Math 101/120 Common Final Exam
Sample 1

1. Find the sixth term of $(3x-2)^7$

2. Graph: $4x^2+9y^2=36$

3. Find an equation of the line through the point (-5, 9) that is perpendicular to the graph of $2x-3y=7$

4. For the sequence 3, 7, 11, …
   (a) Find the twentieth term.
   (b) Find the sum of the first twenty terms.

5. Simplify: $\dfrac{\dfrac{x-5}{x^2-4}}{\dfrac{x^3-3x^2-10x}{x-2}}$

6. Find $f^{-1}(x)$ for $f(x)=\dfrac{x+2}{x-3}$

7. Graph: $y=x^2-6x+5$

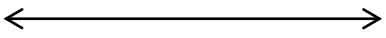
8. Solve: $\dfrac{x}{x+2}-\dfrac{7}{5-x}=\dfrac{14}{x^2-3x-10}$

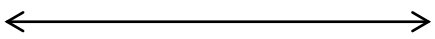
9. Graph: $x^2+y^2-4x+6y=12$

10. Sandy needs 30 liters of a 30% HCl solution but only has supplies of 25% HCl solution and 40% HCl solution. How much of each must Sandy mix to get the desired solution?

11. Solve by graphing $\begin{cases} x-y\le -4 \\ x\le 0 \\ y\ge 0 \end{cases}$

12. Solve: $\log_2 x+\log_2(x-7)=3$

13. Solve: $\left|\dfrac{1}{2}x-3\right|-\dfrac{7}{2}<-1$ and then graph the solution. 

14. Solve: $x^2-x\ge 12$ and then graph the solution. 

15. If you put $1000 into an account yielding 8% interest continuously compounded, in how many years would your account have $3000? (Round answer to the nearest year.)

16. $f(x) = x^2 - 2x + 1$ and $g(x) = x^3 - 2$ Find: $f \circ g(x)$

17. Solve: $\sqrt{18 - x} - 2 = x$

18. Solve: $3x^2 + 4 = 4x$

19. For the function $f(x) = 2x^2 + 3x - 4$, evaluate **one** of the following formulas.

$$\frac{f(x+h) - f(x)}{h} \quad \textbf{OR} \quad \frac{f(x) - f(a)}{x - a}$$

20. Graph: $y = \log_3(x + 1)$

21. You buy a car for $20,000. Each year thereafter, it loses 1/6 of its value. What is the car worth in 5 years? (Round answer to the nearest cent.)

22. Simplify: $\dfrac{(16x^6y^{-4})^{-\frac{1}{2}}}{(-27x^{-6}y^3)^{\frac{1}{3}}}$

23. a) **Graph**: $(x - 3)^2 + (y + 2)^2 = 4$
    b) Find the domain and range.
    c) Is the relation a function?

24. Solve:
$$x - 3y + 3z = -6$$
$$-2x + 4y + z = 3$$
$$3x - 5y + 4z = -9$$