Math 188 Ch. 10 and 11 Sample Test Name_____
Show all your work if you want to receive credit.

1. Find the equation of a parabola with vertex $(2, 3)$ and directrix $y = 8$.

2. Find the equation of the parabola with focus at $(2, 3)$ and directrix $y = 8$.

3. An ellipse has foci at $(0, \pm 2)$ and vertices $(0, \pm 5)$. Find the equation of the ellipse.

4. A hyperbola has vertices $(0, \pm 2)$ and foci $(0, \pm 5)$. Find the equation of the hyperbola.

5. The asymptotes of a hyperbola are $y = \pm \frac{12}{5} x$ and the foci are at $(0, \pm 39)$. What is the equation of the hyperbola?

6. An ellipse is cut from a piece of plywood that is 8 feet long and 4 feet wide. What is the equation of the largest such ellipse?

7. Find the sum of the infinite series $\frac{3}{x^2} - \frac{6}{x^4} + \frac{12}{x^6} - \ldots$. Assume $x > 2$.

8. If $r > 0$, find the sum of $P(1+r)^{-n} + P(1+r)^{-n+1} + P(1+r)^{-n+2} + \cdots + P(1+r)^{1}$.

9. A ball is dropped from a height of 15 feet. After each bounce, the ball bounces vertically to two-fifths of its previous height. What is the exact value of the total vertical distance travelled by the ball?

10. Write $12.345454545\ldots$ as a fraction.

11. A square has a side of length L. The square is cut into 16 equal smaller squares. One of these squares is shaded. A second square is again cut into 16 smaller squares. One of these smaller squares is shaded and again a second is cut into 16 smaller squares. This process continues indefinitely. What is the total shaded area?

12. Find the coefficient of the x^{140} term in $(x^2 - 2x^{-4})^{100}$.