

3.

### Solution

Quadratic function: is a function that can be written in the form:

$t(d) = ad^2 + bd + c$  where  $a$ ,  $b$ , and  $c$  are real numbers and  $a \neq 0$

we have  $t(d) = 2d^2 + 11d + 24$ , note:  $2d^2 + 11d + 24$  is in  $dt$ -plane

Here, we know that  $a=2$ ,  $b=11$ ,  $c=24$

Since  $a > 0$ , we know that the  $t$ -coordinate of the vertex is a minimum. However, to find the  $t$ -coordinate of our vertex we first need to find the  $d$ -coordinate of the vertex by using  $d = -\frac{b}{2a} = -\frac{11}{4} = -\frac{11}{4}$  Now that we have the  $d$ -coordinate, we can find the  $t$ -coordinate

of the vertex by finding  $t(-\frac{11}{4}) = 2(-\frac{11}{4})^2 + 11(-\frac{11}{4}) + 24 = \frac{121}{8} - \frac{121}{4} + 24 = \frac{21}{8}$  Minimum =  $\frac{21}{8}$