

Answer on Question #60654 – Math – Algebra

Question

The graph of $y = -\frac{x^2}{8} + \frac{11}{8}x + \frac{3}{2}$ is a parabola.

1. Use algebra to find the x-intercepts.
2. Explain why the y-intercept is $\frac{3}{2}$.

Solution

1. Take $y = 0$ for the x-intercepts, hence

$$-\frac{x^2}{8} + \frac{11}{8}x + \frac{3}{2} = 0,$$

$$D = \left(\frac{11}{8}\right)^2 - 4 \cdot \left(-\frac{1}{8}\right) \cdot \frac{3}{2} = \frac{121}{64} + \frac{12}{16} = \frac{121+48}{64} = \frac{169}{64},$$

$$x_1 = \frac{-\frac{11}{8} + \frac{13}{8}}{2 \cdot \left(-\frac{1}{8}\right)} = \frac{-\frac{24}{8}}{-\frac{2}{8}} = 12;$$

$$x_2 = \frac{-\frac{11}{8} - \frac{13}{8}}{2 \cdot \left(-\frac{1}{8}\right)} = \frac{-\frac{24}{8}}{-\frac{2}{8}} = -1;$$

Then the x-intercepts are the points (12,0) and (-1,0).

2. Take $x = 0$ for the y-intercepts, hence

$$y(0) = -\frac{0^2}{8} + \frac{11}{8} \cdot 0 + \frac{3}{2} = \frac{3}{2}.$$

Thus, if $x = 0$ then $y = \frac{3}{2}$.