



## *Placement Test – Level III*

**Directions:** Complete all problems to the best of your ability. Show all of your work. You may use a non-graphing calculator to do basic calculations, but not to factor or graph. There is no time limit. Each problem is worth 1 point. When you are done, please grade your test using the “Placement Test – Level III – Answer Key”.

1. Solve.  $8[-12 + 4(3x - 7)] = 9[5(x - 2) - 6(3x - 1)]$

2. Find three consecutive odd integers whose sum is -243.





3. Solve the formula  $A = \frac{1}{2}h(b_1 + b_2)$  for  $b_2$ .

4. Harry is making 15 pounds of nut mixture with cashews and almonds. The cashews cost \$6 per pound and the almonds cost \$4.50 per pound. How many pounds of each should Harry use for the mixture to cost \$5.40 per pound?





5. Solve, graph the solution on a number line, and write the solution in interval notation.

$$-\frac{8}{5}x \leq \frac{3}{7}$$

6. Solve, graph the solution on a number line, and write the solution in interval notation.

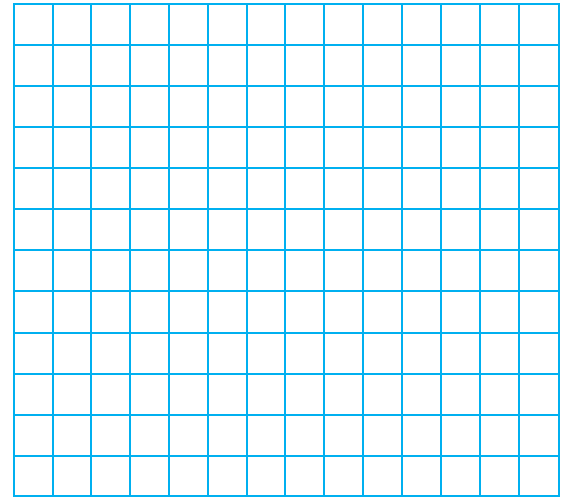
$$5x - 3 > 6 \text{ or } 4x - 1 \leq 3$$

7. Solve.  $|4x - 3| + 7 = 12$





8. Graph the line.  $4x + 2y = 8$



9. Identify the slope and y-intercept of the line.  $7x + 3y = 9$

10. Find the equation of the line passing through the given points. The slope formula is:  $m = \frac{y_2 - y_1}{x_2 - x_1}$ . The point-slope equation is:  $y - y_1 = m(x - x_1)$ .  
(-3, -1) and (4, 7)

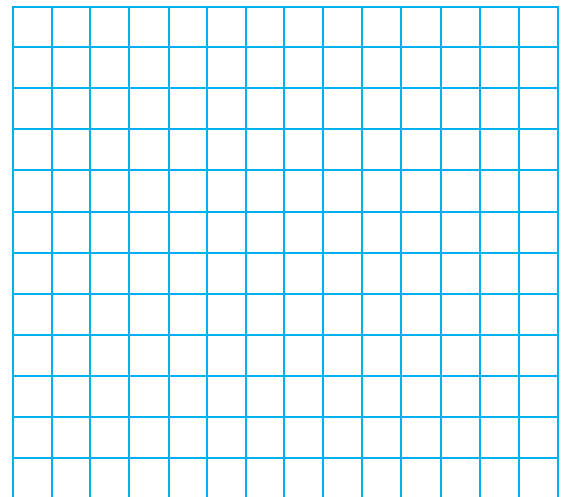




11. Determine whether the ordered pair is a solution to the inequality:  
 $y > x - 4$  ;  $(-5, -6)$

12. Determine the domain and range of the given relation.  
 $\{(2, 5), (4, 9), (5, 12), (7, 13), (8, 20)\}$

13. Graph the function.  $f(x) = \sqrt{x - 3}$





14. Solve the system of equations.

$$\begin{aligned}5x + 3y &= 11 \\ -3x + y &= -1\end{aligned}$$

15. The difference of two complementary angles is 28 degrees. Find the measure of the angles.

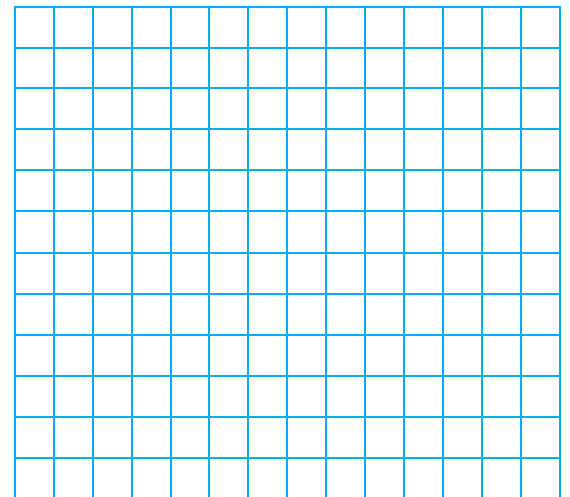




16. Sophia is preparing 15 liters of a 20% saline solution. She has only 35% and 15% solutions in her lab. How many liters of the 35% and 15% solutions must be mixed to make the 20% solution?

17. Solve the system by graphing.

$$\begin{aligned}y &\geq -2x + 5 \\ y &< x - 1\end{aligned}$$





18. A boy drops a ball off a 100-foot cliff into the ocean. The polynomial  $h(t) = -16t^2 + 100$  gives the height of the ball, in feet,  $t$  seconds after it is was dropped. Find the height after  $t = 2$  seconds.

19. Simplify.  $\left(\frac{3x^2y^{-3}}{2z^4}\right)^2$

20. Multiply.  $(2x^2 - 7)(9x^2 + 3x - 1)$







21. Divide.  $(y^3 - 343) \div (y - 7)$

22. Factor.  $xy - 5y - x^2 + 5x$

23. Factor.  $18x^2 - 37xy + 15y^2$





24. Factor. The difference of cubes formula is:  $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$ .  
 $27x^3 - 125y^3$

25. Factor.  $60x^2y - 75xy + 30y$

26. Solve.  $3x^2 + 8x = 9 + 2x$





27. Multiply.  $\frac{5x^2-180}{10x^2-10} \cdot \frac{20x+20}{2x-12}$

28. Add.  $\frac{6}{y^2+12y+35} + \frac{3y}{y^2+y-42}$





29. Simplify.

$$\frac{\frac{3}{x} + \frac{1}{2x}}{\frac{1}{3x} - \frac{3}{4x}}$$

30. Solve.

$$\frac{4}{x-3} + \frac{2x}{x^2-9} = \frac{1}{x+3}$$





31. Bobby can weed the garden in 6 hours, while his wife can do it in 4 hours. How long would it take them if they worked together?

32. Solve and write the solution in interval notation.

$$\frac{3x-4}{2x+1} < 0$$

33. Simplify.  $-\sqrt{392x^5y^6}$





34. Simplify.  $\sqrt[3]{\frac{16x^5y^4}{250xy}}$

35. Simplify.  $81^{\frac{1}{4}}$

36. Multiply and simplify.  $(2\sqrt{5} - 3)(\sqrt{5} + 4)$

37. Rationalize the denominator.  $\frac{4}{\sqrt[3]{9x^2}}$





38. Solve.  $\sqrt{x+4} + 2 = x$

39. Find the domain of the function and write the domain in interval notation.

$$f(x) = \sqrt{5x - 7}$$

40. Multiply and simplify.  $(4 - 9i)(3 + 7i)$





41. Solve by completing the square.  $z^2 + 4z = -12$

42. Solve using the Quadratic Formula. The Quadratic Formula is:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ .  
 $x^2 - 2x = 198$

43. Solve.  $2x^4 - 11x^2 + 12 = 0$



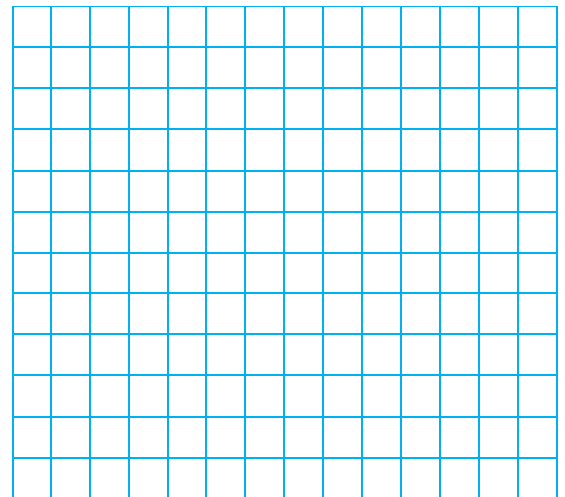




44. The base of a triangular sail is 4 feet less than the height. The area is 96 square feet. Find the base and height of the sail. The area of a triangle is:  $A = \frac{1}{2}bh$ .

45. Find the maximum or minimum value of the function.  $f(x) = -x^2 - 8x - 10$

46. Graph the quadratic using transformations.  $f(x) = 3(x - 4)^2 + 1$





47. Solve the inequality and write the solution in interval notation.

$$x^2 + 8x \geq -15$$

48. For the functions  $f(x) = 3x^2 + 4$  and  $g(x) = 7x - 2$ , find  $(f \circ g)(x)$ .

49. Solve.  $3^{2x-1} = 81$





50. Find the exact value of the logarithm without using a calculator.

$$\log_{\frac{1}{5}} 25$$

51. Use the properties of logarithms to condense the logarithm. Simplify if possible.

$$2\log_3 7 + \log_3(x - 1)$$

52. Solve.

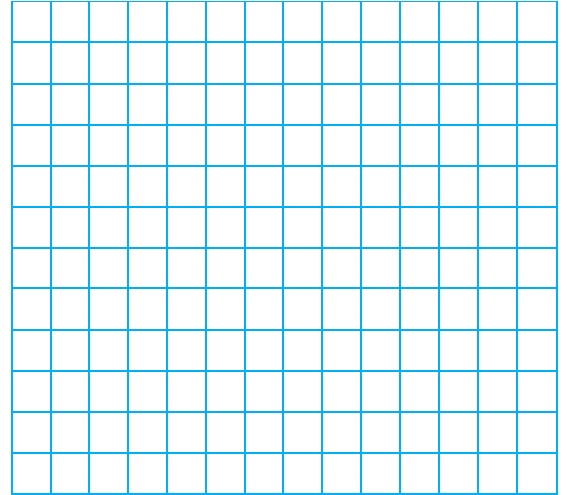
$$e^x = 9$$



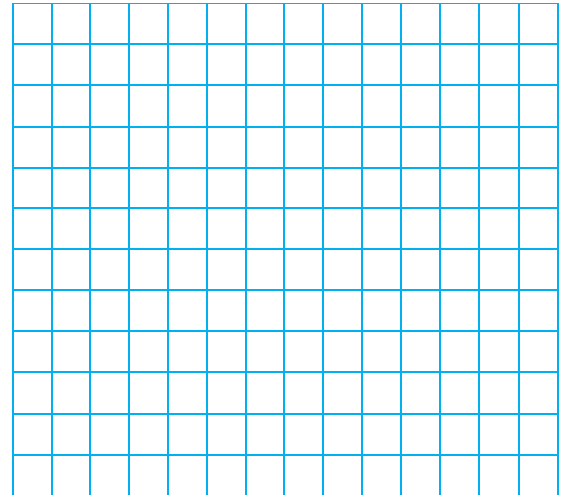


53. Identify the center and radius and then graph the circle.

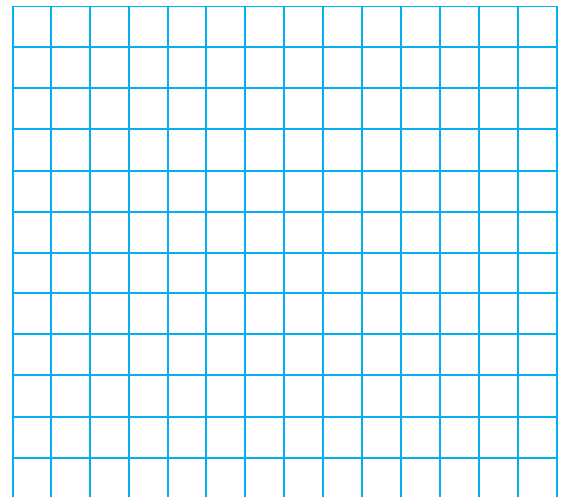
$$(x - 2)^2 + (x + 1)^2 = 9$$



54. Graph.  $x^2 + 4y^2 = 16$



55. Graph.  $\frac{x^2}{9} - \frac{y^2}{16} = 1$





56. Write the first five terms of the sequence whose general term is given.

$$a_n = 3n - 5$$

57. Write the first five terms of the arithmetic sequence with the given first term and common difference.

$$a_1 = 10 \text{ and } d = 4$$

58. Determine if the sequence is arithmetic, geometric, or neither.

144, 72, 36, 18, 9,.....





59. Evaluate.  $5!$

60. Evaluate.  $\binom{9}{2}$

