Math 130 Exam #1 Review Sheet – Spring 2016

Please Note: The exam will cover the material covered in Chapter 1 and 2.1 to 2.7. The review sheet is designed for you to have a guide as to what to study. The problems on the exam are not limited to the type of problems on this sheet. Any types of problem from the assigned homework problems and problems discussed in class are possible exam questions. Please attempt other practice problems other than those presented on this sheet in order to be completely prepared for the exam.

1. Find all solutions for the following equations. Be able to solve by using either factoring, by completing the square, or by using the quadratic formula.

a. $2x^2 - 5x - 3 = 0$
b. $x(x+4) = 12$
c. $(2x+3)^2 = 9$
d. $x^2 - 6x = 13$
e. $x^2 + \frac{2}{3}x - \frac{1}{3} = 0$
f. $4x^2 + x + 1 = 0$
g. $3x = 1 - \frac{1}{x}$

2. Solve the following equations for all solutions.

a. $\sqrt{5t+3} = 2$
b. $x = 2\sqrt{x-1}$
c. $\sqrt{3 - x + x^2} = x - 2$
d. $2 + \sqrt{12 - 2x} = x$
e. $x^4 - 10x^2 + 25 = 0$
f. $x^6 + 7x^3 - 8 = 0$
g. $2(x+1)^2 - 5(x+1) = 3$
h. $t^{1/2} - 2t^{1/4} + 1 = 0$
i. $\frac{1}{(x-1)^2} + \frac{1}{x-1} = 12$
j. $\frac{8}{x^2-9} + \frac{4}{x+3} = \frac{2}{x-3}$
k. $\frac{1}{x-2} + \frac{1}{x+2} = \frac{4}{x^2-4}$

l. $\dfrac{2x-1}{x^2+2x-8}+\dfrac{2}{x+4}=\dfrac{1}{x-2}$

3. Solve the following inequalities. Leave your solution in interval notation.

a. $3x-1\geq 3+x$

b. $8-4(2-x)\leq -2x$

c. $3x+4>\dfrac{1}{3}(x-2)$

d. $4\leq 2x+2\leq 10$

e. $0<1-\dfrac{1}{3}x<1$

f. $\dfrac{x^2-4x+3}{x+4}\geq 0$

g. $x^2+4x<12$

h. $\dfrac{x+1}{x-3}\geq 0$

i. $3x^2+5x-2\geq 0$

4. Find the slope, *x*- and *y*-intercepts of the following lines. Then, graph the line.

a. $y=-3x+4$

b. $\dfrac{1}{3}x+y=2$

c. $x+2y=4$

d. $3x+2y=6$

e. $x=5$

f. $y=3$

g. $x-y=2$

5. Find the equation of the line with the given information.

a. Slope $=-\dfrac{2}{3}$; containing the point $(1,-1)$

b. Containing the points $(-3,4)$ and $(2,5)$

c. Slope $=-2$; y-intercept $=(0,-2)$

d. Slope undefined; containing the point $(2,4)$

6. Determine whether the equation is a function.

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

b. $y^2 = 4 - x^2$

c. $y = |x|$

d. $y = \dfrac{3x-1}{x+2}$

7. For each of the following functions, find: $f(0), f(2), f(a), f(x+1), f(2x), f(x+h)$.

a. $f(x) = x^2 + 2x + 3$

b. $f(x) = |x| + 4$

c. $f(x) = \dfrac{2x+1}{3x-5}$

8. Find the domain of each function.

a. $f(x) = x^2 + 4x - 3$

b. $f(x) = \dfrac{4x}{x^2 - 3x + 2}$

c. $f(x) = \sqrt{5x-3}$

d. $f(x) = \dfrac{3}{\sqrt{3x-7}}$

9. Sketch the graph of the following functions.

a. $f(x) = x^2$

b. $f(x) = x^3$

c. $f(x) = \sqrt{x}$

d. $f(x) = \begin{cases} 2x & x < 0 \\ 3x - 1 & x \geq 0 \end{cases}$

e. $f(x) = \begin{cases} x + 3 & x < -2 \\ x^2 & -2 \leq x < 1 \\ -x + 2 & x > 1 \end{cases}$

f. $f(x) = [\![x]\!]$

10. Sketch the graph of each of the following functions by using techniques of shifting, compressing, stretching, and/or reflecting.

a. $f(x) = x^2 + 4$

b. $f(x) = \sqrt{x} - 3$

c. $f(x) = -x^3 + 2$

d. $f(x) = (x+2)^3 - 4$

e. $f(x) = 3(x-2)^2 + 1$

f. $f(x) = -2|x-3| + 4$

11. Write the function whose graph is the graph of $y = x^3$, but is:

a. Shifted up 4 units.
b. Shifted right 3 units.
c. Reflected about the *x*-axis, shifted up 3 units and shifted left 2 units.

12. The relationship between Celsius $(°C)$ and Fahrenheit $(°F)$ degrees for measuring temperature is linear. Find an equation relating $°C$ and $°F$ if $0°C$ corresponds to $32°F$ and $100°C$ corresponds to $212°F$. Use this equation to find the Celsius measure of $70°F$.

13. Cynthia wants to buy a rug for a room that is 12 ft. by 15 ft. She wants to leave a uniform strip of floor around the rug. She can afford to buy 108 sq. ft. of carpeting. What dimensions should the rug have?

14. An ecology center wants to set up an experimental garden using 300 meters of fencing to enclose a rectangular area of 5000 sq. meters. Find the dimensions of the garden.

15. How many gallons of 50% antifreeze must be mixed with 80 gallons of 20% antifreeze to get a mixture that is 40% antifreeze?

16. Deep Thought Granola is 25% nuts and dried fruit. Oat Dream Granola is 10% nuts and dried fruit. How much of Deep Thought and how much of Oat Dream should be mixed to form a 20-lb. batch of granola that is 19% nuts and dried fruit.

17. How many gallons are pure alcohol should be mixed with 20 gallons of a 15% alcohol solution to obtain a solution that is 25% alcohol?

18. Doug's copier can do a printing job in 7 hours. Scott's copier can do the same job in 12 hours. How long would it take to do the job using both copiers?

19. Working alone, Jorge can paint a room in 8 hours. Caterina can paint the same room working alone in 6 hours. How long will it take them if they work together?

20. An experienced employee can enter tax data into a computer twice as fast as a new employee. Working together, it takes the employees 2 hours. How long would it take the experience employee working alone?

21. The lengths of the sides of a right triangle are consecutive integers. Find the lengths of the sides.

22. The lengths of the sides of a right triangle are such that the shorter leg is 7 inches shorter than the longer leg. The hypotenuse is 1 inch longer than the longer leg. Find the lengths of the side of the triangle.

23. Margaret drove to a business appointment at 50 mph. Her average speed on the return trip was 40 mph. The return trip took ¼ hour longer because of heavy traffic. How far did she travel to the appointment?

24. Two planes leave Los Angeles at the same time. One heads south to San Diego, while the other heads north to San Francisco. The San Diego plane flies 50 mph slower than the San Francisco plane. In ½ hour, the planes are 275 miles apart. What are their speeds?