

Answer on Question #55825 – Math – Algebra

Question

9. A computer can sort x objects in t seconds, as modeled by the function below:

$$t = 0.005x^2 + 0.002x$$

How many objects are required to keep the computer busy for exactly 9 seconds? Round to the nearest whole object.

Solution

$t = 9$ seconds; $x = ?$

We should solve the following quadratic equation:

$$0.005x^2 + 0.002x - 9 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x_1 = \frac{-0.002 - \sqrt{0.002^2 - 4 \cdot 0.005 \cdot (-9)}}{2 \cdot 0.005} = \frac{-0.002 - 0.42}{0.01}$$

$= -42.2$ does not satisfy the question, because the number of objects is positive.

$$x_2 = \frac{-0.002 + \sqrt{0.002^2 - 4 \cdot 0.005 \cdot (-9)}}{2 \cdot 0.005} = \frac{-0.002 + 0.42}{0.01} = 41.8 \approx 42$$

Answer: 42 objects.

Question

10. A computer can sort x objects in t seconds, as modeled by the function below:

$$t = 0.003x^2 + 0.001x$$

How long, in seconds will it take the computer to sort 12 objects? Round your answer to the nearest hundredth of a second.

Solution

$x = 12$ objects; $t = ?$

$$t = 0.003 \cdot (12)^2 + 0.001 \cdot 12$$

$$t = 0.432 + 0.012$$

$$t = 0.444 \approx 0.44$$

Answer: 0.44 seconds.