Question

What does this equation tell you about a graph?

$$y = 5x^2 - 11x + 8$$

Solution

(1) the largest exponent of x is 2, the largest exponent of y is 1, therefore, the graph is a parabola. It is a vertical parabola;

(2) the coefficient of x^2 is positive; therefore, the parabola opens upwards;

(3) the coefficient of x^2 is 5, not equal to 1; therefore, the graph is stretched vertically by the ratio of 5;

(4) $5x^2 - 11x + 8 = 5\left(x^2 - 2.2x + 1.21\right) + 1.95 = 5\left(x - 1.1\right)^2 + 1.95$; the vertex is at (1.1,1.95);

(5) $5x^2 - 11x + 8 = 0$; $D = 11^2 - 4 \cdot 5 \cdot 8 = 121 - 160 < 0$, therefore, the equation does not have real solutions ($x \in \varnothing$); there are no x-intercepts;

(6) if $x = 0$ then $y = y(0) = 5 \cdot 0^2 - 11 \cdot 0 + 8 = 8$, therefore, the y-intercept is at (0,8).