

# Pre-Calculus Summer Packet



Dear Student,

Welcome to Sayreville War Memorial High School and your math course for the year! There is much to learn this year, and each class session during school will require students to work diligently, both during and outside of class. This summer Math packet addresses the material that you should be comfortable with before the start of Pre-Calculus. This Math packet serves 2 purposes:

- 1) It will allow you to remain mathematically fresh during the summer and
- 2) It will enable you to “hit the ground running” when this course begins.

**This packet should be completed and brought with you on the first day of school. Use the answer key provided to check your work. If you come across questions that you are unsure of, make note and bring that up to your teacher during the review.** It would be a mistake to complete this packet immediately upon the completion of this past school year as well as waiting until just before the next school year begins. Take some time off and look towards beginning the packet come mid-summer. It is important that the techniques practiced in this packet are fresh in your mind come the first day of school.

**You will be assessed on this content within the first week or so of school.**

Good luck!

Name: \_\_\_\_\_

Directions: Show all Work! Place your answers on the space provided.

Select all that is applicable:

1.  $\sqrt{2}$

1. \_\_\_\_\_

Real number, Irrational number, Rational number, Integer, Whole number, Natural numbers

2.  $-\frac{13}{7}$

2. \_\_\_\_\_

Real number, Irrational number, Rational number, Integer, Whole number, Natural numbers

3. Let  $f(x) = 3x + 2$  and  $g(x) = 7x + 6$ . Find  $f \cdot g$  and its domain.

3. \_\_\_\_\_

4. Let  $f(x) = 3x - 6$  and  $g(x) = x - 2$ . Find  $\frac{f}{g}$  and its domain.

4. \_\_\_\_\_

Write the expression as a single logarithm

5.  $4\log x - 6\log(x + 2)$

5. \_\_\_\_\_

6. Solve  $\frac{1}{16} = 64^{4x-3}$

6. \_\_\_\_\_

7. Solve  $125^{9x-2} = 150$ . Round answer to the nearest ten-thousandth.

7. \_\_\_\_\_

8. Solve  $3\log 2x = 4$ . Round answer to the nearest ten-thousandth.

8. \_\_\_\_\_

9. Solve  $\log(x + 9) - \log x = 3$ . Leave your answer in simplest form of fraction.

9. \_\_\_\_\_

10. Simplify  $\ln e^3$

10. \_\_\_\_\_

11. The sales of lawn mowers  $t$  years after a particular model is introduced is given by the function  $y = 5500 \ln(9t + 4)$ , where  $y$  is the number of mowers sold. How many mowers will be sold 2 years after a model is introduced? Round the answer to the nearest whole number.

11. \_\_\_\_\_

12. A football was kicked vertically upward from a height of 4 feet with an initial speed of 60 feet per second. The formula  $h = 4 + 60t - 16t^2$  describes the ball's height above the ground,  $h$ , in feet,  $t$  seconds after it was kicked. What was the ball's height 3.2 seconds after it was kicked?

12. \_\_\_\_\_

13. Evaluate the expression.

$$\frac{7(x-3)}{2x-16}; x=9$$

13. \_\_\_\_\_

14. Find the distance between  $a$  and  $b$ ,  $a = -2.57$  and  $b = 9.23$

14. \_\_\_\_\_

15. Use absolute notation to describe the distance between  $a$  and 7 is no more than 9.

15. \_\_\_\_\_

16. If  $f(x) = 2x - 3$  and  $g(x) = -5x + 1$ , find the value of  $\frac{f(5)}{g(-3)}$ .

16. \_\_\_\_\_

For problem # 17 - 19, graph the equations on the coordinate planes provided at the end of the packet.

17. Find the slope of the line  $x = 5$ . Graph it on the coordinate plane.

17. \_\_\_\_\_

18. Find the equation of a line in slope intercept form, passing through  $(2, 5)$  and parallel to  $2x + 3y = -12$ . Graph the given line and the line parallel to it on the coordinate plane.

18. \_\_\_\_\_

19. Find the equation of line in standard form, passing through  $(-6, 4)$  and perpendicular to  $3x + 4y = 7$ . Graph the given line and the line perpendicular to it on the coordinate plane.

19. \_\_\_\_\_

For problem # 20 and 21 write the equation in Logarithmic form.

20.  $6^4 = 1,296$

20. \_\_\_\_\_

21.  $125^{\frac{4}{3}} = 625$

21. \_\_\_\_\_

For problem # 22 and 23 evaluate.

22.  $\log_5 \frac{1}{625}$

22. \_\_\_\_\_

23.  $\log 0.01$

23. \_\_\_\_\_

For problem # 24 -32, factor the following expressions:

24.  $5x^2 + 15x$

24. \_\_\_\_\_

25.  $10x^3 - 4x^2$

25. \_\_\_\_\_

26.  $2x(x - 7) + 3(x - 7)$

26. \_\_\_\_\_

27.  $x^3 + 4x^2 + 3x + 12$

27. \_\_\_\_\_

28.  $x^2 + 3x - 18$

28. \_\_\_\_\_

29.  $8x^2 - 10x - 3$

29. \_\_\_\_\_

30.  $6x^2 + 19x - 7$

30. \_\_\_\_\_

31.  $x^2 - 4$

31. \_\_\_\_\_

32.  $81x^2 - 49$

32. \_\_\_\_\_

33. Solve by factoring.  
 $6x^2 - 17x + 12 = 0$

33. \_\_\_\_\_

34. Solve the equation by using quadratic formula, leave answer in simplest form of radical.  
 $2x^2 - 6x + 1 = 0$

34. \_\_\_\_\_

Simplify the following expressions.

35.  $5(2x^2 - 6x) - (4x^2 - 3x)$

35. \_\_\_\_\_

36.  $\frac{30x^3y^4}{6x^9y^{-4}}$

36. \_\_\_\_\_

37.  $\sqrt{128x^7y^4}$

37. \_\_\_\_\_

38.  $81^{\frac{3}{4}}$

38. \_\_\_\_\_

39.  $\sqrt{6r}\sqrt{3r}$

39. \_\_\_\_\_

40.  $4\sqrt{50}-3\sqrt{18}$

40. \_\_\_\_\_

41.  $\frac{3}{5+\sqrt{2}}$

41. \_\_\_\_\_

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

42. \_\_\_\_\_

43.  $(2x-5)(x^2-4x+3)$

43. \_\_\_\_\_

44.  $(5x+3y)^2$

44. \_\_\_\_\_

45.  $\frac{x^2}{2} \div \frac{x}{4}$

45. \_\_\_\_\_

46.  $3^{\frac{1}{3}} \cdot 9^{\frac{1}{3}}$

46. \_\_\_\_\_

47.  $(8-\sqrt{2})(9+\sqrt{5})$

47. \_\_\_\_\_

Solve the equation and check for extraneous solutions.

48.  $\sqrt{x+10} - 7 = -5$

48.

X = \_\_\_\_\_

Extraneous solution if any \_\_\_\_\_

49. For the function  $f(x) = x^2 - 6x + 5$

Find the following:

a. axis of symmetry

a. \_\_\_\_\_

b. coordinates of vertex

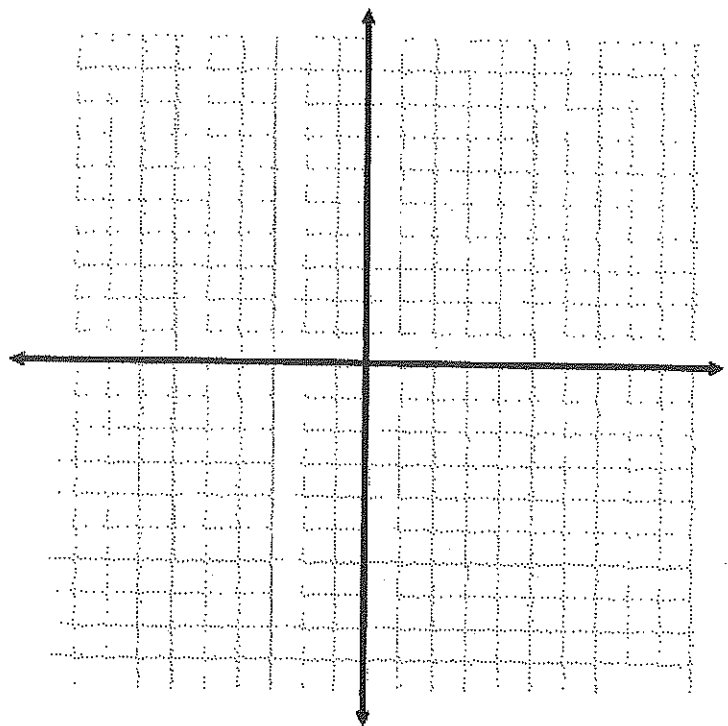
b. \_\_\_\_\_

c. x-intercept

c. \_\_\_\_\_

d. graph the function

d. \_\_\_\_\_



50. Solve the following inequalities algebraically and graphically and write your answer using interval notation:

$3x - 2 < 4$  and  $-4x - 3 \leq 9$



50. \_\_\_\_\_

