1. The position, in feet, of a particle moving along a straight path is given by the differentiable function $x(t)=\sin 2 t-\cos 4 t$ where t is measured in seconds. Find the acceleration of the particle at $t=0$. Include units in your answer.
2. The position, in feet, of a particle moving along a straight path is given by the differentiable function $s(t)=-t^{3}+5 t^{2}-7 t+3$. Find all times $t$ where the particle is at rest.
3. A person is hiking in a national park and their velocity in meters per minute is graphed below.


When does the person change direction?

When is the person walking at her greatest speed?

When is the person slowing down?

Calculate the acceleration at $\mathrm{t}=20 \mathrm{~min}$.

D-AD5
4. Find the slope of the tangent line at $x=-1$ when $y=x y+x^{2}+1$
5. If $x^{2}+x y+y^{3}=0$, then find $\frac{d y}{d x}$

D-CD7
6. Write the equation of the line tangent to $y=(2 x-1)^{4}$ where $\mathrm{x}=1$
7. Write the equation of a line with a slope of 6 that is tangent to $y=x^{2}-4 x+3$.

