Math 252 Winter 2021. Office hours: Tues-Thurs 9:30-10:30 am by appointment, or a different meeting ID (see Canvas or course page.)

Course policies: Midterm 20% (proctored); final exam, short answer, no partial credit. It is solid on prerequisites, not a good early grade.

First in, in 8:10 am Canvas; by private request at MO. It has trouble with exam instructions, let me know right away.


3. Names of files submitted to Canvas (or emailed to me): no spaces, no punctuation, etc. Use only a-z, A-Z, 0-9, underscore, "", period in "pdf" etc. Change file name if needed.

4. Email in plain text only. (All systems send html, only email by default - need to change settings.) This protects me from "return receipt email" or other tracking.

5. Notation counts. Get it right. (See web pages on notation.)

Examples: \( \sqrt{2x} \) is \( \sqrt{x^2} \) or \( (\sqrt{2})x \)?

- \( \frac{1}{x^2(x+6)} \) will be marked wrong unless \( x \) intended.
- \( \frac{1}{x+6} \) is not \( \frac{1}{x} + 6 \), more likely \( \frac{1}{x+6} \) is what?

Problem:

A ball is dropped off the lip of a vertical cliff, 300 m high, on the planet Glaepthsk, where \( g = 6 \) m/sec^2, a grav. acc. on its surface. Drop at time 0.

Acceleration is \(-6\) for \( t \geq 0 \) (until it hits the ground)

\[ a(t) = -6 \]
Velocity \( v(t) \) at time \( t = 6t \). How do we know: need \( v'(6t) \)

What is now the height \( h(t) \) at time \( t \)? Need to have \( h'(t) = -6t \),
so \( h(t) \) should be \( -3t^2 \) with a slight correction. \( h(0) = 300 \), so should
really have \( h(t) = -3t^2 + 300 \). This gives the right direction and the right \( h(t) \)

When does the ball hit the ground? How fast is it falling at that time?

Solve \( h'(t) = 0 \). Get \( t = 0 \) .

(Read \( t = 0 \); \( x(t) = -60 \), so \( x(t) = 0 \), falling at \( 60 \) m/sec.]

Problem: A particle moves along a horizontal straight line with velocity
\( v(t) = 20 \sin(t) \). What is its position at time \( t \)? \( \text{Calc} \ x(t) \)

Maybe \( x(t) = -20 \cos(t) \) . Check: \( x'(t) = -20 \cos(t) = -20(-\sin(t)) \)

\[= 20 \sin(t) \text{, yes} \]

Maybe \( x(t) = -20 \cos(t) + 762 \) ? Check: \( x'(t) = 20 \sin(t) \) yes.

Maybe \( x(t) = -20 \cos(t) + C \) for any fixed constant \( C \). Check: yes.

\[ \left( \frac{dx}{dt} \right) = 0 \text{, yes} \].

Any other possibilities? No.

General problem: Given a function \( f \), find all functions \( F \) such that \( F' = f \)
(these are called "antiderivatives" of \( f \)).