Algebra Review – prep for Honors Algebra II

SOLVING EQUATIONS

SOLVE each of the following equations. Show all work.

1. $-\dfrac{3d}{4} + 5 = 7$

$\quad\quad\quad \dfrac{-5 \quad -5}{}$

$4\left(-\dfrac{3d}{4} = 2\right) \quad\quad \dfrac{-3d}{-3} = \dfrac{8}{-3}$

$\quad\quad\quad\quad\quad\quad\quad d = -8/3$

1. $\underline{\quad d = -8/3 \quad}$

2. $\frac{1}{2}(4x + 12) = 6(x - 1)$

$\quad 2x + 6 = 6x - 6$

$\quad\quad 12 = 4x$

$\quad\quad\quad x = 3$

2. $\underline{\quad x = 3 \quad}$

3. $\dfrac{5n+1}{8} = \dfrac{3n-5}{4}$

$\quad 4(5n+1) = 8(3n-5)$

$\quad 20n + 4 = 24n - 40$

$\quad\quad\quad 44 = 4n$

$\quad\quad\quad n = 11$

3. $\underline{\quad n = 11 \quad}$

Solve for x.

4. $\dfrac{x-3}{6} + 3 = a$

$\quad\quad \dfrac{-3 \quad -3}{}$

$\left(\dfrac{x-3}{6} = a - 3\right)6$

$x - 3 = 6(a - 3)$

$\quad +3$

$x = 6a - 18 + 3$

$x = 6a - 15$

4. $\underline{\quad x = 6a - 15 \quad}$

FUNCTIONS, EQUATIONS & GRAPHS

State the DOMAIN and RANGE of each relation. Then determine if it is a function.

5. $\{(-30, 40), (0, 40), (30, 20), (20, 0)\}$

ORDER! No repeat ✓

Domain: $\underline{\{-30, 0, 20, 30\}}$

Range: $\underline{\{0, 20, 40\}}$

Function? $\underline{\text{yes}}$

NO X VALUES Repeat

CLEARVIEW REGIONAL

6. Does the graph below represent a FUNCTION? Explain.
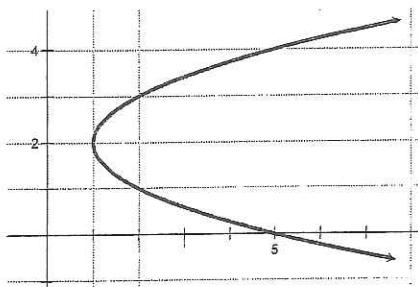
Domain: $\underline{\quad X \geq 1 \quad}$

Range: $\underline{\quad \mathbb{R} \quad}$

Function? $\underline{\quad NO \quad}$

Fails Vertical Line test

Given the FUNCTIONS $f(x) = 2x - 3$ and $g(x) = 2 - x + 2x^2$, evaluate the following:

7. $f(-5) = 2(-5) - 3$

$= -10 - 3 = -13$

7. $\underline{\quad -13 \quad}$

Plug-IN "x" and simplify

8. $g(½) = 2 - ½ + 2(½)^2$

$= 2 - ½ + 2(¼)$

$= 2 - ½ + ½ \quad = 2$

8. $\underline{\quad 2 \quad}$

9. If $f(x) = -3x + 7$ and $g(x) = -7x + 3$, what is the value of $f(-3) - g(3)$?

$-3(-3) + 7 - (-7(3) + 3)$

$9 + 7 - (-21 + 3)$

$16 - (-18)$

34

9. $\underline{\quad 34 \quad}$

10. Find the EQUATION OF THE LINE containing the points $(7, -1)$ and $(-2, 4)$.

Review Slope

$m = \dfrac{4 - (-1)}{-2 - 7} = \dfrac{5}{-9}$

$y = mx + b$

$-1 = (\frac{5}{-9})(7) + b$

$-1 = \frac{-35}{9} + b$

$b = 26/9$

10: $\underline{\quad y = -5/9x + 26/9 \quad}$

11. Find the X and Y INTERCEPTS of $6x + 2y = 12$.

$6x + 2(0) = 12$ $\qquad$ $6(0) + 2y = 12$

$6x = 12$ $\qquad\qquad$ $2y = 12$

$x = 2$ $\qquad\qquad\qquad$ $y = 6$

11. $\underline{(0,6), \quad (2,0)}$
$\qquad\qquad\uparrow\qquad\quad\uparrow$
$\qquad\quad$ y-int $\qquad$ x-int

12. Write the equation of the line in STANDARD FORM $\left(y = -\frac{3}{5}x + 3\right)5$

12. $\underline{3x + 5y = 15}$

$ax + by = c$
NO. Fractions
a positive

$5y = -3x + 15$

$3x + 5y = 15$

13. Graph the INEQUALITY: $2x + 3y \geq -6$

$3y \geq -2x - 6$

$y \geq -\frac{2}{3}x - 2$

Solid Line
Shade above
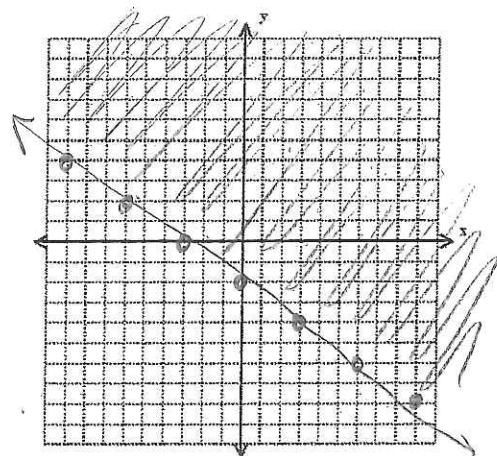
LINEAR SYSTEMS:

Solve each System of Equations using **SUBSTITUTION** or **ELIMINATION**.

14. $\begin{cases} 4p + 2q = 8 \\ q = 2p + 1 \end{cases}$

Substitute

$4p + 2(2p + 1) = 8$

$4p + 4p + 2 = 8$

$8p + 2 = 8$

$8p = 6$

$P = 6/8 = 3/4$

14. $\underline{\quad (3/4, \ 5/2) \quad}$
$\quad$ p $\qquad$ q

$q = 2(3/4) + 1$
$\quad = 6/4 + 1 = 5/2$

15. $\begin{cases} 2a + 3b = 12 \\ 3(5a - b = 13) \end{cases}$

$2a + 3b = 12$
$15a - 3b = 39$

Eliminate $\quad 17a = 51$
$\qquad\qquad a = 3$

$5(3) - b = 13$

$15 - b = 13$
$\quad -15 \qquad -15$

$-b = -2$
$b = 2$

15. $\underline{\quad (3, 2) \quad}$
$\qquad$ a $\quad$ b

Graph the solution of the SYSTEM OF INEQUALITIES.

16. $\begin{cases} x + 2y \le 10 \\ x + y \le 3 \end{cases}$

$y \le 3 - x$

↑ below solid

$2y \le 10 - x$

$y \le 5 - \frac{1}{2}x$

↑ below solid
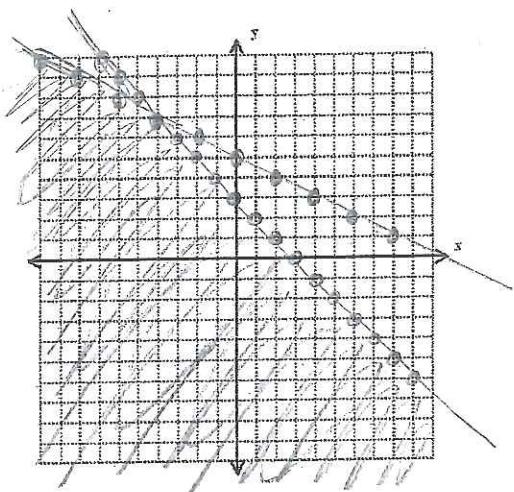
EXPONENTS & EXPONENTIAL FUNCTIONS:

Simplify each expression. Use only POSITIVE EXPONENTS.

17. $(2x^3 y^7)^{-2}$

$\dfrac{1}{(2x^3 y^7)^2} = \boxed{\dfrac{1}{4x^6 y^{14}}}$

18. $\dfrac{12x^5 y^3}{4x^{-1}}$

$\boxed{3x^6 y^3}$

19. $\left(\dfrac{r^{-7} b^{-8}}{t^{-4} w}\right)^0$

$\boxed{1}$

Simplify each RADICAL EXPRESSION. Answers should be in simplest radical form.

✱ Rationalize denominator

20. $\sqrt{18}$

$\sqrt{9}\sqrt{2}$

$\boxed{3\sqrt{2}}$

21. $\sqrt[3]{216}$

$\boxed{6}$

22. $\sqrt{\dfrac{3}{15}}$ $\dfrac{\sqrt{15}}{\sqrt{15}} = \dfrac{\sqrt{45}}{15}$

$\dfrac{\sqrt{9 \cdot 15}}{15} = \dfrac{3\sqrt{15}}{15} = \boxed{\dfrac{\sqrt{15}}{5}}$

23. $4\sqrt{b^5}$

$\boxed{4b^2\sqrt{b}}$

24. Express in Radical Form: $m^{\frac{1}{3}}$

$\boxed{\sqrt[3]{m}}$

POLYNOMIALS & FACTORING:

Simplify.

25. $(5x^2 - 3x + 7x) + (9x^2 + 2x^2 + 7x)$

$16x^2 + 11x$

25. $\underline{16x^2 + 11x}$

26. $(3x - 5)(2x + 7)$

$6x^2 + 21x - 10x - 35$

$\boxed{6x^2 + 11x - 35}$

27. $(8r - 5s)^2 \quad (8r - 5s)$

$64r^2 - 40rs - 40rs + 25s^2$

$64r^2 - 80rs + 25s^2$

26. $\underline{6x^2 + 11x - 35}$

27. $\underline{64r^2 - 80rs + 25s^2}$

FACTOR each polynomial completely.

28. $x^2 - 10x + 24$ $\quad \dfrac{24}{-6, -4}$

$\boxed{(x-6)(x-4)}$

GCF!

29. $14y^2 + 7y - 21$

$7(2y^2 + y - 3) \quad \dfrac{-6}{3, -2}$

$2y^2 + 3y - 2y - 3$

$y(2y+3) - 1(2y+3)$

28. $\underline{(x-6)(x-4)}$

29. $\underline{7(2y+3)(y-1)}$

GCF!

30. $4x^3 + 12x - 28$

$4(x^3 + 3x - 7)$

30. $\underline{4(x^3 + 3x - 7)}$

QUADRATIC FUNCTIONS:

Graph the quadratic function:

make a table!

31. $y = -2x^2 + 4$

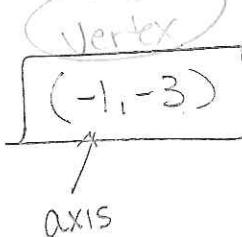| x	y
2	-4
1	2
0	4
-1	2
-2	-4
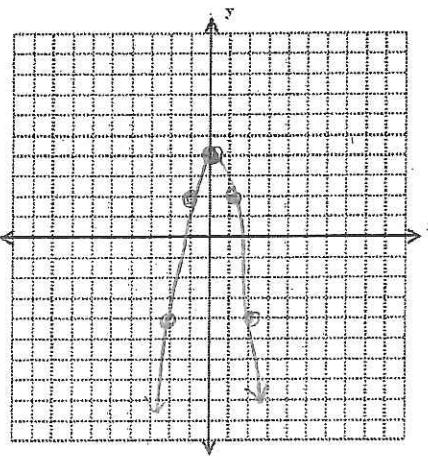
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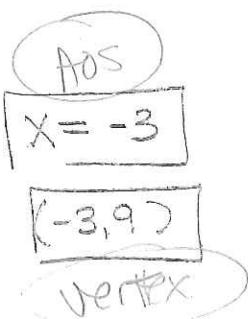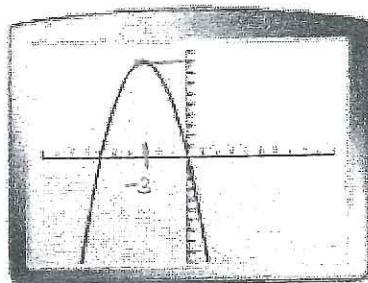**Find the equation for the AXIS OF SYMMETRY and the coordinates of the VERTEX for each graph.**

32. $y = 2x^2 + 4x - 1$

$\boxed{x = \dfrac{-b}{2a}}$ AOS

$X = \dfrac{-4}{2(2)} = \dfrac{-4}{4} = -1$ $\boxed{X = -1}$

Vertex

$y = 2(-1)^2 + 4(-1) - 1$
$= -3$ $\boxed{(-1, -3)}$

axis

33.

AOS

$\boxed{X = -3}$

$\boxed{(-3, 9)}$

vertex

Solve the quadratic equation using SQUARE ROOTS:

34. $5x^2 - 20 = 0$

$5x^2 = 20$
$x^2 = 4 \rightarrow X = \pm\sqrt{4}$
$X = \pm 2$

34. $\underline{X = \pm 2}$

OR $\begin{array}{l}(2, 0)\\(-2, 0)\end{array}$

Set each factor = to zero + solve

SOLVE each Quadratic Equation by FACTORING.

35. $x^2 - 16 = 0$

$(X - 4)(X + 4) = 0$

$X = 4 \quad X = -4$

✱ difference of squares

36. $2k^2 + 22k + 60 = 0$

$2(k^2 + 11k + 30)$

GCF $\uparrow$ $(k + 6)(k + 5)$

$k = -6 \quad k = -5$

35. $\underline{X = \pm 4}$

36. $\underline{K = -6 \quad K = -5}$

Solve the quadratic equation using the QUADRATIC FORMULA:

37. $2x^2 - 3x - 5 = 0$

$\boxed{X = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}}$

$= \dfrac{3 \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$

$= \dfrac{3 \pm \sqrt{49}}{4} = \dfrac{3 \pm 7}{4} \nearrow \dfrac{10}{4}$
$\searrow \dfrac{-4}{4}$

37. $\underline{X = 5/2}$
$\underline{X = -1}$

CLEARVIEW REGIONAL

RADICAL EXPRESSIONS & EQUATIONS:

Simplify each expression.

38. $5\sqrt{8} + 2\sqrt{72}$

$5\sqrt{4}\sqrt{2} + 2\sqrt{36}\sqrt{2}$

$5 \cdot 2\sqrt{2} + 2 \cdot 6\sqrt{2}$

$10\sqrt{2} + 12\sqrt{2}$

$22\sqrt{2}$

39. $-\sqrt{12}(4 - 2\sqrt{3})$

$-4\sqrt{12} + 2\sqrt{36}$

$-4\sqrt{4}\sqrt{3} + 2 \cdot 6$

$-4 \cdot 2\sqrt{3} + 12$

$-8\sqrt{3} + 12$

38. $\underline{\quad 22\sqrt{2} \quad}$

39. $\underline{\quad -8\sqrt{3} + 12 \quad}$

Solve the RADICAL EQUATION:

40. $\sqrt{2b} + 4 = 8$

$(\sqrt{2b} = 4)^2$

$2b = 16$

$b = 8$

40. $\underline{\quad b = 8 \quad}$