

Duke Ellington School of the Arts

AP Pre-Calculus Summer Packet

This summer packet is for all students enrolled in AP Pre-Calculus for the 2023-2024 school year. It is designed to review the pre-requisite skills that students need to be able to complete without a scientific/graphing calculator to be successful in this course. It should take 2 to 3 hours to complete this assignment. The entire packet is due **September 8, 2023**. You can either print out the packet, or work on the problems in a notebook. Any summer work turned in after the deadline will only be worth 86%. The problems in the packet are designed to help you review topics that are important to your success in AP Pre-Calculus. You will be tested on this material at the end of the second week of school. **You will NOT be allowed to use a calculator on the Summer Packet Test.**

Follow the directions in the packet and complete all the problems, neatly showing all your work. You will not be given credit for this assignment if no work is shown. You should not use a calculator when completing this packet. If you get stuck, please seek out online resources to help you strengthen these prerequisite skills. This packet will count as part of your first term grade and will be worth 50 points towards your Practice & Application grade. Enjoy your summer and see you in the fall!

Supplies list for SY23-24

- Pencils
- Erasers
- Pens
- Highlighters
- College-ruled loose-leaf paper
- 2-in binder with 4 dividers (only used for this class)
- Graph paper notebook
- Graphing Calculator (student's can lease one for the year from the school if unable to purchase)

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Simplify each expression.

1. $(-4)^2$

2. -4^2

3. 4^{-2}

4. -4^{-2}

5. $(5x^3)^2$

6. $(-4x^2)^{-1}$

7. $(x^3y^{-2})^{-1}$

8. $\frac{x^2y^3}{xy^5}$

9. $\frac{4x^{-2}(yz)^{-1}}{2^2x^4y}$

10. $\left(\frac{3x^{-1}}{4y^{-1}}\right)^{-2}$

Add, subtract, or multiply, as indicated. Express your answer as a single polynomial.

11. $(x^3 + 2x^2 + 3) + (x^2 - 3x + 3)$

12. $(x^2 - 2x - 4) - (x^3 - 2x^2 - x + 2)$

13. $4x^2(x^4 - 2x + 3)$

14. $(2x - 4)(x + 2)$

15. $(2x - 5)^2$

16. $(2x - 4)(3x^3 - 4x + 2)$

Factor each polynomial completely.

17. $x^2 - 49$

18. $4x^2 - 9y^4$

19. $5 - 45x^2$

20. $x^2 + 5x + 6$

21. $x^2 + 5x + 4$

22. $x^2 + 3x - 4$

23. $x^3 + 7x^2 - 30x$

24. $3x + 3$

25. $2x^2 - 9x + 10$

26. $x^3 - 3x^2 + 2x - 6$

27. $x^3 - 7x^2 + 5x - 35$

Use synthetic division to find the quotient and remainder when:

28. $x^3 - x^2 + 2x + 4$ is divided by $x - 2$

29. $x^5 + 5x^3 - 10$ is divided by $x + 1$

Reduce each rational expression to lowest terms.

$$30. \frac{3x+9}{x^2-9}$$

$$31. \frac{2x^2+5x-3}{1-2x}$$

$$32. \frac{\frac{x^2+7x+6}{x^2+x-6}}{\frac{x^2+5x-6}{x^2+5x+6}}$$

Solve each equation.

$$33. 2x - 3 = 5$$

$$34. 6 - x = 2x + 9$$

$$35. 5 - (2x - 1) = 10$$

$$36. \frac{2}{y} + \frac{4}{y} = 3$$

$$37. x^2 = 4x$$

$$38. |3x - 1| = 2$$

$$39. 2x^2 - 5x - 3 = 0$$

$$40. x^2 - 4x = -2$$

$$41. x^3 + 4x^2 - x - 4 = 0$$

Simplify each expression. (Your answer should NOT contain a decimal.)

42. $\sqrt{8}$

43. $\sqrt{54}$

44. $\sqrt{16x^5}$

45. $3\sqrt{7} + 2\sqrt{7}$

46. $(\sqrt{7} - 2)(\sqrt{7} + 4)$

47. $(\sqrt{x} + \sqrt{3})^2$

Rationalize the denominator.

48. $\frac{1}{\sqrt{3}}$

49. $\frac{-\sqrt{2}}{\sqrt{5}}$

50. $\frac{3}{2-\sqrt{5}}$

Perform the operation indicated.

51. $\frac{1}{3} + \frac{3}{4}$

52. $\frac{x}{5} + \frac{x}{3}$

53. $\frac{2}{5} - \frac{1}{3}$

Perform the operation indicated.

$$54. 3 - \frac{4}{7}$$

$$55. \frac{2}{5} \cdot \frac{1}{4}$$

$$56. 4 \cdot \frac{3}{5}$$

$$57. \frac{2}{5} \div \frac{1}{4}$$

$$58. 3 \div \frac{2}{5}$$

$$59. \frac{\frac{8}{9}}{\frac{3}{16}}$$

$$60. \frac{\frac{y}{5}}{\frac{y^2}{20}}$$

Solve each equation. Answers should be simplified without using decimals. No solution is not possible for these problems.

$$61. x^2 - 4x + 2 = 0$$

$$62. 4x^2 = 1 - 2x$$

Find an equation for the line:

63. containing the points (1,3) and (-1,2)

64. x-intercept = -4; y-intercept = 4

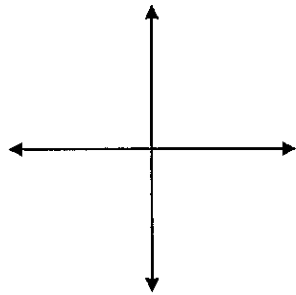
Solve the system of equations.

65. $x + 2y = -7$
 $x + y = -3$

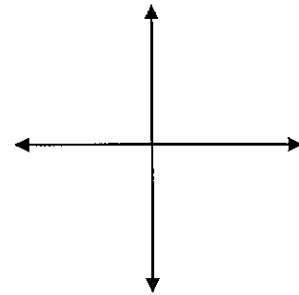
66. $3x - 6y = 2$
 $5x + 4y = 1$

Graph.

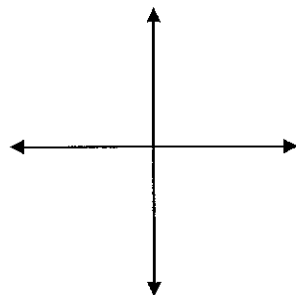
67. $y = -x + 3$



68. $2x + 3y = 6$



69. $x = 3$



70. $3y = 2x - 1$

