DATE

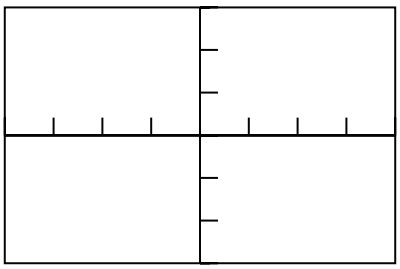
1.4 Concepts Worksheet

NAME

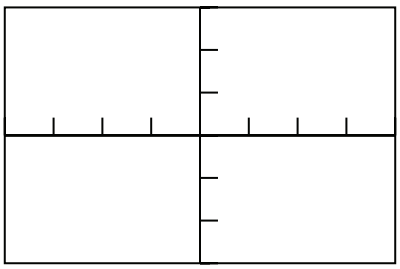
Parametric Equations

The mention of the curve $y = x^2$ should summon an immediate mental image of a parabola on the coordinate plane. The following parametric curve descriptions are related to the curve $y = x^2$, but perhaps do not evoke a mental image as quickly. Graph the following curves indicating direction for increasing values of t in the domain of each curve. Also indicate the value(s) of t corresponding to the domain endpoints and the point corresponding to $t = 0$, if any.

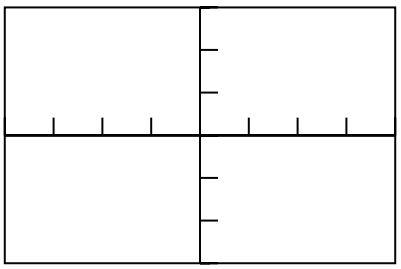
1. $x = t, y = t^2$



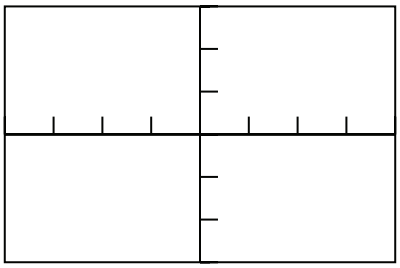
2. $x = -t, y = t^2$



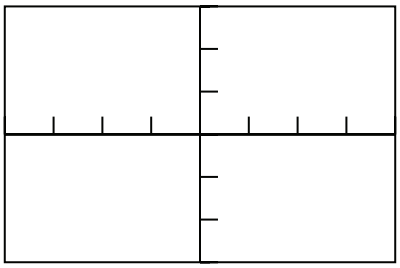
3. $x = t^2, y = t$



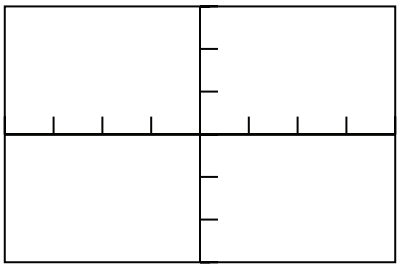
4. $x = t^2, y = t^4$



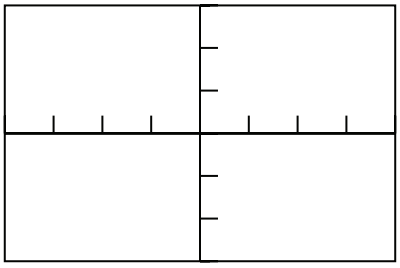
5. $x = \sin t, y = 1 - \cos^2 t$



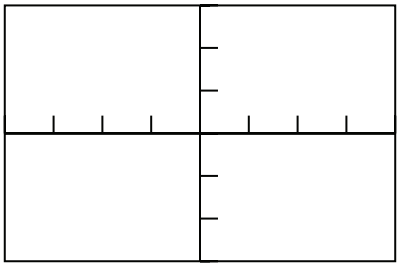
6. $x = \sec t, y = \sec^2 t$ where $0 \le t \le \pi, t \ne \frac{\pi}{2}$



7. $x = e^t, y = e^{2t}$



8. $x = \frac{1}{t}, y = \frac{1}{t^2}, t \ne 0$



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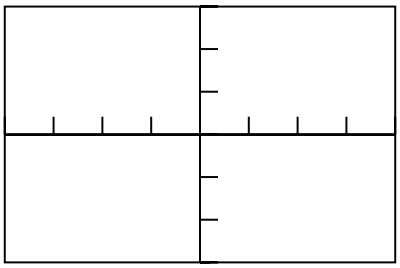
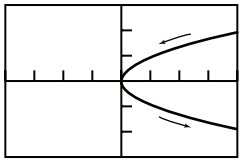
9. In parametric form a graph can easily be reflected over the line $y = x$. If the graph of $x = f(t)$, $y = g(t)$ is reflected over the line $y = x$, the new graph is described by $x =$ _____, $y =$ _____. Which of the above curves (1–8) is a reflection over the line $y = x$ of the graph of $y = x^2$? _____

10. For Exercise 7, find a corresponding parametric description of the reflection of the curve over the line $y = x$, then sketch the graph.



11. The following graphs of $y^2 = x$ or $y = \sqrt{x}$ are drawn indicating direction for increasing values of t. Provide a parametric description of each:

(a)



[–4, 4] by [–3, 3]

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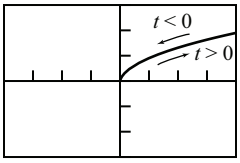
(b)



[–4, 4] by [–3, 3]

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