7.13 Dorton Arena

A Practice Understanding Task

Dorton Arena at the State Fairgrounds in Raleigh, North Carolina, has the shape of two intersecting parabolas. An aerial model of Dorton Arena has been created and put
 on a set of axes. The shape of one of the parabolas can be modeled by the equation $f(x)=x^{2}-127 x$ where $x$ and $f(x)$ are measured in feet.

1. Which parabola is modeled by this equation? How do you know?

2. What are the features of the parabola modeled by the equation $f(x)=x^{2}-127 x$ ? ' Include domain, range, intercepts, maxima- or minima, intervals of increase and decrease. zeros
$D^{\prime} \cdot(-\infty, \infty)$
$R \cdot[-4632,25, \infty)$
(-val) $\frac{I}{D} I^{(x,-\infty, \infty)}(-\infty)$

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y \text { int }(0,0)
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x=0
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\text { Plugin } x=0
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$\operatorname{Max}($ min) $y=-4032.25$
standard form)
$-x^{2}+127 x \stackrel{2}{2}$
3. Can the other parabola be modeled by the equation $f(x)=-x(x-127)$ ? How do you know?
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check
4. What are the features of the parabola modeled by the equation $f(x)=x^{2}-127 x$ ? Include domain, range, intercepts, maximums or minimums, intervals dfincrease and


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x-\text { int }(0,0)(127,0)
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R:(-\infty, 4032.25]
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$x$-voles
5. Based on these features, how long is Dorton Arena? How wide is the arena?

6. Find the average rate of change for each of the parabolas on the interval $(20,40)$.
7. Will the average rate of change of two parabolas always be the same given the same interval? Explain.
8. How do the different forms (standard and factored form) help you find different features of the graph?


