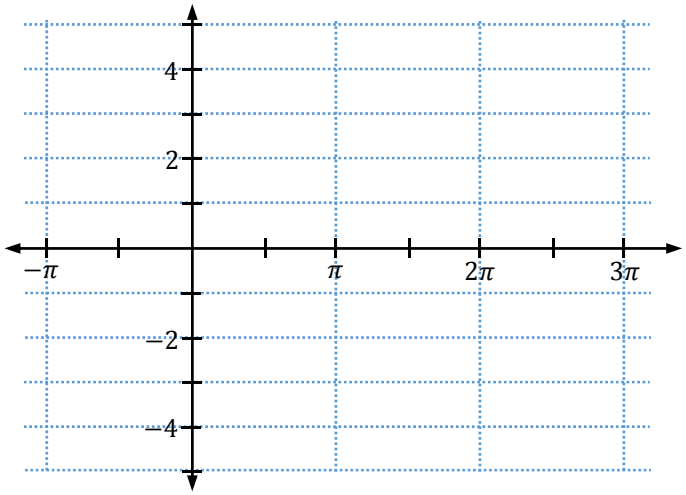
a) $f(x) = \cos x + 1$



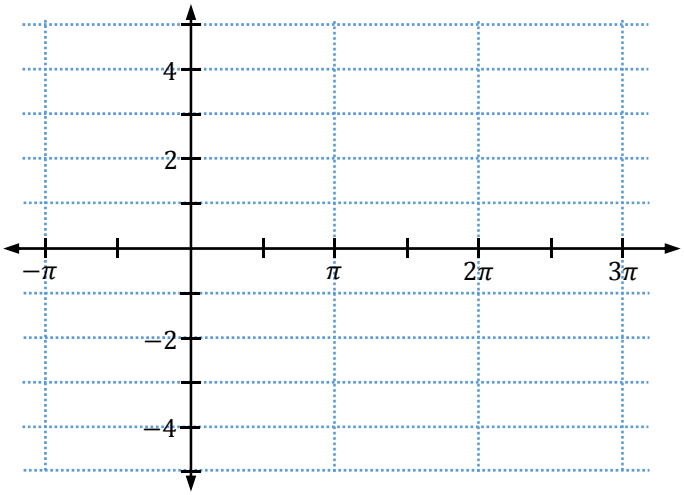
b) $f(x) = 3\sin(x - \pi)$



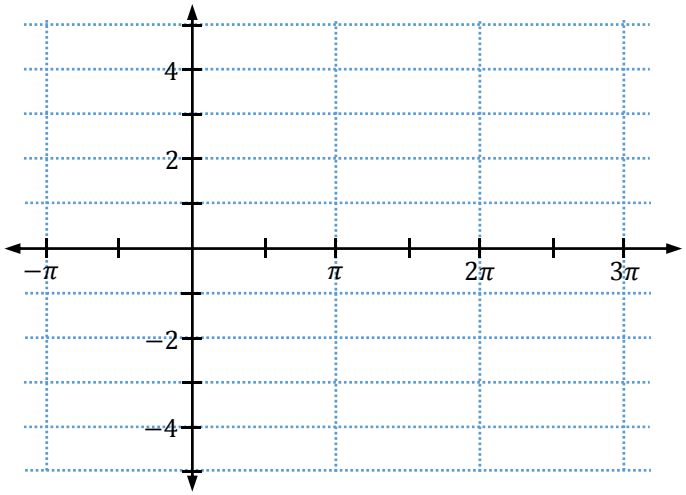
c) $f(x) = 4\cos\left(x + \frac{\pi}{2}\right) + 1$



d) $f(x) = -2\sin(x - \pi) + 3$



e) $f(x) = 3\sin\left(x - \frac{\pi}{2}\right) - 1$



f) $f(x) = -\frac{1}{2}\cos\left(x + \frac{\pi}{2}\right) - 2$