

Linganore High School

Transition Packet

Precalculus

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in Precalculus.

This packet is due within the first five days of the semester.
It will be your first homework grade for the course.

- Show all of your work NEATLY and ORGANIZED.
- Do not use a calculator on the sections that say "Noncalculator"
- Questions with NO work will receive NO credit.
- You will be graded on completion of the packet as well as accuracy on select problems.

NAME: _____

Math class prior to this one: _____ Grade Earned _____

Last math teacher: _____

Scoring:

Total points for completion ____/____

Total points for accuracy ____/____

TOTAL POINTS ____/____

TRANSITION INTO PRECALCULUS PACKET

I. Algebra/Geometry

1. Write an equation of the line, in slope intercept form, through $(2, -4)$ and perpendicular to $x - 2y = 7$.

2. Write the equation of the line parallel to the line $4x - 6y = -1$ and contains the x -intercept of $3x - 2y = 12$.

Use the following formulas to answer questions 3 and 4.

Midpoint formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

Distance formula: $d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

3. Find the distance and midpoint of the segment whose endpoints are $(-17, 11)$ and $(7, -7)$.
4. Find the distance and midpoint of the segment whose endpoints are $(1, -1)$ and $(-1, 1)$.

5. Without using a graph, find the point where the lines $y = \frac{2}{3}x - 5$ and $5x + 12y = 57$ intersect.

II. Polynomials – Perform the given operations and simplify the expressions.

6. $(y^2 + 2y - 5) + (8y^2 - 5y + 9)$

7. $(7x^3 - 5x^2 - 2) - (5x^3 - 2x^2 + 4)$

8. $-2ab(6a^2 - 4ab + 5b^2)$

9. $(2x - 5)(3x + 2)$

10. $(3x - 5)^2$

11. $(x + 4)(x - 1)(x - 5)$

III. Radicals/Complex Numbers – Simplify each expression.

12. $\sqrt{75}$

13. $\sqrt{128}$

14. $\sqrt{-1}$

15. $\sqrt{-63}$

16. $\sqrt{-300}$

17. $4\sqrt{3} + 11\sqrt{3}$

18. $2\sqrt{80} - \sqrt{320}$

19. $(\sqrt{10} + \sqrt{23})(\sqrt{10} - \sqrt{23})$

20. $(7i)^2$

21. $(4 + 17i) - (-2 + 12i)$

22. $(2x + 3)(1 - 2i)(1 + 2i)$

IV. Quadratics

Strategies to try when factoring

-GCF -Guess and Check

-Difference of two squares -Grouping

-Sum/Difference of cubes

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Factor completely each of the following:

23. $x^2 + 6x$

24. $8t^3 - 4t^2 + 20t$

25. $a^2 + 19a + 84$

26. $y^2 + 19y - 42$

27. $r^2 - 81$

28. $4n^2 - 49$

29. $t^3 - 125$

30. $8x^3 + 27$

31. $x^3 - 2x^2 - 9x + 18$

32. $2x^3 + 9x^2 + 8x + 36$

33. $5x^2 - 8x - 4$

34. $4x^2 + 15x + 14$

35. $7t^2 - 28y^2$

36. $8a^4 + 27ab^3$

37. $x^{16} - 1$

Solve each equation by factoring:

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

39. $3x^2 - 8 = 2x$

40. $25x^2 + x - 4 = x + 5$

3. Solve each equation by completing the square:

41. $x^2 + 6x + 1 = 0$

42. $x^2 - 10x + 7 = 0$

43. $2x^2 + 4x + 6 = 0$

Solve each equation by using the quadratic formula.

44. $-3x^2 - 5x + 12 = 0$

45. $3x^2 + 5x = 6$

46. $x^2 + 2x + 3 = 0$

V. Exponents

Properties:

$$a^m \cdot a^n = a^{m+n} \quad (a^m)^n = a^{m \cdot n} \quad a^{\frac{p}{r}} = \sqrt[r]{a^p}$$
$$a^{-n} = \frac{1}{a^n} \quad \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \quad \frac{a^m}{a^n} = a^{m-n}$$

Directions – Simplify using only positive exponents and NO CALCULATOR!!!

47. $\frac{x^2 \cdot x^5}{x^9}$

48. $(ht^2)^3$

49. $(-2)^4$

50. -2^4

51. $(-5)^3$

52. $(-2w^4)^2$

53. $\frac{10^5}{10^3}$

54. $\left(\frac{-8xz}{x^3}\right)^2$

55. $\frac{3}{x^2} \cdot 2x^4$

56. $(x^6 y^3)^3$

57. $\frac{3x^4 y^2}{9x^6 y^4}$

58. $\left(\frac{6ab^2}{2b}\right)^0$

59. $\frac{(3x^2)^{-1}}{6x^{-3}}$

60. $(27^{-2})^{-\frac{1}{3}}$

61. $\left(\frac{81}{64}\right)^{-\frac{1}{2}}$

62. $\left(\frac{0}{2a}\right)^{-1}$

VI. Logarithms

$$\text{Given } \log_b a = x, \text{ then } b^x = a$$

Evaluate the logarithm.

63. $\log_5 25$

64. $\log_3 27$

65. $\log_2 64$

66. $\log_4 \frac{1}{4}$

67. $\log_9 3$

68. $\log_4 8$

69. $\log_{27} \frac{1}{3}$

70. $\log_8 1$

71. $\log_6 \frac{1}{36}$

72. $\log_{16} 128$

VII. Rational Expressions

Simplify each expression.

73. $\frac{5}{x} + \frac{8}{x-3}$

74. $\frac{15x}{x^2+6x+8} - \frac{14}{x+4}$

75. $\frac{x+1}{x} + \frac{11x}{3x^2} - \frac{3}{2}$

76. $\left(\frac{x-6}{x^2-9}\right)\left(\frac{x^2+7x+12}{x^2-6x}\right)$

77. $\left(\frac{x^2-4}{x^2-3x-10}\right) \div \left(\frac{x^2-12x+20}{x^2-25}\right)$

78. Solve for x: $\frac{1}{x-2} = \frac{3}{x+2} - \frac{6x}{x^2-4}$

VIII. Graphing

LINES

$$y = mx + b$$

$$m = \frac{\text{rise}}{\text{run}} = \text{slope}$$

b = y-intercept

ABSOLUTE VALUES

$$y = a|x - h| + k$$

Vertex at (h, k)

a = right-side slope

$-a$ = left-side slope

PARABOLAS

$$y = ax^2 + bx + c$$

Y-Intercept at $(0, c)$

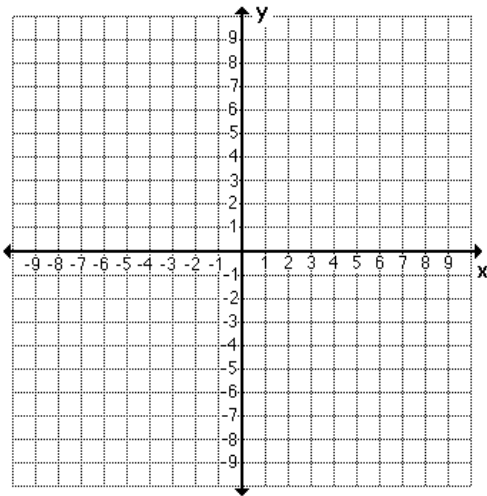
Axis of Symmetry at $x = \frac{-b}{2a}$

Vertex at $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

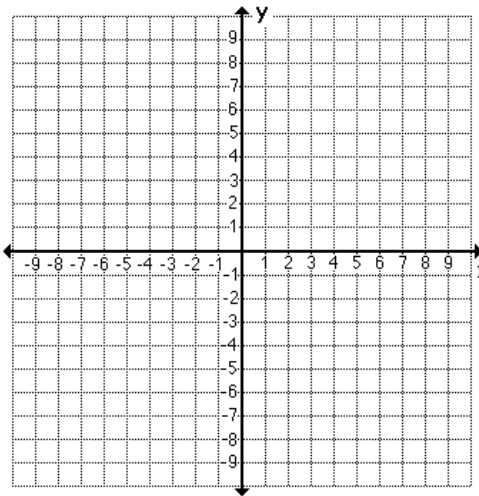
X-Intercepts: factor to form
 $y = (x - p)(x - q)$
 and the x-ints are
 at $(p, 0)$ and $(q, 0)$

Graph:

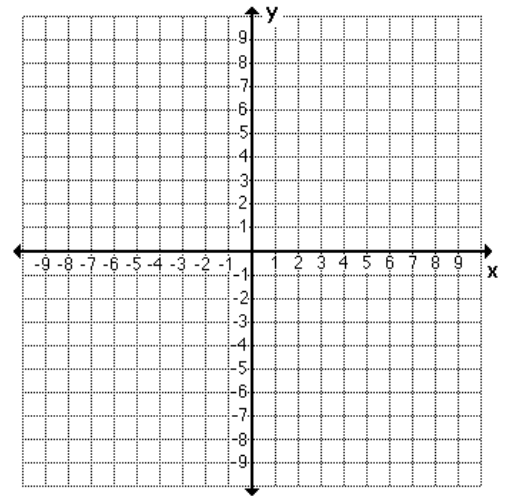
79. $y = -\frac{3}{2}x + 3$



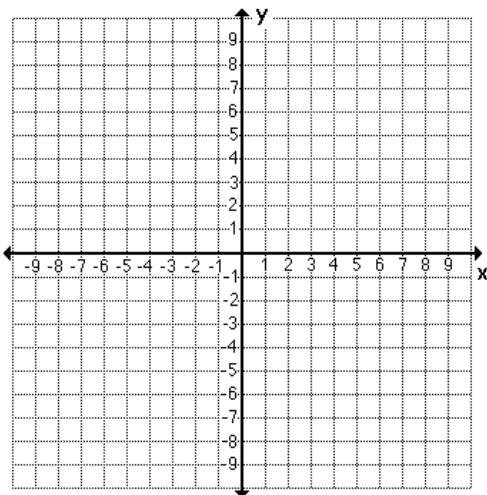
80. $y = |x - 3| - 1$



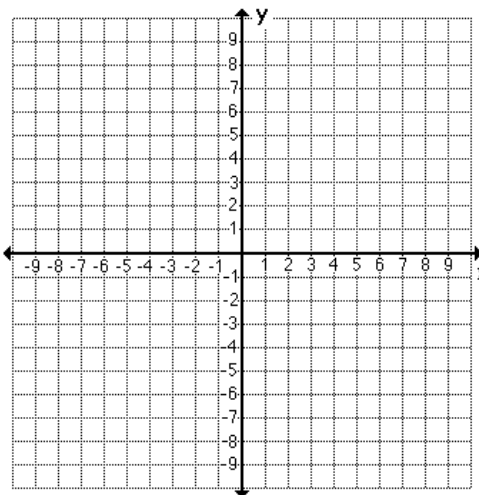
81. $y = -2|x + 4| + 6$



82. $y = x^2 + 4x - 5$



83. $y = x^2 - 14x + 45$



84. $y = -x^2 - 6x - 9$

