## Practice Problems for CE Math 1010 Midterm

Please note, this is a collection of problems that reflect the scope of material that could be tested on the midterm exam. It is not a "practice test." The relative point values are reasonably accurate.

1. (3 pts) Write the equation of a line, in slope-intercept form, that has a slope of 2 that passes through the point (-3, 4).

2. (2 pts) Multiply $(3x^2 - 2x - 1)(2x)$.

3. (2 pts) Simplify the expression $3x^3 + x^2 - 5x + 6x^2 + 2x - 10$

4. (5 pts) Graph given compound inequality of the number line then write it in interval notation.

$$-3 \leq x < 4$$
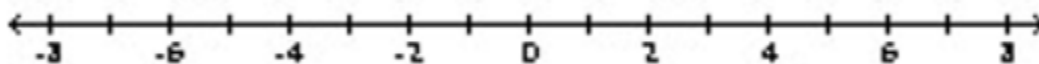
   Interval Notation: _____

5. (8 pts) Find or determine the following for $4x + 6y = 24$:
   a. The x intercept as an ordered pair.

   b. The y intercept as an ordered pair.

   c. What is the slope of the line?

6. (3 pts) Determine whether the function $h(x) = -2x + 5$ is increasing or decreasing? Explain how you know (or how you arrived at your conclusion)

7. (5 pts) The value of a car that is two years old is $24,500. That same car will be worth only $20,100 when it is 6 years old. Assume the rate of depreciation is constant from year to year. Write a linear function labeled f(x) that represents the value of the car at any age.

Use the expression $\sqrt[4]{16x^5y^7z}$ for questions 8 and 9.

8. (4 pts) Rewrite the expression in simplified radical form.

9. (3 pts) Convert the expression to exponential form. Simplify your answer so that it doesn't contain parentheses.

10. (9 pts) Use the coordinate planes provided to answer the following questions. Graph the equation of each line. Identify the slope of each line. Then determine whether or not it is a function.
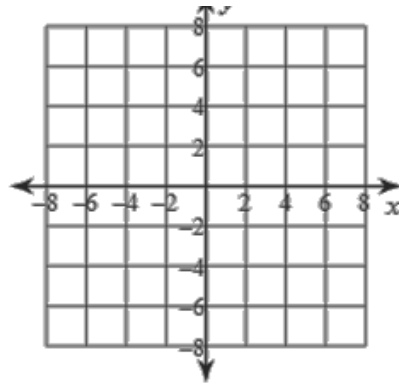
   a. Graph the equations $y = -\frac{3}{2}x - 1$
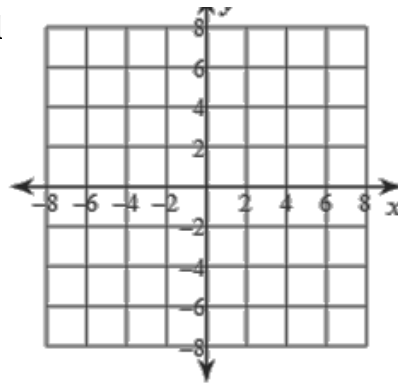
   b. Create a table of three ordered pair that satisfies the equation $y = -2$ then graph the equation.
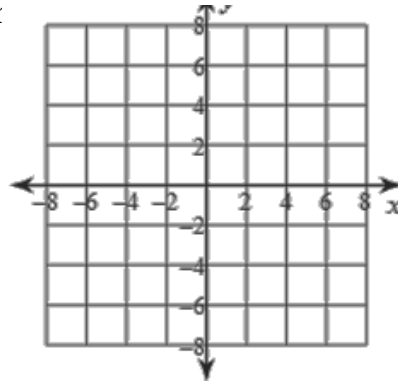
c. Draw a graph that is not a function

11. (2 pts) Simplify $\sqrt[3]{2y} + 5\sqrt[3]{2y} - 4\sqrt[3]{y}$

12. (2 pts) Multiply $\sqrt{3x}\left(\sqrt{4y} + \sqrt{5z}\right)$

13. (3 pts) If $f(x) = ax - 2$ and $f(1) = 8$ find the value of a.

14. (3 pts) Is the ordered triple $(2,1,1)$ a solution to the following system of equations? Show all work leading to your conclusion or no points will be awarded.
$$3x - y + z = 6$$
$$2x + y - z = -1$$
$$x + 2y - 3z = 1$$

15. (4 pts) Simplify $\dfrac{12x^2y^5z^4}{18x^6z}$. Write with positive exponents only.

16. (3 pts) Is the following statement Never, Sometimes, or Always True?
$(3x)^2 = 3x^2$.
Explain how you arrived at your conclusion.

17. (2 pts) Write the given expression in radical form.
$$y^{\frac{5}{12}}$$

18. (2 pts) Consider the radical equation $\sqrt{2x-5} - 7 = 2$. What would be the most efficient first step in solving the equation?

    a. $\sqrt{2x-5} = 9$

    b. $\left(\sqrt{2x-5} - 7\right)^2 = (2)^2$

    c. $9 = -\sqrt{2x-5}$

    d. $\left(\sqrt{2x-5}\right)^2 - (7)^2 = (2)^2$

19. (5 pts) Rationalize the denominator and write as a simplified fraction.
$$\frac{4x}{\sqrt{2x^3}}$$

20. (2 pts) Expand $(y + 5)^2$

21. (4 pts) Divide.
$$\frac{m^3 + 5m^2 - 23m + 16}{m - 2}$$

22. (9 pts) For your high school graduation present you decide you are going to rent an exotic car. After careful consideration you decide on the Lamborghini Huracan because it has a 602 horsepower V10 engine and the Ferrari only has a V8. There are two rental agencies that have the Huracan. Agency 1 offers the Huracan for $1275 a day plus a fee of $5 per mile. Agency 2 offers it for $1625 plus $3 per mile. The respective cost equations are:
$$c = 5m + 1275$$
$$c = 3m + 1625$$

    a. For the equation $c = 5m + 1275$ what does the slope of the line represent?

    b. For the equation $c = 3m + 1625$ what does the y-intercept represent?

    c. Solve the system of equations.

    d. Explain how you know your solution to the system is correct. Include context as part of you explanation.

23. (9 pts) A swimming pool in your back yard has a leak. It holds 1035 gallons of water but is leaking at a rate of 45 gallons per hour. The function describing the amount of water in the pool at time t, in hours since it started leaking is given by:
$$A(t) = 1035 - 45t$$

a. Find $A(12)$

b. Explain the meaning of $A(12)$.

c. What is the practical domain $A(t)$?

d. What is the practical range of $A(x)$?

24. (3 pts) Determine whether the function represented in the following table is linear or not. Explain your reasoning.

x	g(x)
4	20.4
5	22.1
6	23.8
7	25.5

25. (2 pts) When solving a system of two linear equations in two variables the final step yields the following equation: $0 = 5$. How many solutions does this system have? Explain how you arrived at your conclusion

26. (3 pts) Solve $\sqrt[3]{x - 11} + 5 = 3$

27. (4 pts) Solve the inequality and write the solutions using interval notation.
$$6 \le -3x - 9 < 12$$

28. (3 pts) Multiply $(3x^2 - 2x - 1)(x + 4)$

29. (3 pts) $\sqrt[3]{3}\left(\sqrt[3]{18y} + \sqrt[3]{4}\right) + 5\sqrt[3]{2y}$