

Show all work for each of the following in the space provided.

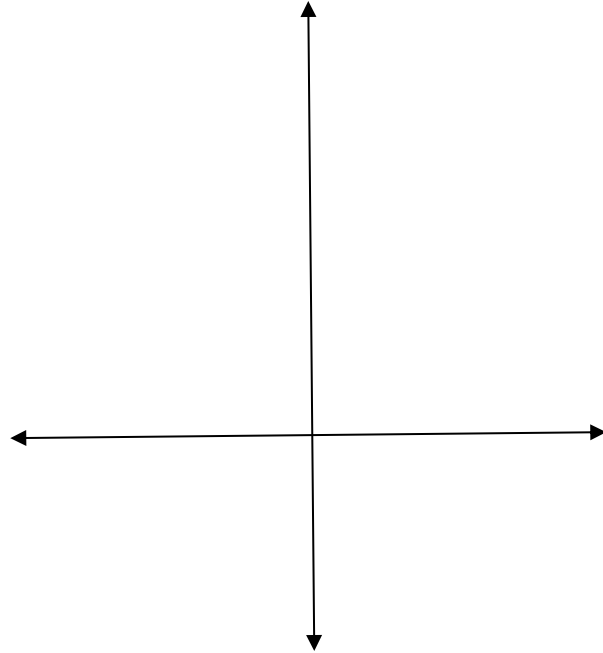
[64 MARKS]

1. Complete the chart shown below for the quadratic function $y = 2x^2 - 12x + 17$

[14]

Vertex	
Domain	
Range	
Stretch Factor	
Direction of Opening	
Maximum or Minimum	
Equation of Axis of Symmetry	
y-Intercept	

Provide a sketch of this function on the axes below. Be sure and label the coordinates of **three key points** that were used to determine the sketch.



2. Solve the following radical equation:

$$7 + \sqrt{3x} = \sqrt{5x + 4} + 5$$

[8]

3. The Chinese architectural marvel shown to the right depicts an opening that consists of a parabolic arch sitting at the top of two 60 m columns. The parabolic arch is 22 m wide at the bottom and its highest point is 9 m above the top of the columns.



- (a) Draw a sketch of this parabolic arch on a Cartesian Plane. Determine a quadratic function that describes the parabolic arch. [5]

- (b) At a point 6 m from the left column of the opening, determine how far it would be from the top of the head of a person measuring 1.85 m in height up to the top of the arch. [3]

4. Simplify each of the following radical expressions:

[10]

(a) $\frac{3\sqrt{50} + \sqrt{27}}{(\sqrt{8} - 1)^2}$

(b) $3x\sqrt[4]{32x^9} - 5\sqrt{72} + \frac{3}{5}\sqrt{200} + \sqrt[4]{162x^{13}}$

5. An electronics store sells an average of 60 entertainment systems per month at an average of \$800 more than the cost price. For every \$20 increase in the selling price, the store sells one fewer system. What amount should be charged above the cost price in order to maximize profit? [6]

6. Solve the equation $\frac{2}{x^2+5x-14} = \frac{3x}{x+7} + \frac{2x-1}{x-2}$. State all non-permissible values of x . [8]
(Express solutions to the nearest hundredth)

7. Simplify the following rational expression. State all non-permissible values of the variable.

[10]

$$\left(\frac{x-1}{x^2-5x-6} - \frac{x-2}{x^2+4x+3} \right) \times \frac{4x^2-23x-6}{30-20x} \div \frac{16x^2-1}{x^2+4x+3}$$