 Matching activity for heating to the ambient temperature

Activity

Match the initial condition, an additional data point, the exponential equation and dN/dt.

Note: k values have been rounded to 4 decimal places.

Initial condition

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| An item at 10 degrees Celsius in placed in a room which has a constant temperature of 35 degrees Celsius |
| An item at 10 degrees Celsius in placed in a room which has a constant temperature of 35 degrees Celsius |
| An item at 10 degrees Celsius in placed in a room which has a constant temperature of 25 degrees Celsius |
| An item at 10 degrees Celsius in placed in a room which has a constant temperature of 25 degrees Celsius |
| An item at -5 degrees Celsius in placed in a room which has a constant temperature of 35 degrees Celsius |
| An item at -5 degrees Celsius in placed in a room which has a constant temperature of 35 degrees Celsius |
| An item at -5 degrees Celsius in placed in a room which has a constant temperature of 25 degrees Celsius |
| An item at -5 degrees Celsius in placed in a room which has a constant temperature of 25 degrees Celsius |

Additional data point

|  |
| --- |
| After 5 minutes the temperature of the item has increased to 15 degrees Celsius |
| After 5 minutes the temperature of the item has increased to 15 degrees Celsius |
| After 5 minutes the temperature of the item has increased to 20 degrees Celsius |
| After 5 minutes the temperature of the item has increased to 20 degrees Celsius |
| After 10 minutes the temperature of the item has increased to 15 degrees Celsius |
| After 10 minutes the temperature of the item has increased to 15 degrees Celsius |
| After 10 minutes the temperature of the item has increased to 20 degrees Celsius |
| After 10 minutes the temperature of the item has increased to 20 degrees Celsius |

Exponential Equation

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| N = 35-40e-0.0981t | N = 25-15e-0.0811t | N = 25-30e-0.2197t | N = 25-15e-0.0405t |
| N = 35-25e-0.0511t | N = 25-30e-0.1099t | N = 35-25e-0.1022t | N = 35-40e-0.1962t |

dN/dt

|  |  |  |  |
| --- | --- | --- | --- |
| dN/dt = -0.1022(N - 35) | dN/dt = -0.0981(N + 5) | dN/dt = -0.1099(N - 25) | dN/dt = -0.1962(N + 5) |
| dN/dt = -0.0405(N - 25) | dN/dt = -0.0811(N - 25) | dN/dt = -0.2197(N - 25) | dN/dt = -0.0511(N - 35) |