Question 1:

(a)[**5 points**]   Rationalize the denominator in

$$\frac{2 - \sqrt{3}}{2 + 5\sqrt{3}}$$

(b)[**5 points**]   Simplify. Express your answer so that only positive exponents appear.

$$\frac{(xy)^{1/4}(x^2y^2)^{1/2}}{(x^2y)^{3/4}}$$

Question 2:

(a)[4 points] Find the distance $d(P_1, P_2)$ between the points $P_1 = (-4, -3)$ and $P_2 = (6, 2)$.

(b)[3 points] Find the midpoint of the line segment joining the points $P_1 = (-4, -3)$ and $P_2 = (6, 2)$.

(c)[3 points] Find the slope of the line through the points $P_1 = (-4, -3)$ and $P_2 = (6, 2)$.

Question 3:

(a)[5 points] Find the x and y intercepts of $4x^2 + y^3 = 8$.

(b)[5 points] Determine if the graph of $4x^2 + y^3 = 8$ is symmetric about the x-axis, the y-axis or the origin.

Question 4:

(a)[5 points]   Put the circle $x^2 + y^2 + 4x - 12y - 9 = 0$ into standard form and state the centre and radius.

(b)[5 points]   Find the equation of the line through $(1, -2)$ which is perpendicular to the line $y = -7x + 3$.

Question 5:

(a)[5 points]   Find the domain of the function $f(x) = \dfrac{3x}{\sqrt{1-3x}}$.

(b)[5 points]   Let $f(x) = \dfrac{1}{x}$. Find and simplify the difference quotient

$$\frac{f(x+h) - f(x)}{h}.$$