ALGEBRA II
1ST SEMESTER FINAL EXAM

1. Give an example of a formula
2. Solve for d_1:

   $2A = d_1 d_2$
3. Graph the following inequalities

   a) $-7 \le x$ b) $-7 \ge x$ c) $-7 > x$ d) $-7 < x$

4. Evaluate the expression: $\frac{x}{y - z^3}$, with $x = -5,\ y = 10,\ z = 4$.
5. Simplify: $\frac{\frac{a}{b}}{\frac{c}{d}}$
6. Multiply and simplify: $(13x - 2)(5x + 4)$
7. Simplify: $4(8 + x) - (14 - x)$
8. Solve for the variable x: $2.7x = 1.9 + 0.5x$
9. Solve: $8 - (x + 7) \ge 6$
10. y is **directly proportional** to the square of x. Write the equation that represents this situation
11. What does the product $(3 + 5i)(7 - 3i)$ equal?
12. What does the quotient $\frac{3 - i}{2 - 5i}$ equal?
13. Which complex number is farthest from the origin in the complex plane?

    a) $6i$ b) $3 - 2i$ c) $6 + i$ d) $-4 - 7i$

14. If $x^2 - 12x + c$ is a perfect square trinomial, what is the value of c?
15. What are the solutions of $x^2 - 3x + 9 = 0$?
16. What is the vertex for the graph of $y = \frac{1}{4}(x - 5)^2 + 4$?
17. Graph the following equations:

    a) $y = 2x$ b) $y = -\frac{1}{4}x^2$ c) $y = -\frac{3}{4}x$ d) $y = -\frac{1}{4}$

18. Graph the following equations.

i) $y = 2x^2$ j) $y = -\frac{1}{2}x^2$ k) $y = -4x$ l) $y = \frac{1}{2}x^2 + 2$

19. Factor: $12x^2 + 13xy + 3y^2$?

20. Identify the slope and the y-intercept of the following equation: $y = \frac{3}{4} - \frac{2}{3}x$

21. A slope of $-\frac{5}{6}$ means:

(m) a vertical change of -6 units for a horizontal change of 5 units.

(n) a vertical change of $-\frac{5}{6}$ unit for every horizontal change of 1 unit.

(o) a vertical change of 6 units for a horizontal change of -5 units.

(p) a vertical change of 1 unit for a horizontal change of $-\frac{5}{6}$ unit.

22. Write an equation for the line with a y-intercept 11 that is parallel to the line $5x - 7y = 35$

23. Find the distance between the given points: $(2, -7)$ and $(12, 7)$

24. A company makes 36" and 48" shoelaces by cutting off lengths from a spool of cord. Let *S* be the number of 36" laces, *L* be the number of 48" laces made, and *C* be the total amount of cord used. Write an equation relating *S*, *L*, and *C*.

25. The problem above: If a spool of cord has 3000 inches and 50 short laces are made, how many long laces can be made?

26. A printer finds that it costs $1290 to print 30 books and $1335 to print 45 books. Let *c* be the cost of printing *b* books. Assume that *c* is linearly related to *b*. Find an equation relating cost to the number of books printed.

27. Which ordered pair is ***not*** a solution of $x < -y + 3$?

i) (-3,5) j) (-4,7) k) (6,-7) l) (-1,3)

28. Graph the following inequalities:

i) $y < \frac{1}{3}x + 4$ j) $y \le \frac{1}{4}x - 2$ k) $y > \frac{2}{3}x + 4$ l) $y \ge -4x + 3$

29. Find the solution of the system of equations:

$$-3x - 5y = -23$$
$$2x - 4y = -14$$

30. A line perpendicular to the line with equation $x = 5$ has

i) undefined slope j) slope 7 k) slope 0 l) slope $-\frac{1}{7}$

31. Solve the system $\begin{cases} 3x+2y=5 \\ 7x+4y=9 \end{cases}$

32. Solve the system $\begin{cases} 2x-y=-2.5 \\ y=x-4 \end{cases}$

33. Solve the system $\begin{cases} x+3y=12 \\ 4x+12y=48 \end{cases}$

34. The system $\begin{cases} 2x+3y=19 \\ 4x-y=17 \end{cases}$ becomes $-7y=-21$ if you:

(cc) multiply the second equation by 3 and add.

(dd) multiply the first equation by 2, the second equation by -1 and add.

(ee) multiply the second equation by 3 and subtract.

(ff) multiply the first equation by -2 and add.

35. For what value of *k* does $\begin{cases} 28x+ky=84 \\ 14x+7y=42 \end{cases}$ have infinitely many solutions?

36. Write an example of a quadratic equation in
a. standard form b, vertex form c. intercept form

37. The graph of $y=x^2$ is translated 9 units to the left and 3 units up. What is the equation for its image?

38. Complete the square: Find a number to put in the blank to make the expression a perfect-square trinomial $y=x^2-14x+$_____

39. Transform the equation into the vertex form of a parabola by **completing the square**. Find the vertex. $y = 3x^2 + 6x + 15$

40. Solve $3x^2+4x-5=0$ by using the quadratic formula to find the x-intercepts.

41. Which is not a square root of -9?

;) -3*i* l) 3*i* i) -3 j) $\sqrt{-9}$

42. Write the equation $y=x^2-2x+2$ in vetex form.

43. Perform the operations and simplify $(7-14i)(6+7i)$.

44. What is the vertex of the graph of $y = \frac{1}{2}(x+4)^2 + 5$?

45. What are the solutions of $\frac{1}{4}(x-2)^2 = 8$?

46. How many real and imaginary solutions does the equation $3x^2 + 2x - 7 = 0$ have?

47. What is the equation of the line that passes through (0,-5) and (1,5)?

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Additional problems on 6.1 – 6.3