

1. Find the remaining parts of each of the following triangles with given parts.
 - a. $a = 5, b = 8, a = 30^\circ$
 - b. $a = 5, b = 6, c = 9$
 - c. $a = 40^\circ, b = 5, c = 6$
 - d. $a = 40^\circ, b = 30^\circ, c = 5$
2. For each of the followings, sketch the graph, find center (if applicable), focus (or foci), equation of directrix (if applicable), vertex (or vertices), end-points of the minor axis (if applicable), equation of oblique asymptotes (if applicable).
 - a. $x^2 - 4x = 2y$
 - b. $y^2 - 2y = 8x - 1$
 - c. $x^2 + 9y^2 + 6x - 18y + 9 = 0$
 - d. $x^2 - 9y^2 + 6x - 18y + 9 = 0$
 - e. $-x^2 + 9y^2 + 6x - 18y + 9 = 0$
 - f. $-2x^2 - 3y^2 + 8x - 6y = 5$
3. Find the equation of a parabola with focus $F(-2, 2)$ and directrix $x = 2$.
4. Find the equation of a geometrical figure that is the collection of all points in the plane whose sum of distances from two fixed points $F_1(-1, 2)$ and $F_2(3, 2)$ are always 12.
5. Find the equation of a geometrical figure that is the collection of all points in the plane whose difference of distances from two fixed points $F_1(-1, 2)$ and $F_2(3, 2)$ are always ± 12 .
6. Express each sum using summation notation.
 - a. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$
 - b. $\frac{1}{2} - \frac{3}{4} + \frac{5}{6} - \frac{7}{8} + \dots$
7. Find the sum of the first 20 terms of an arithmetic sequences whose 4th term is 12 and 9th term is 8.
8. Find the sum of the first 20 terms of a geometric sequences whose 4th term is 2 and 6th term is 3. (there are two possible answers!)
9. Find the sum of an infinite geometric series whose 1st term is 2 and whose 3rd term is $\frac{1}{2}$. (there are two possible answers!)
10. Use Mathematical induction to prove each of the followings.
 - a. $\sum_{i=1}^n i = \frac{n(n+1)}{2}$
 - b. $\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$