Algebra 2 – Summer Math Packet

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Section 1: Simplifying Algebraic Expressions

Simplify the expression.

1) $5a + 6b + 7a$

$18a$

2) $(4p - 7q) - (5q - 8p)$

$12p - 12q$

3) $5x^2 + 3x - 2 - 4x^2 + 5x - 4$

$x^2 + 8x - 6$

4) $4(2x^2 + y) + 5(x^2 - 3y)$

$13x^2 - 11y$

Section 2: Evaluating Algebraic Expressions

Evaluate the expression for the given value of the variable.

5) $x + 2x - x - 1;\ x = 2$

$2 + 4 - 2 - 1$

3

6) $5c^3 - 6c^2\ ;\ c = -5$

$5(-125) - 6(25)$

-775

7) $4a + 7b - 3 + 6b;\ \ a = 2,\ b = 5$

$8 + 35 - 3 + 30$

70

8) $\frac{3k+2(k-4)}{k+8};\ k = -3$

$-\frac{23}{5} = -4\frac{3}{5}$

Section 3: Solving Linear Equations

Solve the equation. Check your solution.

9) $5c - 9 = 8 - 2c$

$7c = 17$

$c = \frac{17}{7}$

10) $5(2 - a) = 0$

$10 - 5a = 0$

$-5a = -10$

$a = 2$

11) $6(n - 4) = 3n$

$6n - 24 = 3n$

$3n = 24$

$n = 8$

12) $4x - 8 = 2(x - 5)$

$4x - 8 = 2x - 10$

$2x = -2$

$x = -1$

13) $\frac{3}{4}x - 1 = 5$

$\frac{3}{4}x = 6$

$x = 8$

14) $\frac{x}{6} = \frac{9}{2}$

$2x = 54$

$x = 27$

15) $-3(a + 4) - 4a = -5$

$-3a - 12 - 4a = -5$

$-7a = 7$

$a = -1$

16) $3(n - 6) = -18 - 4n$

$3n - 18 = -18 - 4n$

$7n = 0$

$n = 0$

Section 4: Writing and Graphing Linear Equations

Slope Formula: $m = \frac{y_2 - y_1}{x_2 - x_1}$ **Slope-Intercept Form of Line:** $y = mx + b$

Point-Slope Form of a Line: $y - y_1 = m(x - x_1)$

Write the slope-intercept form of the equation of each line given the slope and y-intercept.

17) Slope = 2, y-intercept = -2

$y = 2x - 2$

18) Slope = $-\frac{3}{5}$, y-intercept = 2

$y = -3/5x + 2$

Write the slope-intercept form of the equation of the line that passes through the given point with the given slope.

19) Through: $(-3, 5)$, slope= -1

$y - 5 = -1(x + 3)$

$y = -x + 2$

20) Through: $(5,0)$, slope= $-\frac{3}{5}$

$y = -3/5(x - 5)$

$y = -3/5x + 3$

Write the slope-intercept form of the equation of the line that passes through the given points.

21) Through: $(-4, -2)$ and $(3, -1)$

$m = \frac{-1+2}{3+4} = \frac{1}{7}$

$y + 1 = 1/7(x - 3)$

$y = 1/7x - 10/7$

22) Through: $(0, -2)$ and $(4, 4)$

$m = \frac{4+2}{4-0} = \frac{6}{4} = \frac{3}{2}$

$y = 3/2x - 2$

23) Write the equation of the line parallel to $y = 3x + 2$ that passes through $(-1, -2)$.

$y + 2 = 3(x + 1)$

$y = 3x + 1$

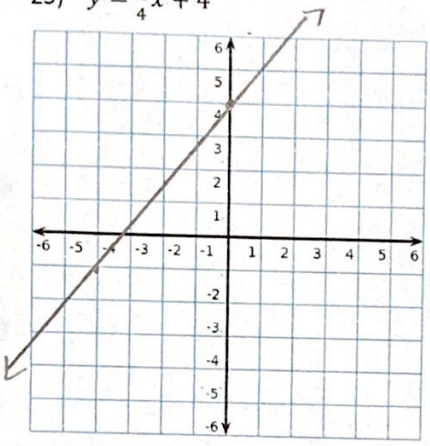
24) Write the equation of a line perpendicular to $y = \frac{1}{4}x - 5$ that passes through $(1, 1)$.

$y - 1 = -4(x - 1)$

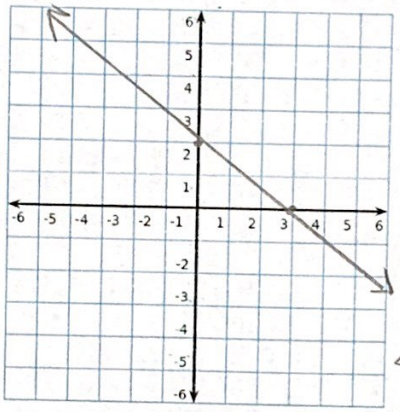
$y = -4x + 5$

Graph the equation.

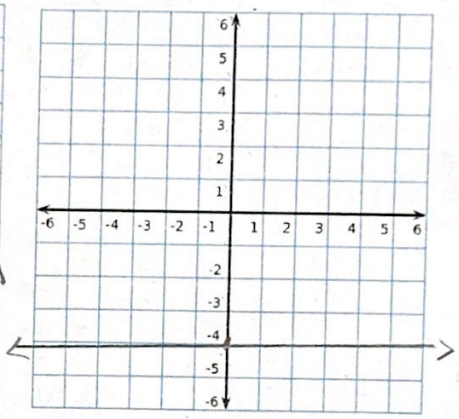
25) $y = \frac{5}{4}x + 4$



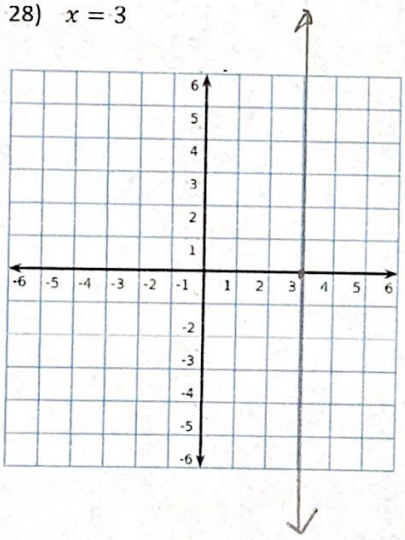
26) $y = -\frac{2}{3}x + 2$



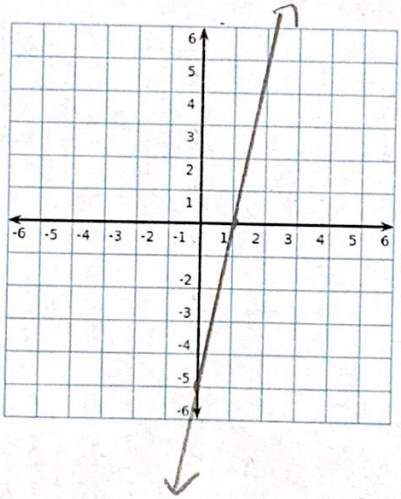
27) $y = -4$



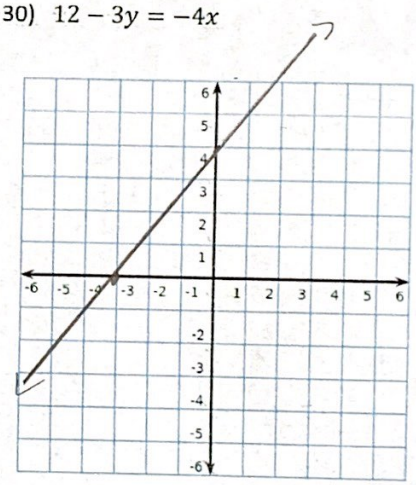
28) $x = 3$



29) $5x - y = 5$

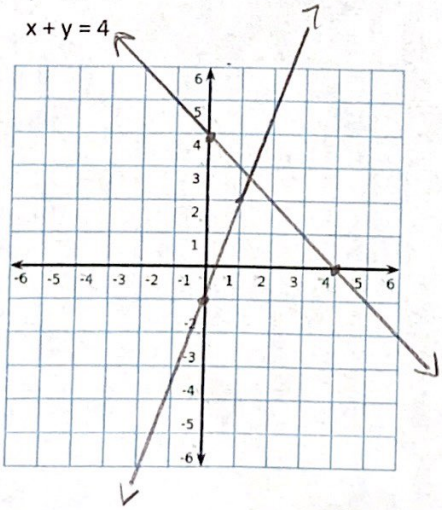


30) $12 - 3y = -4x$



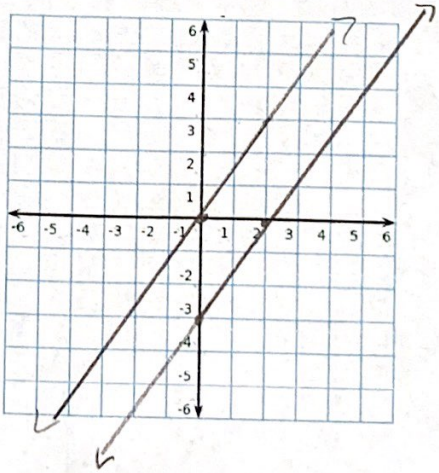
31.) y = 3x - 1

x + y = 4



32.) $y = \frac{3}{2}x$

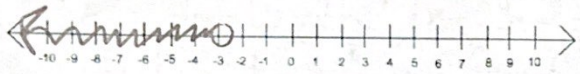
3x – 2y = 6



Section 5: Solving and Graphing Inequalities

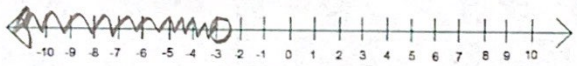
Solve each inequality and graph its solution.

33) $a + 8 < 5$ $a < -3$

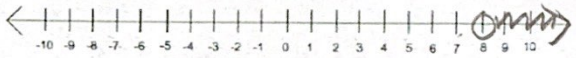


34) $20v \leq 110$ $v \leq 5\frac{1}{2}$

35) $-11 > n - 8$ $-3 > n$

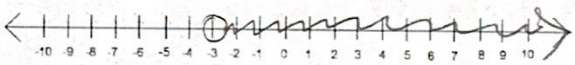


36) $-8(r + 3) < -88$ $r + 3 > 11$ $r > 8$



37) $x - 20 \geq -11$ $x \geq 9$

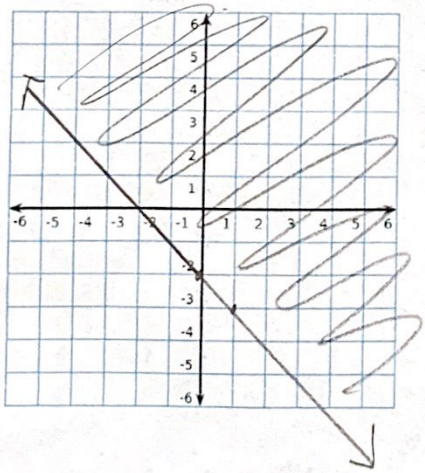
38) $-13m < 39$ $m > -3$



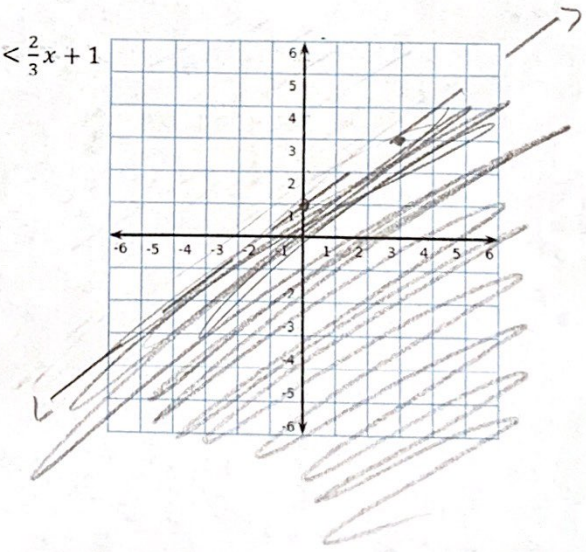
Section 6: Graphing Linear Inequalities

Graph each linear inequality.

39) $y \geq -x - 2$



40) $y < \frac{2}{3}x + 1$



Section 7: Solving Linear Systems

Solve the following systems of equations by substitution.

41) $x + y = 7$
$x = y + 9$

$y + 9 + y = 7$
$2y = -2$
$(8, -1)$

42) $y = 2x + 32$
$2x + y = 60$

$2x + 2x + 32 = 60$
$4x = 28$
$(7, 46)$

Solve the following systems of equations by elimination.

43) $x + 2y = 3$
$+ \quad 8x - 2y = 8$

$9x = 11$
$\left(\frac{11}{9}, \frac{8}{9}\right)$

44) $-3x + 2y = 14$
$+ \quad 2x - 2y = -6$

$-x = 8$
$(-8, -5)$

Section 8: Multiplying Polynomial Expressions

Use the FOIL method to multiply the following binomials.

45) $(2x + 3)(x + 1)$

$2x^2 + 5x + 3$

46) $(3x - 2)^2$

$(3x-2)(3x-2)$
$9x^2 - 12x + 4$

47) $(x - 4)(x + 3)$

$x^2 - x - 12$

Section 9: Factoring Polynomial Expressions

Factor out the Greatest Common Factor.

48) $10x^2y^2 + 15xy^3 - 5xy^2$

$5xy^2(2x + 3y - 1)$

49) $-6rs - 12r^2s + 9rt$

$3r(-2s - 4rs + 3t)$

Factor by Difference of Squares. If the expression is not factorable, write "N.F."

50) $x^2 - 81$

$(x+9)(x-9)$

51) $4t^2 - 25$

$(2t-5)(2t+5)$

52) $z^2 + 36$

NF

53) $x^2 - 49$

$(x+7)(x-7)$

Factor each trinomial into two binomials. (Remember to check for GCF.)

54) $x^2 - 12x + 32$

$(x-8)(x-4)$

55) $x^2 + 19x + 90$

$(x+9)(x+10)$

56) $x^2 - 4x + 4$

$(x-2)(x-2)$

57) $x^2 + x - 12$

$(x+4)(x-3)$

58) $2x^2 - 9x - 18$

$(2x+3)(x-6)$

59) $2x^2 - 6x - 8$

$2(x^2 - 3x - 4)$

$2(x-4)(x+1)$

60.) $3x^2 - 11x - 4$

$(3x+1)(x-4)$

61.) $xy - 3y + 4x - 12$

$y(x-3) + 4(x-3)$

$(x-3)(y+4)$

62.) $x^2 - 2xy + xy - 2y^2$

$x(x-2y) + y(x-2y)$

$(x-2y)(x+y)$

Section 10: Simplifying Radical Expressions

Simplify the radicals.

63) $\sqrt{25}$

5

64) $\sqrt{200}$ $< \sqrt{2}$ $< \sqrt{100}$

$10\sqrt{2}$

65) $\sqrt{96}$ $< \sqrt{6}$ $< \sqrt{16}$

$4\sqrt{6}$

66) $-5\sqrt{32}$ $< \sqrt{16}$ $< \sqrt{2}$

$-20\sqrt{2}$

67) $\sqrt{80x^2}$ $< \sqrt{16}$ $< \sqrt{5}$

$4x\sqrt{5}$

68) $\sqrt{125x^3}$ $< \sqrt{25}$ $< \sqrt{5}$

$5x\sqrt{5x}$

Simplify the radical expressions.

69) $2\sqrt{3} + 5\sqrt{3}$

$7\sqrt{3}$

70) $6\sqrt{12} - 4\sqrt{3}$

$12\sqrt{3} - 4\sqrt{3}$

$8\sqrt{3}$

71) $3\sqrt{3} \cdot 4\sqrt{5}$

$12\sqrt{15}$