Algebra 2 Summer Work Packet

Covering Prerequisite Concepts for Incoming Algebra 31 Students

This workbook contains problems designed to ensure the student's readiness for Algebra 2. The nine topics covered in this packet are concepts that should be mastered before entering Algebra 2. If any of these topics have not been mastered, the accompanying Algebra 2 Review and Study Guide including explanations, examples and extra problems can be viewed or printed to help you complete your summer packet. It is strongly recommended that calculators NOT be used to complete the following problems since the objective of this packet is to verify the student's understanding of the concepts.

Topics Covered in this Packet:

A. Order of Operations
B. Fractions
C. Simplifying Expressions
D. Solving Equations
E. Solving Inequalities
F. Linear Graphs
G. System of Equations
H. Multiplying, Factoring and Solving Polynomial Expressions and Equations
I. Relations and Functions

Name: _____

Please place all answers on the answer sheet. Please do not use a calculator to complete this packet.

A. Order of Operations

Evaluate each expression. Write your answer in simplest form.

1. $4^2 \cdot 2 + \left[7 - \left(3^2 - 5\right)\right]$
2. $\left[15(10) - 12(10)\right] \div 10$
3. $(8-4)(12-3)\left(\frac{1}{2}\right)\left[2+1(2)\right]$
4. $4\left[\left(3+2\times 3\right)-5\right]+7$
5. $80 \div 4 \times 2 - 2 \times 2$
6. $3^2 + 7 \times 2 - 8 \times 2$

B. Fractions

Evaluate each expression. Write your answer in simplest form. Where applicable, leave answers as improper fractions. (Reduce, reduce, and reduce!)

7. $\frac{1}{3}\left(\frac{5}{6} - \frac{3}{4} + \frac{2}{3}\right)$
8. $\dfrac{\frac{3}{9} - \frac{8}{12}}{\frac{3}{8} \cdot 2}$
9. $-\frac{4}{9} \cdot \frac{3}{2} - \frac{5}{6} + 3$
10. $\left(4 - \frac{5}{6} + 3 \times 2\right) \div \frac{5}{6}$
11. $\dfrac{\frac{2}{3} + 4}{\frac{5}{6}}$
12. $\dfrac{\frac{3}{2} + \frac{3}{4} + \frac{3}{8}}{21}$

C. E. Simplifying Expressions

Simplify each expression. Write your answer in simplest form.

13. $\left(2y^3 9 - y + 16\right) - \left(5y^3 + 3y - 3\right)$
14. $-7x + 8(-2x + 5)$
15. $4y(2 - y) + 3y^2$
16. $5(x + y) - 4(3x - 2y + 1)$
17. $\dfrac{30x^2 + 20x - 10}{-5}$
18. $\dfrac{6x^4 + 27x^5 + 3x^4 + 3x^5}{3x^3}$

D. Solving Equations

Solve each of the following equations for *x*.

19. $3-2(x-1)=2+4x$

20. $8x-4+3(x+7)=6x-3(x-3)$

21. $16x-3(4x+7)=6x-(2x+21)$

22. $x-3-5(x+7)=10(x+3)-(7x+5)$

23. $-6x^2=-216$

24. $\frac{2}{3}=\frac{x+7}{3x}$

25. $\frac{x+6}{4}=\frac{4x}{16}$

26. $16x+24=7(x+6)$

Solve each equation for the indicated variable.

27. $ax+r=7$, for x
28. $y=3x+3b$, for b
29. $y=mx+6$, for m

30. You can estimate the time, t, in hours that it takes to fly a distance, d, in miles by using the formula $t=\frac{d}{500}+\frac{1}{2}$

    a. Use the formula to estimate the time that it takes to fly 1300 miles.
    b. Solve the formula for *d*.
    c. Use the rewritten formula from b to find how many miles you can fly in 4 hours.

E. Solving Inequalities

Solve each of the following inequalities for x.

31. $4x+7-x\le 31$

32. $4x+5\ge x+26$

33. $2(x-3)+8x\le 11$

Solve each of the following compound inequalities for x.

34. $-7\le 3x+2\le 8$

35. $-2\le 4x+6<22$

36. $8<3x-1\le 11$

F. Linear Graphs

Given two points M & N on the coordinate plane, find the slope of $\overleftrightarrow{MN}$, and state the slope of the line perpendicular to $\overleftrightarrow{MN}$.

37. M(9,6), N(1,4)
38. M(-2,2), N(4, -4)
39. M(-9,16), N(-11,16)

Find the x-intercept and y-intercept of the given line. Using the intercepts, graph the line.

40. $y = x - 5$
41. $6x + 2y = -12$
42. $3y = 9x + 15$
43. $y = -2x + 1$
44. $y - 10 = 2(x - 4)$
45. $6x - 5 = 2y + 3$

Find the slope and y-intercept of the graph of the equation. Using slope-intercept form, graph the line.

46. $y - 2x = 7$
47. $y = -\frac{2}{3}x + 3$
48. $3x + 6y = 12$

G. System of Equations

Solve the system of equation by using any method (graphing, substitution, combination/elimination).

49. $y = 3x + 13$
    $y = x - 3$
50. $3x + 2y = -10$
    $2x - 5y = 3$
51. $y = -5x + 1$
    $8x + 2y = -2$

52. At a basketball game, the total number of tickets sold was 550. Students were charged $4 each and adults were charged $9 each. If the total amount collected was $3200, how many students and adults were at the basketball game?

H. Multiplying, Factoring and Solving Polynomial Expressions and Equations

Multiply each to find the product.

53. $(3x - 2)(x - 1)$ 54. $(2x - 9)(3x - 8)$ 55. $(3x - 5)^2$

Find the greatest common factor and factor it out of the expression.

56. $-4x^3 - 20x^2 + 16x$ 57. $3x^5y^2 - 21x^2y^7$ 58. $15x^5 - 10x^4 + 5x^2$

Factor each expression completely.

59. $x^2 - 25$ 60. $x^2 + 2x - 8$ 61. $x^2 - 2x - 24$

62. $9x^2 - 81$ 63. $x^2 - 20x + 51$ 64. $2x^3 + 4x^2 - 6x$

Using the Zero Product Property, solve the following quadratic equations for *x*.

65. $x^2 = 25$ 66. $3x^2 = 48$ 67. $x^2 - 9x - 36 = 0$

68. $x^2 - 3x + 2 = 0$ 69. $x^2 + 7x + 12 = 0$ 70. $x^2 - 10x + 9 = 0$

Using the Quadratic Formula, solve the following quadratic equations.

71. $x^2 - 2x + 9 = 0$
72. $4x^2 - 5x - 4 = 0$
73. $6x^2 - 7x - 3 = 0$

I. Relations & Functions

For each relation, list the elements of the domain as a set and the elements of the range as a set. State whether the relation is a function.

74. {(1, 2), (2, 4), (3, 6), (4,8)}
75. {(−1,5), (3, 6), (2,3), (−1,8)}
76. {(−5, 6), (−2,7), (1,8), (4,9), (−5,10)}
77. {(−2, 20), (3,25), (4,30), (5, 20)}
78. {(−2,12), (5,7), (−1,12), (−2,10), (6,12)}

If $H(x) = 3x^2 - 6x$, then determine the following:

79. H(-1)
80. H(4)
81. Find *x* if H(x) = -1

Algebra 32 Summer Math Packet
Answer Key

Please place all answers on this answer sheet. Problems that require graphs should be done on the included grids on the next pages.

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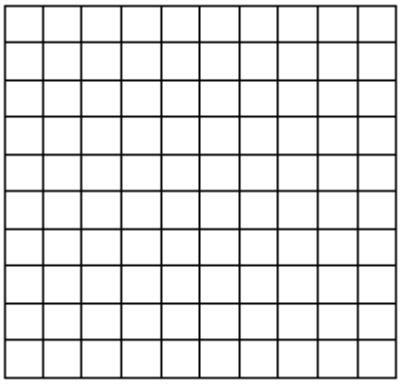

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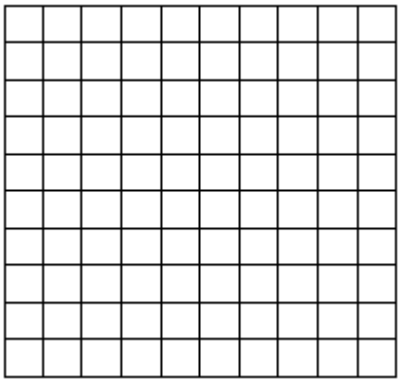

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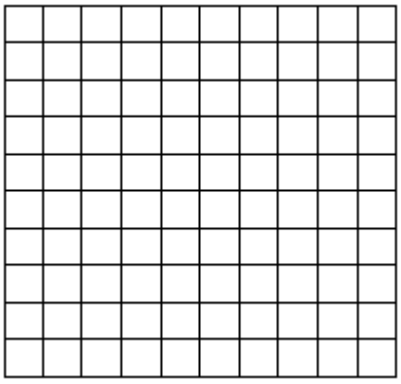

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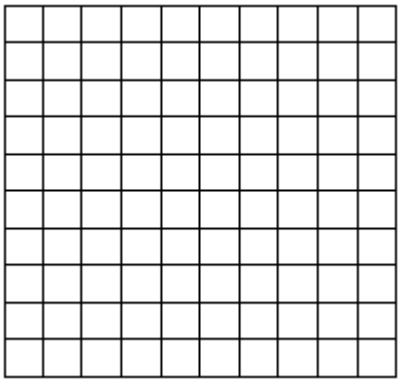

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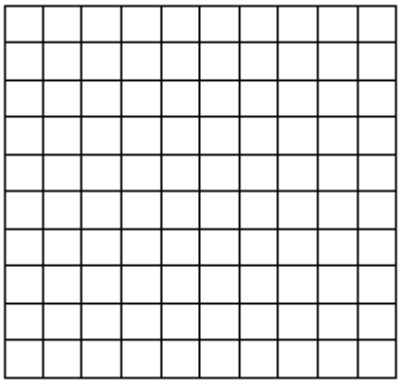

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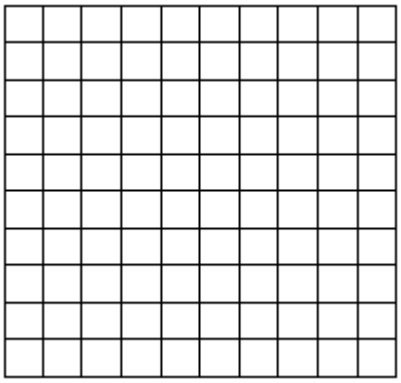

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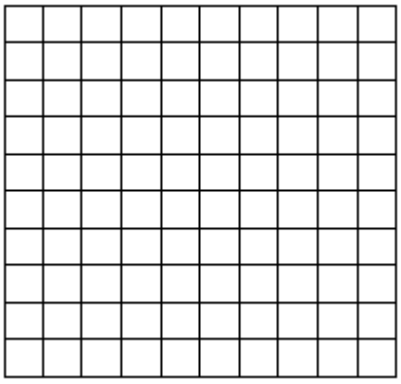

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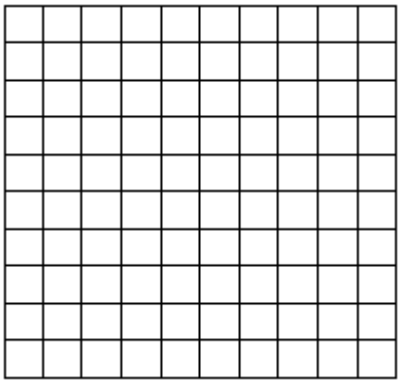

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