1st Semester Final Exam Review – Algebra 2 Trig

Note: This is not intended to cover every single thing we have talked about this semester, that would take a lot of paper, but it is intended to be used as a study aid, and somewhere for you to start. Use your Unit Plans and Student Self Reflections, your ever important word problems per unit (especially for Unit 5!), and spend some time coming in before school or after school to look at your old tests. Study hard, ask questions, lots and lots of questions. Good Luck!

Fall Semester

Linear Functions (Chapter 2): page 77 #12, 13, 17, 18, 27 – 30; page 86 #9, 11, 13; page 93 #12, 15, 24, 25, 37, 41; page 101 #10, 12, 30, 32, 35; page 118 #19, 20; page 127 #11, 13, 19; page 131 #2, 3, 6

Quadratic Functions (Chapter 4): page 240 #15, 21, 25; page 249 #5, 11, 16, 17; page 255 #5, 7; page 263 #8, 11, 15, 32, 38; page 270 #31; page 279 #11, 17, 25; page 288 #4, 6, 24, 29; page 296 #19, 37, 38

Higher Order Polynomials (Chapter 5): page 341 #15, 29, 30; page 349 #11, 21; page 357 #7, 11, 16, 21, 27; page 366 #21, 22, 29; page 374 #17; page 384 #21, 24; page 390 #3, 4, 7

Linear Systems & Matrices (Chapter 3): page 156 #8, 11, 14; page 164 #10, 11, 17, 23, 29; page 182 #9, 14; page 191 #9, 11, 25; page 200 #24, 27; page 214 # 37 (on calculator)

Advanced System Analysis: page 157 #31, 33; page 176 #3, 5, 7

equation

1. What is the slope of the line that passes through (2, 4) and (5, 10)?

   a. $y = \dfrac{1}{2}x$

   b. $y = -\dfrac{1}{2}x + 4$

   c. $y = -2x + 10$

   d. $y = 2x + 6$ ⭕

   e. $y = 4$

   (handwritten: $\dfrac{10-4}{5-2} \to \dfrac{6}{3} = 2$)

   (handwritten: $4 = 2(2) + b$)

   (handwritten: $b = 0$)

2. If you drive 528 miles and you average 16.5 miles per gallon, how much do you spend for gas if it cost $1.35 a gallon?
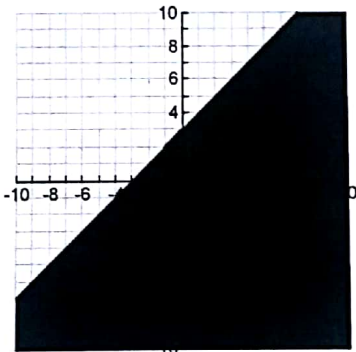
   a. $43   b. $43.15   c. $43.20 ⭕

   d. $43.30   e. $43.35

3. Which inequality is represented by the graph shown?

   a. y > -x + 3   c. y ≥ x − 3

   b. y < x + 3 ⭕   e. y ≤ x + 3 ⭕

   c. y < -x − 3

4. Which ordered pair is a solution of the following system of linear equations?

   $$\begin{cases} x + 2y = 11 \\ -2x - 3y = -16 \end{cases}$$

   a. (6, 1)   b. (1, 6) ⭕   c. (1, 6)

   d. (-1, -6)   e. (-6, 1)

5. What does (2 − 3i)(5 + 8i) equal?

   a. $10 - 224i^2$ d. 34 + i ⭕

   b. 34 − 31i   e. -34 + i

   c. 34 + 31i

6. Which of the following is the factorization of $x^3 + 10x^2 + 12x - 72$?

   a. (x − 2)(x + 2)(x + 6)
   b. $(x - 6)^2(x + 2)$
   c. $(x - 2)(x + 6)^2$ ⭕
   d. (x − 6)(x + 6)(x − 2)
   e. $(x + 6)^2(x + 2)$

7. What are all the solution of $2x^2 + 5(3x - 4) = 5x^2 - 6x + 10$?

   a. 2   b. 5   c. -2

   d. -2, 5   e. 2, 5 ⭕

8. A ladder 30 feet in length that hits the wall at a height of 24 feel has a slope of _____?
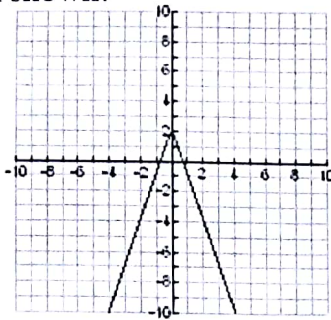
   a. 3/4   b. 4/3 ⭕   c. 3/5

   d. 4/5   e. -4/5
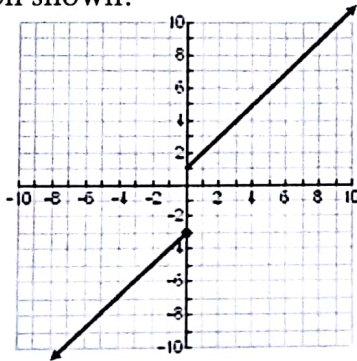
9. Which function is represented by the graph shown?

   a. $y = |3x + 2|$ b. $y = |2 - 3x|$

   c. $y = -|3x| + 2$ d. $y = |-3x + 2|$

10. Which function is represented by the graph shown?

  a. $\begin{cases} x+1, if\ x \leq 0 \\ x+3, if\ x > 0 \end{cases}$

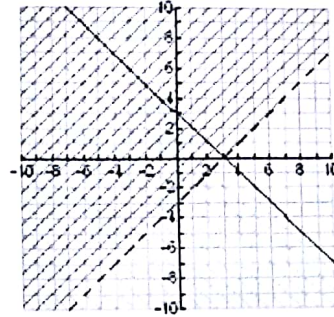 b. $\begin{cases} x+1, if\ x < 0 \\ x-3, if\ x \geq 0 \end{cases}$

  c. $\begin{cases} x-1, if\ x \geq 0 \\ x+3, if\ x < 0 \end{cases}$

  d. $\begin{cases} x-1, if\ x \leq 0 \\ -x+3, if\ x > 0 \end{cases}$

  e. $\begin{cases} x+1, if\ x > 0 \\ x-3, if\ x \leq 0 \end{cases}$

11. Which system of linear inequalities is shown in the graph?

  a. $y < -x + 3$ and $y \geq x - 3$
  b. $y > -x + 3$ and $y < x - 3$
  c. $y \leq -x + 3$ and $y > x - 3$
  d. $y \leq -x + 3$ and $y \geq x - 3$
  e. $y < -x + 3$ and $y > x - 3$

12. What is the maximum value of the objective function $C = 2x + 3y$ subject to the following constraints?

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq -2x+6 \end{cases}$$

  a. 0   b. 3   c. 6

  d. 18   e. 24

13. Which of the following is the factorization of $x^3 + 64$?

  a. $(x + 4)(x + 4)(x + 4)$
  b. $(x + 4)(x^2 + 4x + 16)$
  c. $(x - 4)(x^2 - 4x + 16)$
  d. $(x + 4)(x^2 + 4x - 16)$
  e. $(x + 4)(x^2 - 4x + 16)$

14. What are the real solutions to the equation $x^3 - 13x = 12$?

  a. -3, 1   b. -3, -1, 4   c. -3, 1, 4
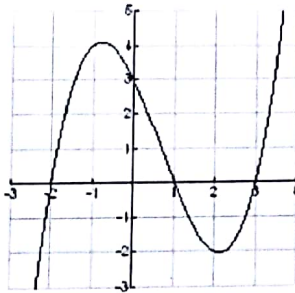
  d. -1, 4   e. 4

15. Which of the following is the factorization of $x^3 - 5x^2 - 16x + 80$?

    a. $(x - 4)(x + 4)(x + 5)$
    b. $(x - 4)^2(x + 5)$
    c. $(x - 4)(x + 5)^2$
    d. $(x - 4)(x + 4)(x - 5)$
    e. $(x + 4)^2(x + 5)$

16. What is the polynomial function of least degree that has real coefficients, a leading coefficient of 1, and the zeroes -1, 3, and 4?

    a. $f(x) = x^3 - 6x^2 + 5x + 12$
    b. $f(x) = x^3 - 6x^2 - 5x + 12$
    c. $f(x) = x^3 - 6x^2 - 5x - 12$
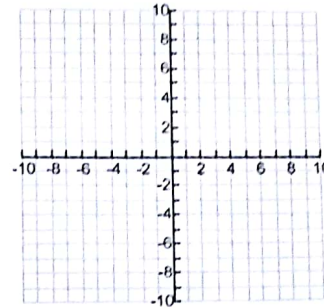   d. $f(x) = x^3 - 6x^2 + 5x - 12$

17. Which function is graphed?

    a. $f(x) = \frac{1}{2}(x - 1)(x + 2)(x - 3)$
    b. $f(x) = -\frac{1}{2}(x - 1)(x + 2)(x - 3)$
    c. $f(x) = 2(x - 1)(x + 2)(x - 3)$
    d. $f(x) = (x - 1)(x - 2)(x + 3)$
    e. $f(x) = -2(x + 1)(x - 2)(x + 3)$

18. Which of the following is a function?

    a. $x = y^2 + 2$
    b. $\{(6, -5), (6, 2), (2, -1)\}$
    c. $\{(-1, 6), (3, 6), (-5, 6)\}$
    d. $3x^2 + 4y^2 - 5 = 1$

19. Write the equation of the line, in slope – intercept form, that passes through the point (2, -3) and has a slope of 3.

    a. $y = 3x - 9$ c. $y = -3x - 9$
    b. $y = -3x + 9$ d. $y = 3x + 9$

20. Solve the system:
$$4x + y = -11$$
$$x - y = 1$$

    a. No solution   c. (-19, -3)
    b. (0, -11)   d. (-2, -3)

21. Your computer supply store sells two types of laser printers. The first type, A, costs $180 and you make $45 profit on each one. The second type, B, costs $120 and you make $30 profit on each one. You expect to sell at least 100 laser printers this month and you need to make at least $3450 profit on them. If you must order at least one of each type of printer, how many of each type of printer should you order if you want to minimize your cost?

    a. 85 type A, 15 type B
    b. 15 type A, 85 type B
    c. 30 type A, 70 type B
    d. 70 type A, 30 type B

22. Factor $36y^2 - 49$

   a. $(6y + 7)(6y - 7)$
   b. $(36 + 1)(y - 49)$
   c. $(6y + 7)(6y + 7)$
   d. $(6y - 7)(6y - 7)$

23. Write in standard form:
   $(7 + 6i) - (9 + 3i)$

   a. $45 + 75i$
   b. $-2 + 3i$
   c. $16 + 9i$
   d. $16 - 9i$

24. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by $d = -16t^2 - 2t + 405$ How long after the rock is thrown is it 300 feet from the ground?

   a. 2.63 seconds   c. 2.5 seconds
   b. 3.63 seconds   d. 3.5 seconds

25. Solve by completing the square.
   $x^2 + 6x - 40 = 0$

   a. 10, 4   c. 10, -4
   b. -10, -4   d. -10, 4

26. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by $d = -16t^2 - 2t + 405$ How long after the rock is thrown is it 300 feet from the ground?

   c. 2.63 seconds   c. 2.5 seconds
   d. 3.63 seconds   d. 3.5 seconds

27. If $f(x) = x^2 - 3x + 5$, what is the value of $f(5)$?

   a. 5   b. 0   c. 23
   d. 15   e. -13

28. If the discriminant is zero:

   a. there are two imaginary roots
   b. there are two real roots
   c. there is one real root
   d. none of these

29. Find the maximum value of:
   $y = -8x^2 + 80x - 196$

   a. maximum = 4
   b. maximum = -196
   c. maximum = -5
   d. maximum = -404

30. Solve by completing the square

   $x^2 - 6x - 39 = 0$

   a. $3 \pm 4\sqrt{3}$
   b. $-3 \pm 4\sqrt{3}$
   c. $-3 \pm 3\sqrt{4}$
   d. $6 \pm 4\sqrt{3}$

$x^2 - 6x = 39$

$(x - 3)^2 = \sqrt{48}$

$x - 3 = \pm 4\sqrt{3}$

$x = 3 \pm 4\sqrt{3}$