

present

```
1 html"<button onclick='present()'>present</button>"
```

# Curves

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```
1 using PlutoUI, Plots, Calculus
```

☐ GRBackend()

```
1 gr()
```

## Define a Curve

Define the curve  $\gamma$ :

$$\gamma : [0, 6\pi] \rightarrow \mathbb{R}^2, t \mapsto \gamma(t) = \begin{pmatrix} \sin(t/3) \\ 5 \sin(2t) \end{pmatrix}$$

$v$  (generic function with 1 method)

```
1 begin
2   using LinearAlgebra
3    $\gamma(t) = [5\sin(t/3), 5\sin(2t)]$ 
4    $\gamma(t) = 2.5 .* [\cos(t/\pi), 4/5 * (\sin(t/\pi) + \sqrt{\text{abs}(\cos(t/\pi))})]$  # heart
    $d\gamma(t) = \text{derivative}(\gamma, t)$ 
5    $\tau(t) = d\gamma(t) ./ \text{norm}(d\gamma(t))$ 
6    $v(t) = \text{derivative}(\tau, t) / \text{norm}(\text{derivative}(\tau, t))$ 
7 end
8
```

 13.03760951239764

