1. Solve by factoring:
\[ 6x^2 - x - 35 = 0 \]

2. Use the quadratic formula to solve:
\[ 3x^2 + 7x - 4 = 0 \]

3. Explain why 6 and 6.378 are rational numbers.


5. Solve the inequality
\[ x^2(2x - 3)(4x + 3)^3(x + 5)^4 < 0 \]

6. Show that
\[ \sqrt{\frac{x}{x + 1}} < \sqrt{\frac{x + 1}{x + 2}} \quad \text{when } x > 0. \]

7. Let \( a \) and \( b \) be non-negative real numbers with \( a \leq b \). Show that
\[ a \leq \sqrt{ab} \leq \frac{a + b}{2} \leq b \]

8. Find the slope-intercept form of the equation for the straight line passing through \((2, 3)\) and \((-4, 5)\).

9. Find the point-slope equation of the line passing through \((3, 1)\) and parallel to \(y = 5x - 7\).

10. Find a general equation of the line passing through \((3, 1)\) and perpendicular to \(y = 5x - 7\).

11. Find the distance between the point \((2, 3)\) and the line \(4x - 5y + 1 = 0\).

12. Graph the circle
\[ (x + 3)^2 + (y - 1)^2 = 5^2 \]

13. Graph the ellipse
\[ \frac{(x + 2)^2}{4^2} + \frac{y^2}{5^2} = 1 \]

14. Graph the parabola
\[ y = 3(x + 2)^2 - 4 \]

15. Graph the hyperbola
\[ \frac{(x - 2)^2}{5^2} - \frac{(y + 1)^2}{3^2} = 1 \]

16. Find \( \sin \theta, \cos \theta \) and \( \tan \theta \) (with \( \theta \) measured in radians) for \( \theta = 0, \pi/6, \pi/4, \pi/3 \) and \( \pi/2 \).

17. Find \( \sin \theta, \cos \theta \) and \( \tan \theta \) when \( \theta = 27\pi/2, -37\pi/6 \) and \( 1000\pi \).

18. Graph \( y = 2\sin(3x - \frac{\pi}{6}) + 1 \).
19. Of the three functions \( \sin x \), \( \cos x \) and \( \tan x \), which are even and which are odd? Also, for each function, find all axes of symmetry and all asymptotes.

20. Find the domain and range of the following functions:
   a. \( f(x) = \frac{2}{x+3} \).
   b. \( G(y) = \frac{-3}{(y+1)^2} \).
   c. \( u(\theta) = \sqrt{2\theta + 1} \).

21. Consider the functions \( f \) and \( g \) whose graphs are drawn below.

   ![Graphs of f and g](image)

Sketch the graphs of \( f + g \), \( f - g \), \( fg \), \( f/g \), \( f \circ g \) and \( g \circ f \). Caution: Watch out for problems with the domain and range.

22. Let \( f(x) = 2x + 3 \) and \( g(x) = \sqrt{x-1} \). Find the domain and range of \( f + g \), \( f - g \), \( fg \), \( f/g \), \( f \circ g \) and \( g \circ f \). Then sketch their graphs.

23. Solve the following system of equations:

\[
\begin{align*}
2x &- 3y &+ z &= 3 \\
x &+ y &- z &= 5 \\
3x & &- 5z &= 7
\end{align*}
\]