

Algebra 2

Summer Packet

Welcome to Algebra 2! This packet is intended to prepare you for the course and ensure that your prerequisite skills are strong enough to be successful in Algebra 2. The packet is lengthy, so please start early. While many of the exercises cover basic algebra skills, you will encounter a few tough exercises. Your algebra 2 teachers are expecting you to come to class with the packet completed and ready to ask questions. There are many resources on the internet that you can use in case you do not remember a topic, or better yet, use your notes from Geometry and Intermediate Algebra!

The packet is due on the first day of school and will be worth many homework points! There will also be a test covering the content in this packet during the first week of school.

– Algebra 2 Teachers

Eastview High School Algebra 2 Preparation Packet

Please show all your work in the space provided. Each of these problems should be able to be solved without extensive use of a graphing calculator.

I. Evaluating Functions

1. $f(x) = 3x - 3$; find $f(-6)$

2. $g(x) = x^3 - x^2$; find $g(-2)$

3. $h(t) = -16t^2 + 16t + 4$; find $h(2)$

4. $f(x) = 2x - (3x + 2)^2 + 4$; find $f(3)$

II. Real Numbers & Operations

5. Identify each of the following numbers as Whole, Integer, Rational, &/or Irrational (some will have more than one answer!)

a. 4.5

b. -17

c. $\frac{2}{3}$

d. $\sqrt{15}$

e. π

f. $\sqrt[3]{27}$

6. Plot the following on the given number line: $\frac{-4}{3}$, $\sqrt{2}$, 2.7, π , -1.2



III. Algebraic Expressions & Models

7. Simplify each of the following:

a. 3^4

b. -3^4

c. $(-3)^4$

d. $-(-3)^4$

8. Simplify:

a. $\frac{-4+2(-2+5)^2}{5-(2-4)^3}$

b. $6^2 \div 4 \cdot 3 - (8 - 5) + 2^3$

9. Identify the following components from the expression “ $5x^7 - 8x + 47$ ”

- a. The Number of Terms: _____
- b. The Lead Coefficient: _____
- c. The Constant Term: _____

10. Simplify

a. $3x^2 - x + 7 + 4x - x^2$ 10a. _____

b. $2(x + 1) - 3(2x - 4)$ 10b. _____

c. $4(x^2 - 2) - 2(3 - 5x^2)$ 10c. _____

IV. Solving Equations

11. Solve each of the following for x. Please show your work.

a. $5x - 2 = 33$

b. $140 = 4x + 36$

c. $1 - x = 3$

$x =$ _____

$x =$ _____

$x =$ _____

d. $4(3x - 5) = -6\left(\frac{-5}{3}x + 8\right) - 6x$

e. $\frac{3}{7}x + 9 = 15$

$x =$ _____

$x =$ _____

f. $\frac{1}{3}x + \frac{1}{4} = x - \frac{1}{6}$

g. $\frac{2x}{3} + 4x - 1 = \frac{1}{2}x - 6$

$x =$ _____

$x =$ _____

V. Rules of Exponents

Hints

Multiplication: $x^m \cdot x^n = x^{m+n}$

Division: $\frac{x^m}{x^n} = x^{m-n}$

Powers of Powers: $(x^m)^n = x^{mn}$

Power of Zero: $x^0 = 1$ (for $x \neq 0$)

12. Simplify each expression

a. $c^5 \cdot c \cdot c^2$

b. $\frac{m^{15}}{m^3}$

c. $(k^4)^5$

d. $(4x^2y)^0$

e. $(p^2q^4)(p^5q^9)$

f. $\frac{45y^3z^{10}}{5y^3z}$

g. $(3m^4n^3)^3$

h. $(-5a^2b)(2ab^2c)$

i. $(3x^4y)(2^2)^3$

VI. Multiply binomials (FOIL)

14. $(x + 10)(x - 9)$

15. $(x - 10)(4 - x)$

16. $(x - 7)^2$

17. $(2x + 9)(2x - 9)$

18. $(3x - 2)(5 - x)$

19. $(2x - 3)^2$

VII. Factoring

Hint: $a^2 - b^2 = (a + b)(a - b)$

20. Factor each expression completely

a. $3x^2 + 6x$

b. $4a^2b^2 - 16ab^3 + 8ab^2c$

c. $x^2 - 25$

d. $n^2 + 8n + 15$

e. $g^2 - 9g + 20$

f. $d^2 + 3d - 28$

g. $x^2 - 7x - 30$

h. $m^2 + 18m + 81$

i. $4y^3 - 36y$

j. $5x^2 + 30x - 135$

VIII. Radicals

21. Simplify each radical (no decimals or calculator approximations please!)

a. $\sqrt{121}$

b. $\sqrt{90}$

c. $\sqrt{175}$

d. $\sqrt{288}$

e. $\sqrt{486}$

f. $2\sqrt{16}$

g. $6\sqrt{500}$

h. $3\sqrt{147}$

i. $8\sqrt{475}$

j. $\sqrt{\frac{36}{9}}$

k. $\sqrt{\frac{2}{8}}$

l. $\sqrt{\frac{125}{9}}$

IX. Inequalities

22. Graph the following solutions on the number line provided:

a. $x < 3$



b. $x \geq 5$



c. $7 \geq x$

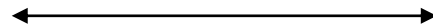


23. Solve and graph the following inequalities:

a. $-5x - 8 < 12$



b. $-2 \leq 3x - 8 \leq 10$



c. $2x + 3 < 12$ or $4x - 7 > 21$



X. Lines

24. Find the slope of the line between the two given points:

a. (8, 10) & (-7, 14)

b. (-19, 6) & (15, 16)

c. (-4, -6) & (-8, -9)

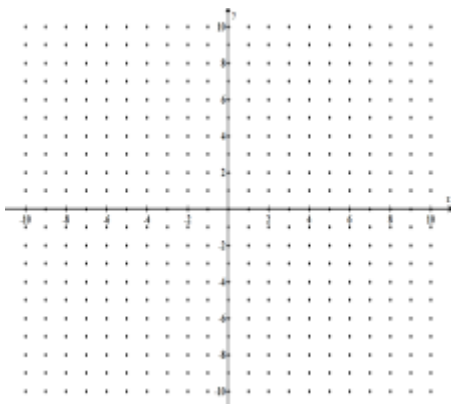
d. (4, 7) & (8, 7)

e. (9, 0) & (0, 6)

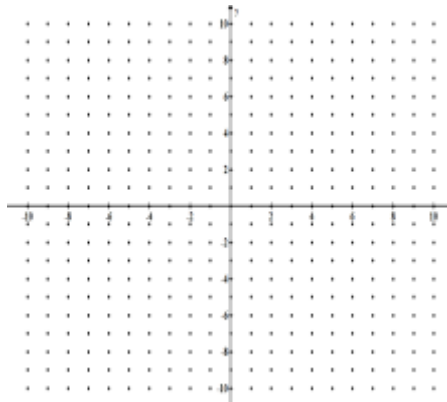
f. (-2, 6) & (-2, -9)

25. Graph these lines on the axes provided. Make sure your x and y intercepts are clearly shown.

a. $y = 3x - 1$



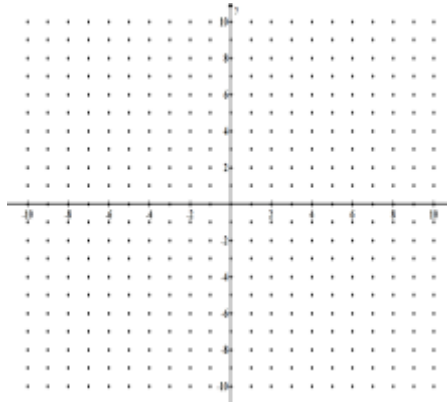
b. $y = \frac{-2}{3}x + 2$



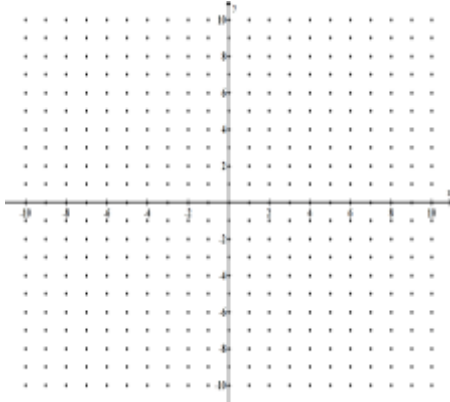
c. $-2x + 3y = -6$



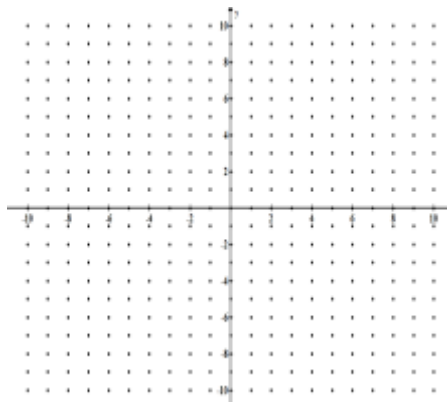
d. $y - 2 = \frac{1}{2}(x + 1)$



e. $x = 4$



f. $y = -2$



26. Write the equation for each line described in slope-intercept ($y = mx + b$) form:

a. $m = 3$, through point $(2, -1)$

b. $m = \frac{1}{2}$, through point $(3, 4)$

c. $m = -2$, through point $(-5, -7)$

d. $m = 0$, through the point $(9, 4)$

27. Find the equation of the line that is parallel to $y = 4x - 5$ and passes through the point $(-3, 10)$

28. Find the equation of the line perpendicular to the line $y = \frac{1}{4}x + 7$ that passes through the point $(2, -9)$

29. Find the equation of the line that passes through the points $(-4, -1)$ and $(-9, 2)$

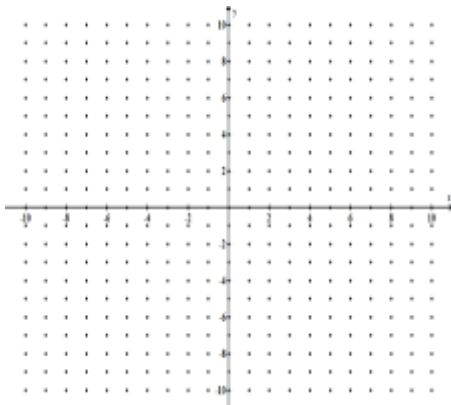
30. Find the equation of the line that passes through the points $(-17, -8)$ and $(-7, -4)$

31. Find the equation of the line that passes through the points $(3, -12)$ and $(3, 7)$

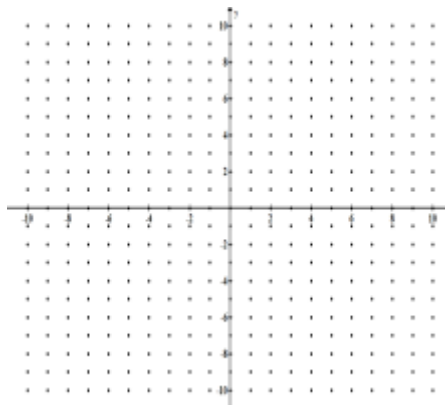
XI. Systems of Equations

32. Find the solution (if any) to the following systems of equations by graphing the lines carefully:

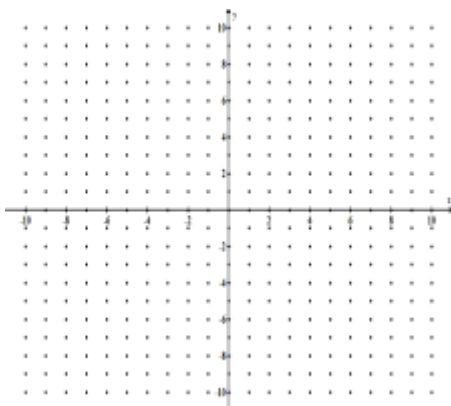
a. $y = -x + 2$, $y = x - 4$



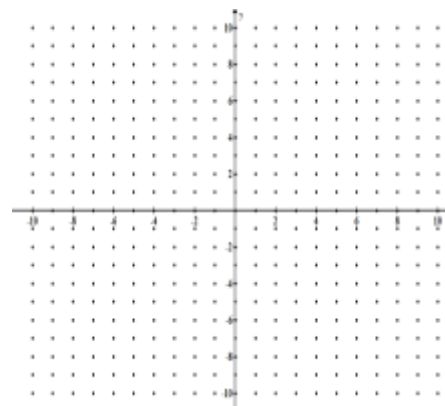
b. $x = 8$, $y = 5$



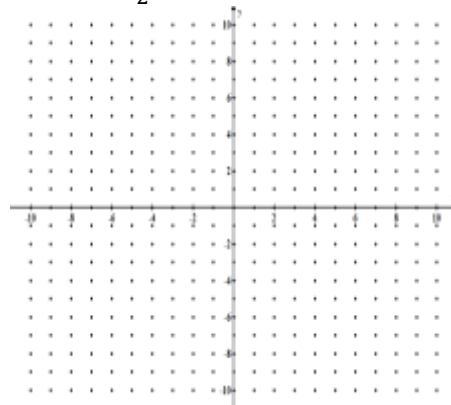
c. $x + y = -2$, $2x - 3y = -9$



d. $y = 5x - 2$, $2y + 4 = 10x$



e. $y = \frac{-1}{2}x + 4$, $2y + x = 2$



f. $5x - y = -5$, $3x + 6y = -3$

