Algebra 1 Exam Review
Semester 2

Fill in the blank:

1. A system of equations that has no solution ~~has~~ is an inconsistent system
2. A system of equations that has 1 solution is a consistent system

Solve the system of equations using any method (substitution, elimination, or graphically)

3. Solve the system of equations: $\begin{cases} x = 2y+3 \\ 4x-5y=9 \end{cases}$

$4(2y+3)-5y=9$
$8y+12-5y=9$
$3y+12=9$
$-12 \quad -12$
$3y=-3$
$y=-1$

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

$(1,-1)$

4. Solve the system of equations: $\begin{cases} 3x-y=11 \\ 2x+3y=0 \end{cases}$

$3(3x-y=11)$
$+\ 9x-3y=33$
$\frac{11x}{11}=\frac{33}{11}$
$x=3$

$3(3)-y=11$
$9-y=11$
$-9 \quad -9$
$-y=2$
$\frac{-y}{-1}=\frac{2}{-1}$
$y=-2$

$(3,-2)$

5. Solve the system of equations: $\begin{cases} x-y=9 \\ x+y=11 \end{cases}$

$+$
$2x=20$
$x=10$

$10+y=11$
$-10 \quad -10$
$y=1$

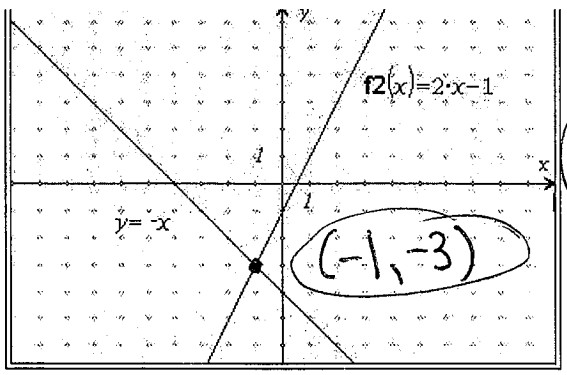
$(10,1)$

6. Solve the system of equations: $\begin{cases} 2x-3y=4 \\ -4x+6y=-8 \end{cases}$

$2(2x-3y=4)$
$4x-6y=8$
$0=0$

Inf. Many Sol.

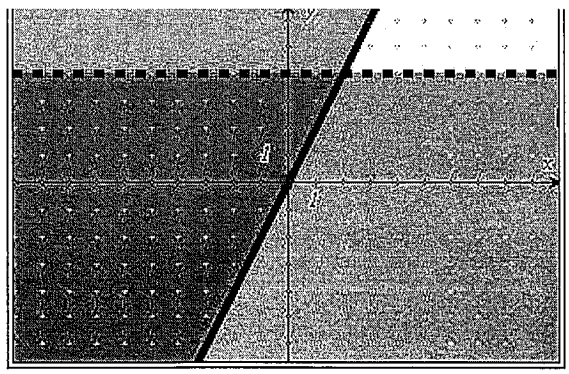
7. Identify the best solution of the system.



$(-1,-3)$

8. Write the equations of the system of inequalities that is graphed below.

$y \geq 2x$
$y<4$



Simplify

9. $\frac{s^{-3}}{t^{-5}}$ $\quad \frac{t^5}{s^3}$

10. $\frac{h^0}{3}$ $\quad \frac{1}{3}$

11. $\frac{2x^{-3}y^{-2}}{z^4}$ $\quad \frac{2}{x^3y^2z^4}$

12. $\frac{\cancel{14}^{7}a^{-4}}{\cancel{20}_{10}bc^{-1}}$ $\quad \frac{7c}{10ba^4}$

13. $\frac{-\cancel{3}^{1}g^{-2}hk^{-2}}{2^{\cancel{6}}\cancel{k^0}}$ $\boxed{\frac{-h}{g^2k^2}}$

14. $\left(\frac{3a}{2b}\right)^{-4} = \left(\frac{2b}{3a}\right)^4 = \boxed{\frac{2^4b^4}{3^4a^4}}$

15. $(-5k)^2$ $(-5k)(-5k) = \boxed{25k^2}$

16. $(v^2)^5 \bullet v^4$

$v^{10} \cdot v^4 = \boxed{v^{14}}$

17. What is the degree of $5x^4y^2 - y^5z^2$? 7

6 7

18. What is the degree of x^3y^1? 4

19. What is the leading coefficient of $7b^6 - 3b^2 - b + 4$ 7

Simplify

20. $(9x^6 - 5x^2 + 3) + (6x^2 - 5)$

$9x^6 + x^2 - 2$

21. $(5y^3 - 6y + 2) + (2y^7 + y)$

$2y^7 + 5y^3 - 5y + 2$

22. $(4r^4 - 3r^2 + 4) - (2r^4 - r^2)$

$-2r^4 + r^2$

$2r^4 - 2r^2 + 4$

23. $(2s^7 - 6s^3 + 2) - (3s^7 + 2)$

$-3s^7 - 2$

$-s^7 - 6s^3$

24. $(3a^7)(2a^4)$

$6a^{11}$

25. $(-6c^2e)(-2de^2)$

$12c^2de^3$

26. $(3xy^2)(2x^2y - 3y)$

$6x^3y^3 - 9xy^3$

27. $(x-3)(x+1)$

$x^2 + x - 3x - 3 = x^2 - 2x - 3$

28. $(2x^2 - 3y)(3x - y^2)$

$6x^3 - 2x^2y^2 - 9xy + 3y^3$ or $-2x^2y^2 + 6x^3 + 3y^3 - 9xy$

29. $(3a + b)(2a^2 + ab - 2b^2)$

$6a^3 + 3a^2b - 6ab^2$

$+2a^2b + ab^2 - 2b^3$

$6a^3 + 5a^2b - 5ab^2 - 2b^3$

30. $(2x+1)(2x-1)$

$4x^2 - \cancel{2x} + \cancel{2x} - 1$

$4x^2 - 1$

Factor the problems below completely.

31. $3p^2 - 3p$ $3p(p-1)$

32. $x^2 - 3x + 10$

~~(x)(x~~) Not Factorable

33. $9x^2 - 4$ $(3x-2)(3x+2)$

34. $4x^2 - 20x + 25$

~~(4x)(x~~ $(2x-5)(2x-5)$

35. $(2x^2 + 4x)(-2xy - 4y)$

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

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

36. $x^2 + 8x + 15$

$(x+3)(x+5)$

37. $x^2 - 2xy - 3y^2$

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

$x^2 + xy - 3xy - 3y^2$

$-2xy$ ✓

38. $4x^2 - 8x + 3$

$(2x-3)(2x-1)$

39. $6x^2 + 15x - 9$

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

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

40. Solve for x:

$x^2 - 5x + 6 = 0$

$(x-2)(x-3) = 0$

$x=2 \quad x=3$

41. Solve for c:

$c^2 - 7c + 3 = -3$

$+3 \quad +3$

$c^2 - 7c + 6 = 0$

$(c-6)(c-1) = 0$

$c=6 \quad c=1$

42. ~~Solve for w:~~

~~$5x^2 + 17x - 12$~~

43. What are the equation of the axis of symmetry and the coordinates of the vertex of the graph of $y = 3x^2 - 18x + 6$?

$x = \frac{-(-18)}{2(3)} = \frac{18}{6} = 3$

$3(3)^2 - 18(3) + 6$

$3(9) - 54 + 6$

$27 - 54 + 6$

$-27 + 6 = -21$

AoS: $x=3$

Vertex: $(3, -21)$

44. Find the equation of the axis of symmetry for the graph $y = -2x^2 + 4x - 5$, and state whether the graph has a minimum point or a maximum point.

$\frac{-4}{2(-2)} = \frac{-4}{-4} = 1$

$x=1$

Max. point

45. Graph the equation: $y = x^2 - 6x + 4$

$x = \frac{-(-6)}{2(1)} = \frac{6}{2} = 3$

$3^2 - 6(3) + 4$

$9 - 18 + 4$

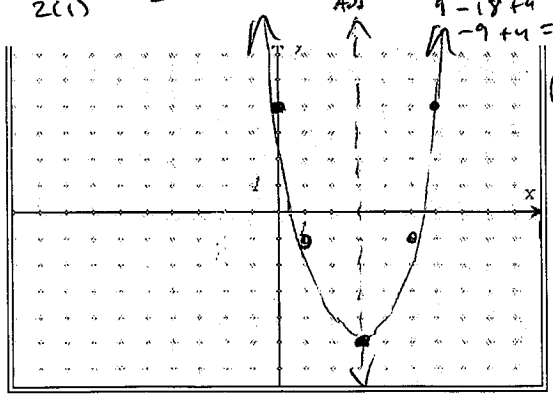
$-9 + 4 = -5$

$(1)^2 - 6(1) + 4$

$1 - 6 + 4$

$-5 + 4$

-1



46. Graph $y = 2^x - 5$.

x	y
-2	-4.75
-1	-4.5
0	-4
1	-3
2	-1

$2^{-2} - 5$

$\frac{1}{4} - 5$

$2^{-1} - 5$

$\frac{1}{2} - 5$

-4.5

$2^0 - 5$

$1 - 5$

-4

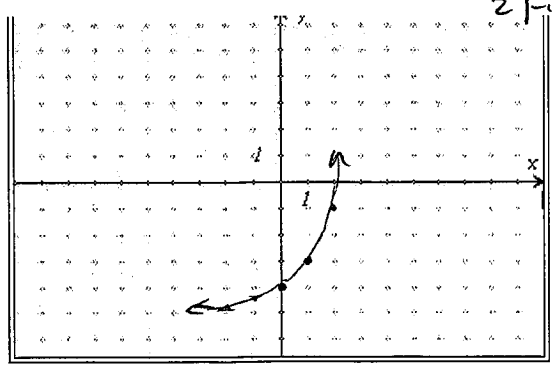
$2^1 - 5$

-3

$2^2 - 5$

$4 - 5$

-1



47. How any real roots do the following quadratic equations have? $\sqrt{b^2 - 4ac}$

$a=1 \quad b=-2 \quad c=2$

A) $x^2 - 2x + 2 = 0$

$\sqrt{(-2)^2 - 4(1)(2)}$

$\sqrt{4-8} = \sqrt{-4}$

None

B) $2x^2 + 9x + 4 = 0$

$\sqrt{9^2 - 4(2)(4)}$

$\sqrt{81-32} = \sqrt{49}$

2 sol

C) $x^2 - 6x + 9 = 0$

$\sqrt{(-6)^2 - 4(1)(9)}$

$\sqrt{36-36} = \sqrt{0}$

1 solution

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

48. ~~What are~~ the roots of $x^2 - 3x + 10 = 0$?

No roots!

$\cancel{(x-5)(x+1)=0}$

$\frac{3 \pm \sqrt{9-4(1)(10)}}{2(1)} = \frac{3 \pm \sqrt{9-40}}{2} = \frac{3 \pm \sqrt{-31}}{2}$

Solve the quadratic equations using any method (factoring, graphing, or the quadratic formula)

49. $2x^2 + 9x + 4 = 0$.

$(2x+1)(x+4)=0$

$x = -1/2 \quad x = -4$

50. $x^2 - 12x - 7 = 0$

$x = 12.56$ & $x = -0.56$

$a=1 \quad b=-12 \quad c=7$

$\frac{12 \pm \sqrt{144-4(1)(-7)}}{2} = \frac{12 \pm \sqrt{144+28}}{2} = \frac{12 \pm \sqrt{172}}{2} = \frac{12 \pm 13.11}{2}$

$\frac{12+13.11}{2}$ & $\frac{12-13.11}{2}$

51. $2x^2 + 8x = -3$

$2x^2+8x+3=0$

$a=2 \quad b=8 \quad c=3$

$\frac{-8 \pm \sqrt{64-4(2)(3)}}{4} = \frac{-8 \pm \sqrt{40}}{4}$

$\frac{-8 \pm 6.32}{4} \rightarrow \frac{-8+6.32}{4} = -0.42$

$\frac{-8-6.32}{4} = -3.58$

$x = -0.42$ & $x = -3.58$

52. $\sqrt{x^2} = \sqrt{64}$

$x = \pm 8$

53. $2x^2 - 5x + 4 = 0$

$a=2 \quad b=-5 \quad c=4$

$\frac{5 \pm \sqrt{25-4(2)(4)}}{4} = \frac{5 \pm \sqrt{-7}}{4}$

No solution

54. Simplify $\sqrt{48}$

$\sqrt{16}\sqrt{3}$

$4\sqrt{3}$

55. Simplify $\sqrt{\frac{12 \div 4}{28 \div 4}} = \sqrt{\frac{3}{7}} = \frac{\sqrt{3}}{\sqrt{7}}\left(\frac{\sqrt{7}}{\sqrt{7}}\right)$

$\frac{\sqrt{21}}{7}$

56. Simplify $4\sqrt{3} + 7\sqrt{3} - 6\sqrt{3}$

$5\sqrt{3}$

57. Solve for x: $\frac{3\sqrt{x-6}}{3} = \frac{9}{3}$

$(\sqrt{x-6})^2 = (3)^2$

$x-6=9 \quad x-6=-9$

$+6 \quad +6 \quad +6$

$x=-3$

$x=15$

$x=-3$

58. Solve for m: $\sqrt{m} - 16 = 0$

$+16 \quad +16$

$(\sqrt{m})^2 = (16)^2$

$m = \pm 256$

59. An \$12, 500 car depreciates in value at the rate of 8% per year. After how many years will the car be worth less than \$8, 000?

$y = a(1-r)^t$

$y = 12500(1-0.08)^t = 12500(0.92)^t$

6 years

60. An initial population of 12 rabbits doubles each year for 6 years. What is the ~~three~~ rabbits population after 6 years?

$y = a(1+r)^t$

$12(2)^t = 12(2)^6 = 768$ rabbits

61. If $y = 8(1.7)^t$ represents growth of bacteria, how many will there be at time $t = 8$?

$8(1.7)^8 = 558.06$

62. 120 grams of a radioactive substance decays at a rate of 15% per year. How much substance is left after 5 years?

$y = a(1-r)^t$

$120(1-0.15)^t = 120(0.85)^t = 53.24$ grams