

Math 152 Ch. 13, 14, and 12 Sample Test Name _____
Show all your work if you want to receive credit.

1. Find the equation of a circle with center $(2, 3)$ and radius $\sqrt{5}$.
2. Sketch the graph of $y = x^2 + 2x - 8$. Be sure to show the location of the vertex, the y -intercept, and the x -intercepts.
3. Sketch the graph of $x = -y^2 + 4y$. Be sure to show the location of the vertex, the x -intercept, and the y -intercepts.
4. Find the center and radius of the circle $x^2 - 6x + y^2 + 8y - 11 = 0$.
5. Sketch the graph of the ellipse $\frac{(x-3)^2}{9} + \frac{(y+4)^2}{4} = 1$
6. Sketch the graph of the ellipse $16x^2 + 9y^2 = 1$
7. Sketch the graph of the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$
8. Solve the system of equations $\begin{cases} x + y = -1 \\ xy = -12 \end{cases}$
9. Find the sixth term of the sequence described by $a_n = \frac{n-1}{2n+1}$.
10. Find the sum $\sum_{k=2}^4 (2 + k^2)$. Be sure to show your work.
11. Solve each of the following.
 - (a) $8^x = 19$
 - (b) $3e^{2x} = 12$
 - (c) $\ln 4x = 8$
12. A bacteria culture doubles in size every 6 hours. What is the exponential growth constant r for this bacteria? Assume that the population grows according to the model $P = P_0 e^{rt}$.
13. A roast is taken from the oven and has an internal temperature of 130°F . If the room temperature is 65°F , how long will it take the roast to cool to 90°F ? $T(t) = M + (T_0 - M)e^{-0.043t}$