LECTURE 10

F, F', F''

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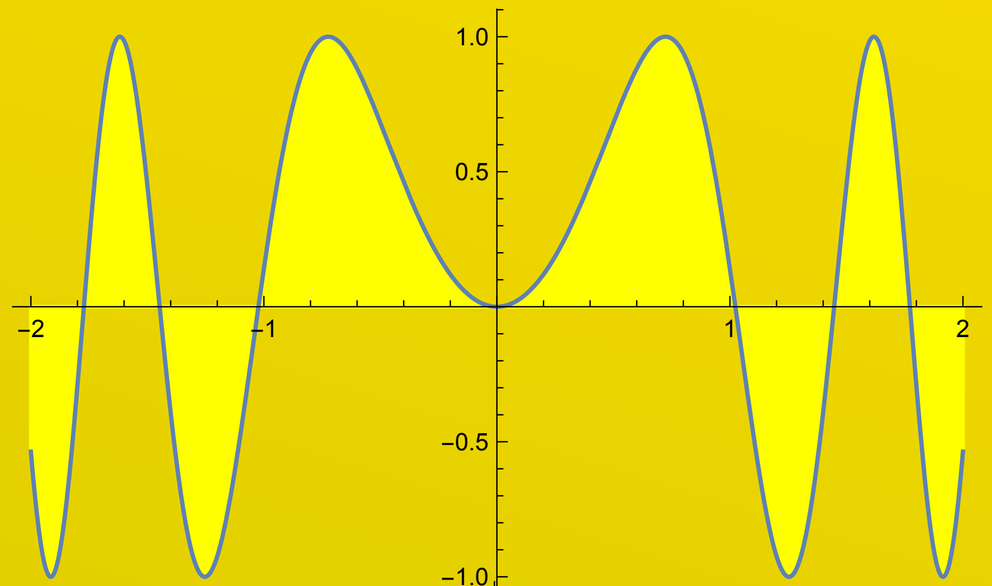
PLAN

1. Matching
2. continuous and differentiable
3. f and f'
4. f and f''
5. find f from f'
6. find f' from f
7. Jam
8. Jam with CA

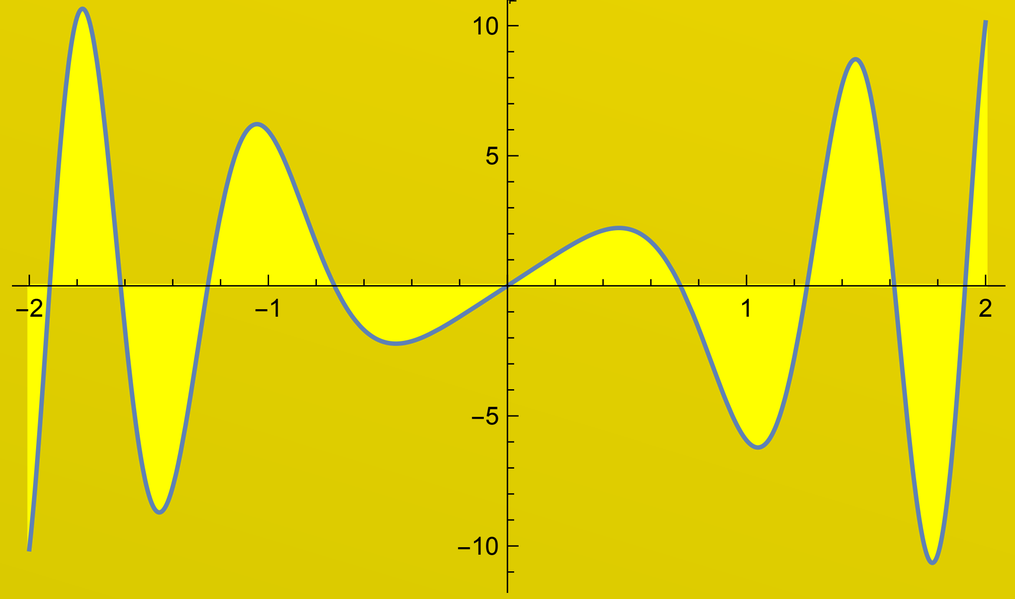
POLL

One of the functions is f and one is f'. Which one is f, A or B?

A



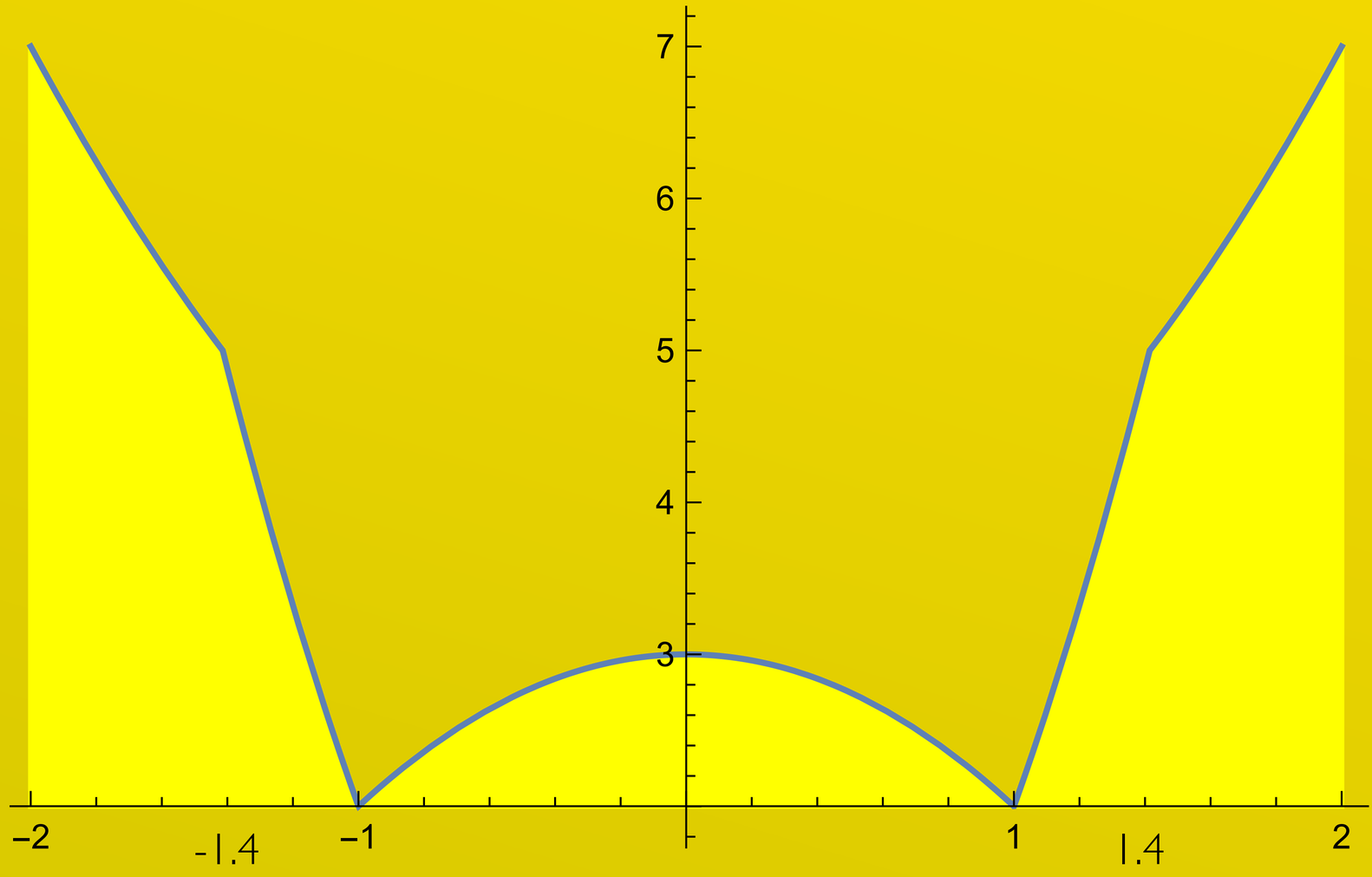
B



DIFFERENTIABLE

Continuous and differentiable

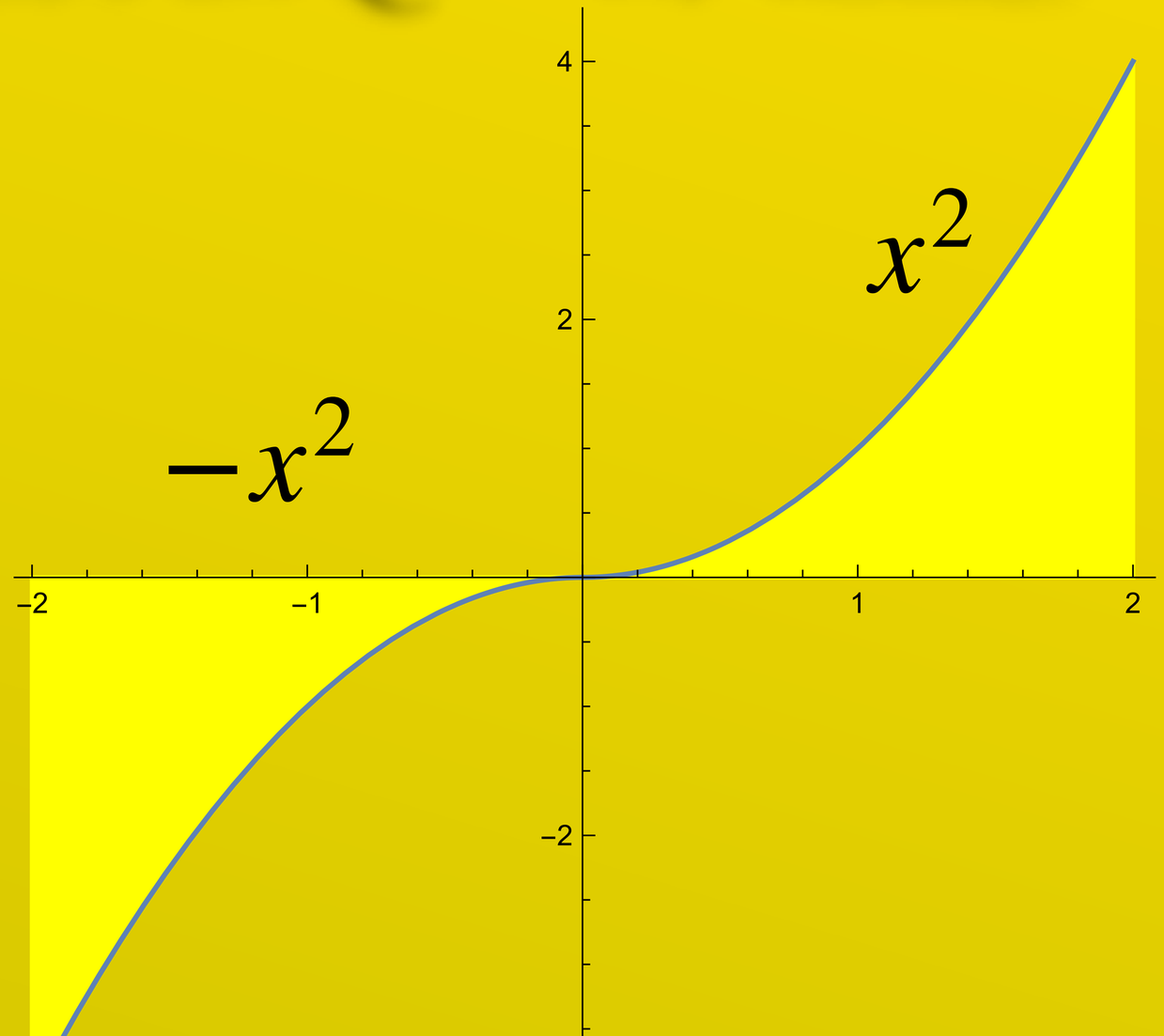
Where is f differentiable?
Where is it continuous?
Where is f' continuous?



CONTINUOUSLY DIFFERENTIABLE

Continuous and differentiable

Is this function continuously differentiable?

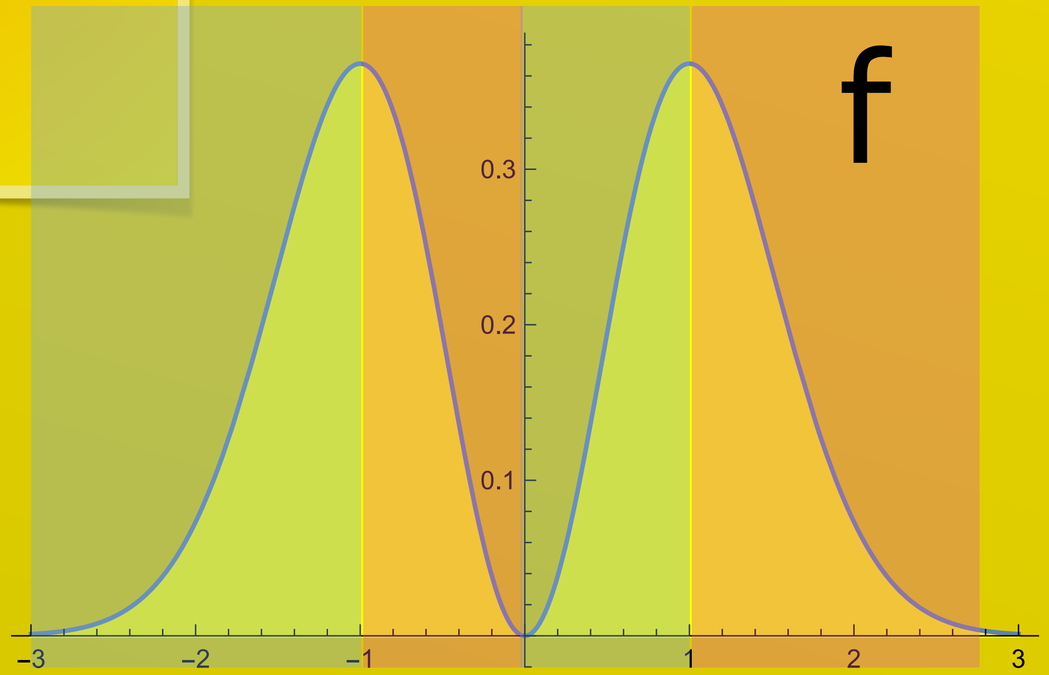


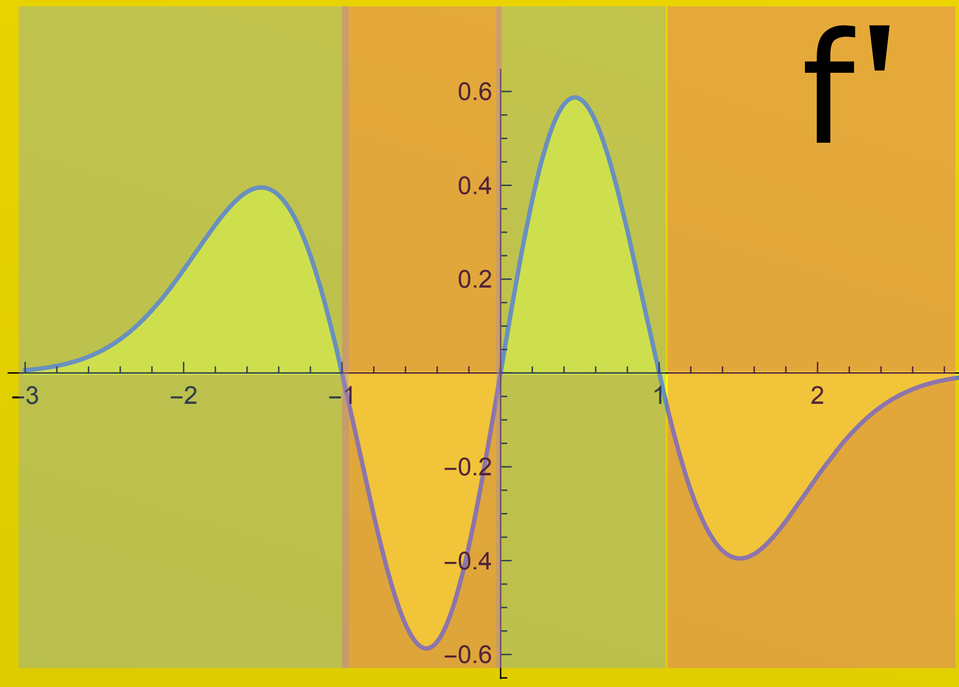
DERIVATIVE

Derivative = Slope = Instantaneous Rate of Change

Positive derivative

Negative derivative



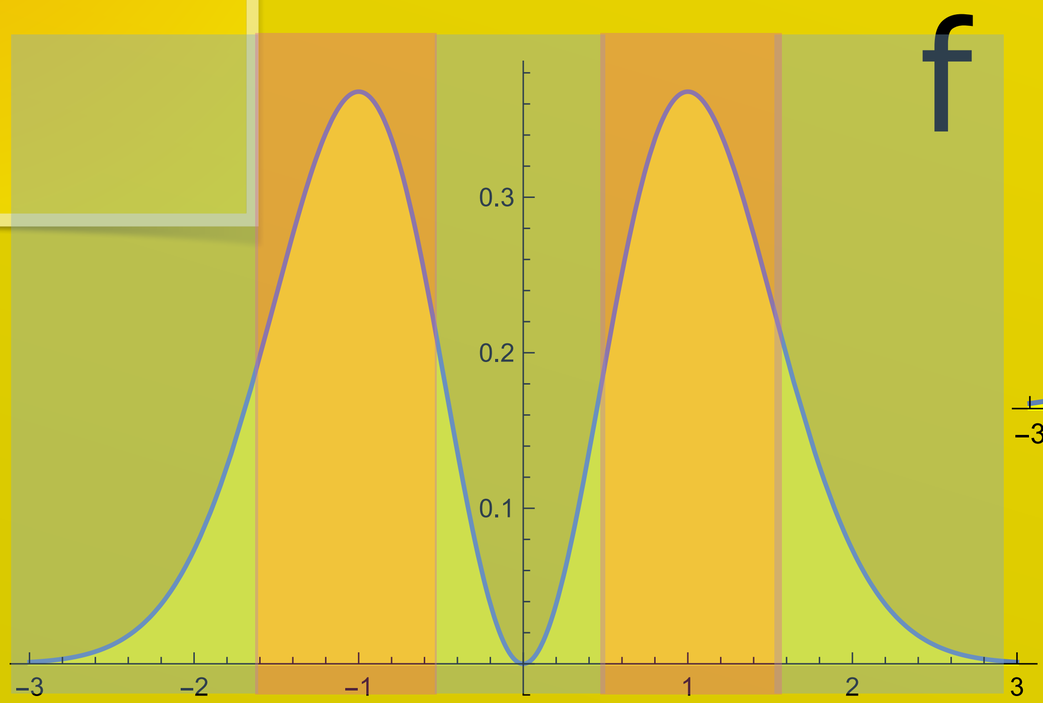


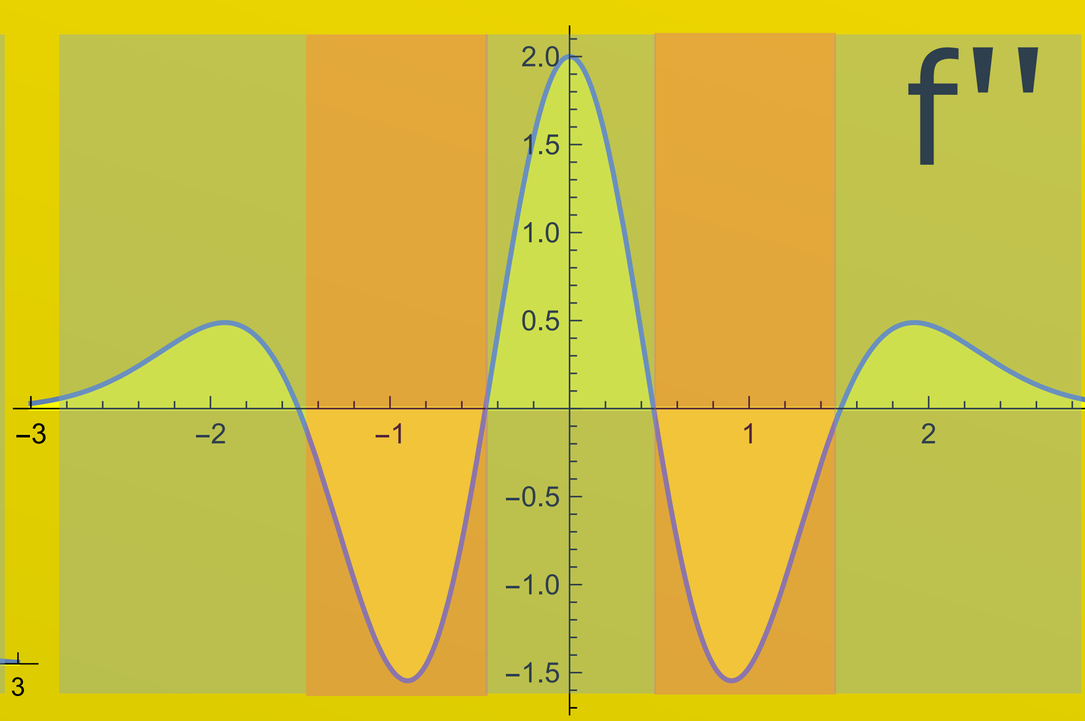
SECOND DERIVATIVE

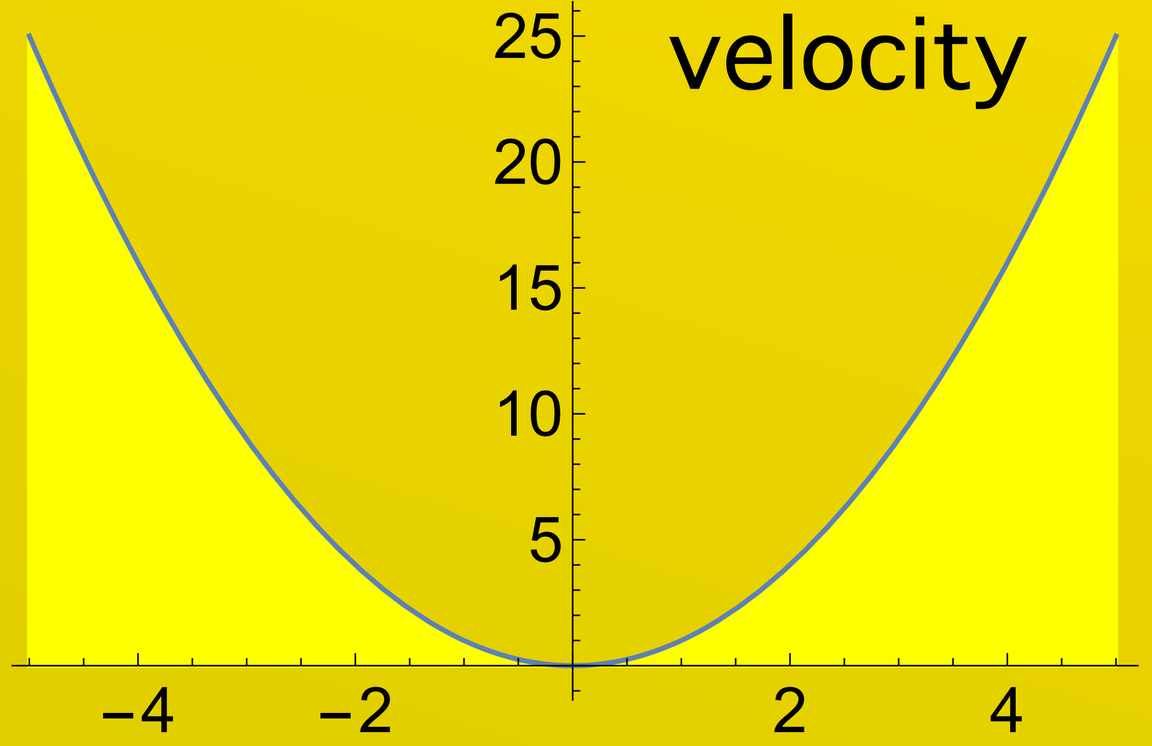
Second Derivative = Concavity

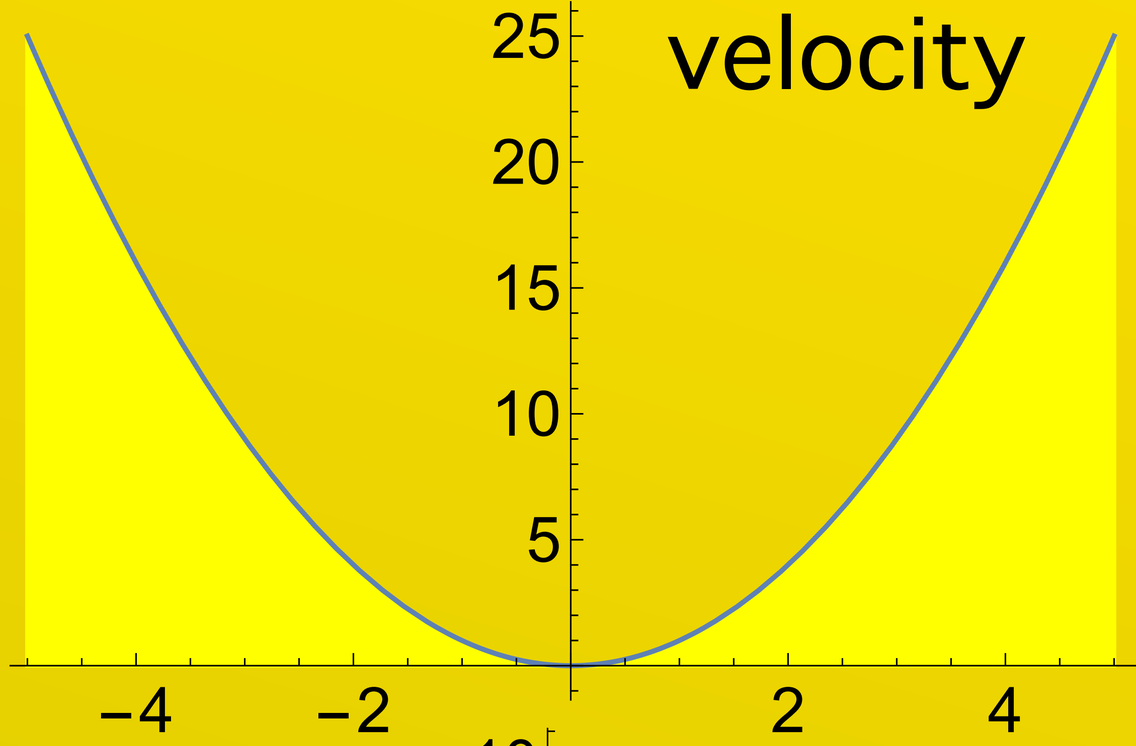
Concave Up

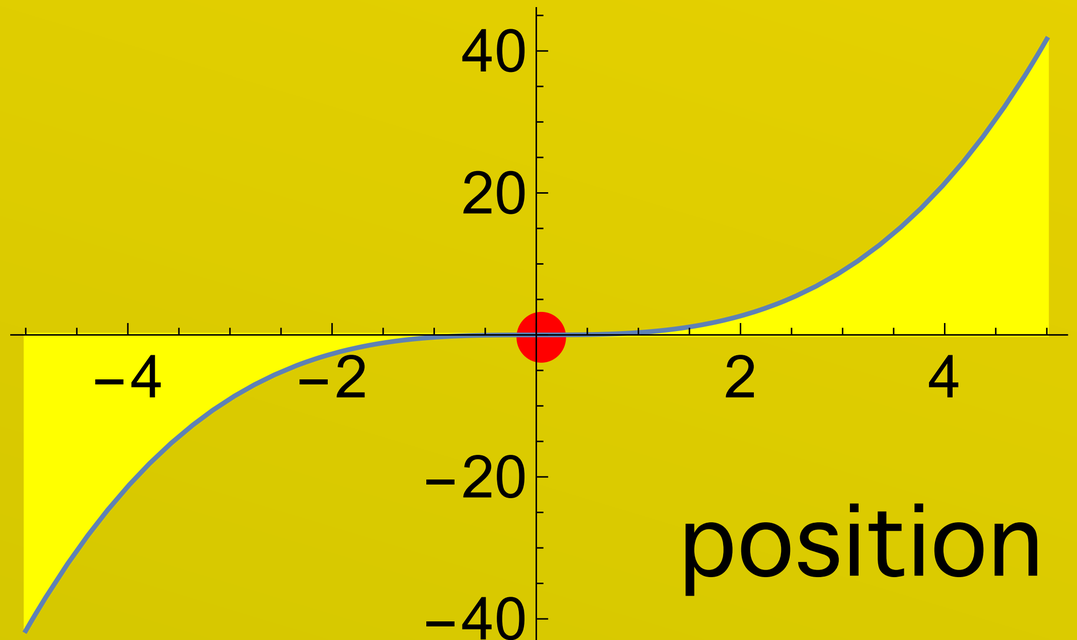
Concave Down

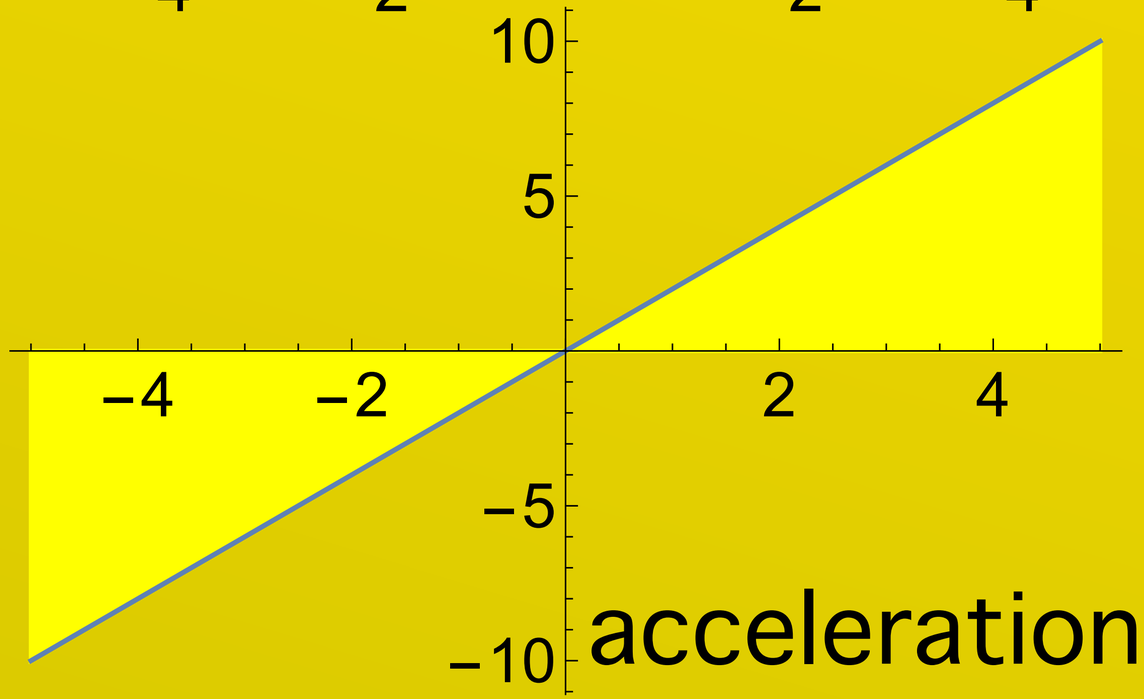


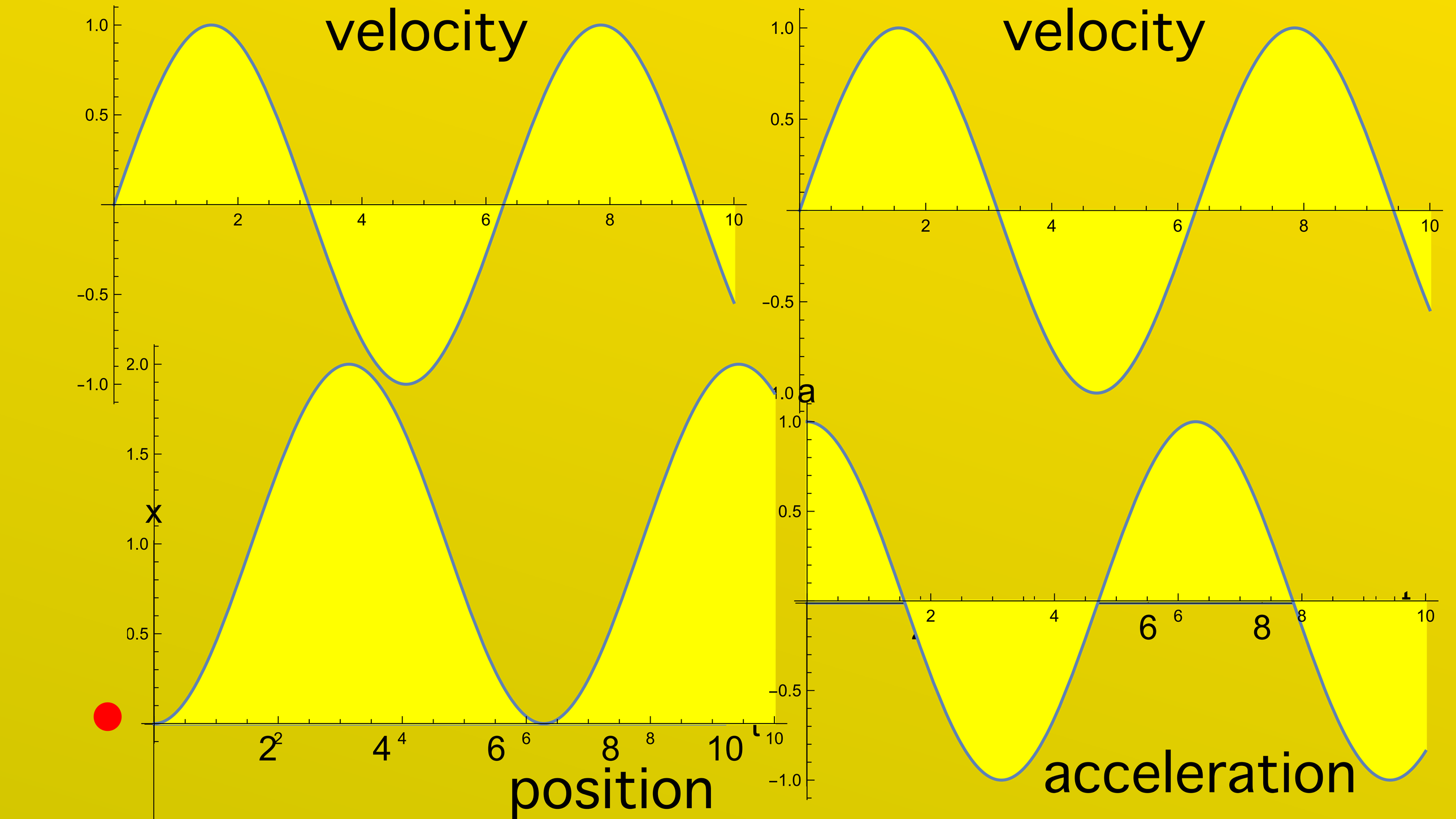



velocity
25
20
15
10
5
−4
−2
2
4

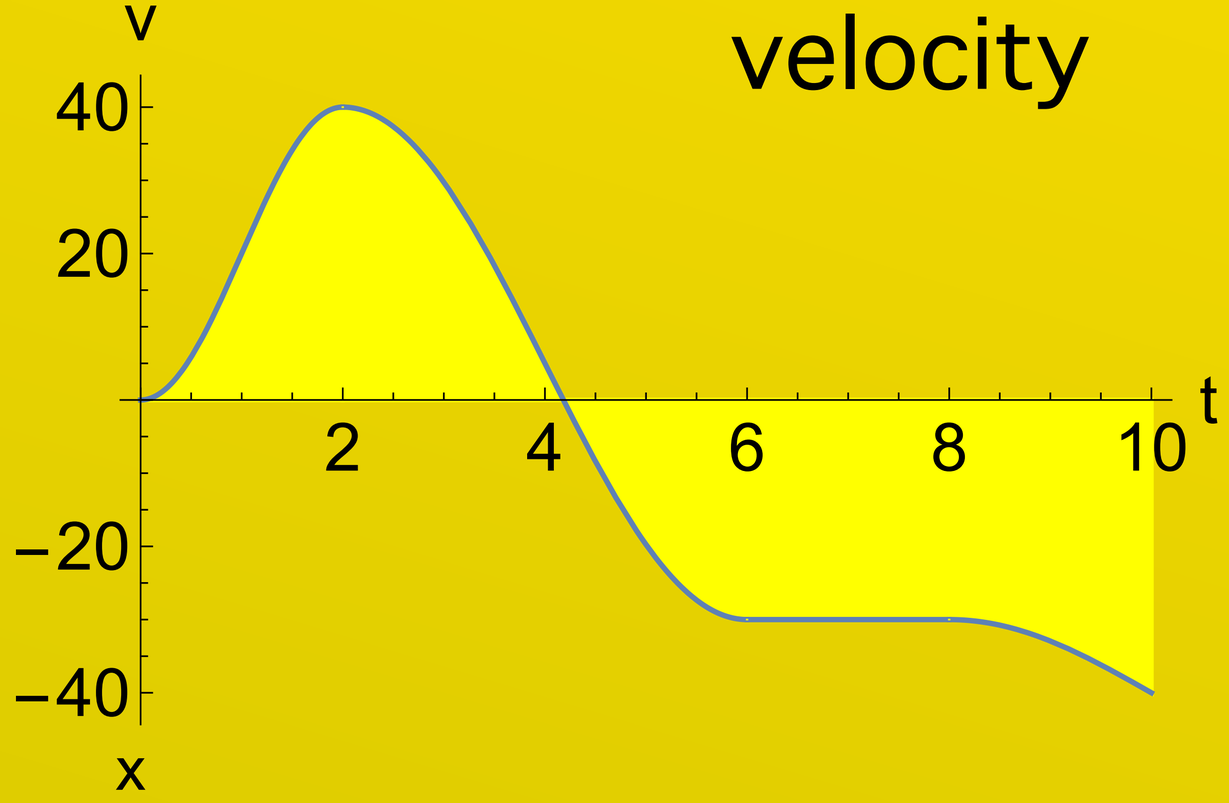

velocity
25
20
15
10
5
−4
−2
2
4

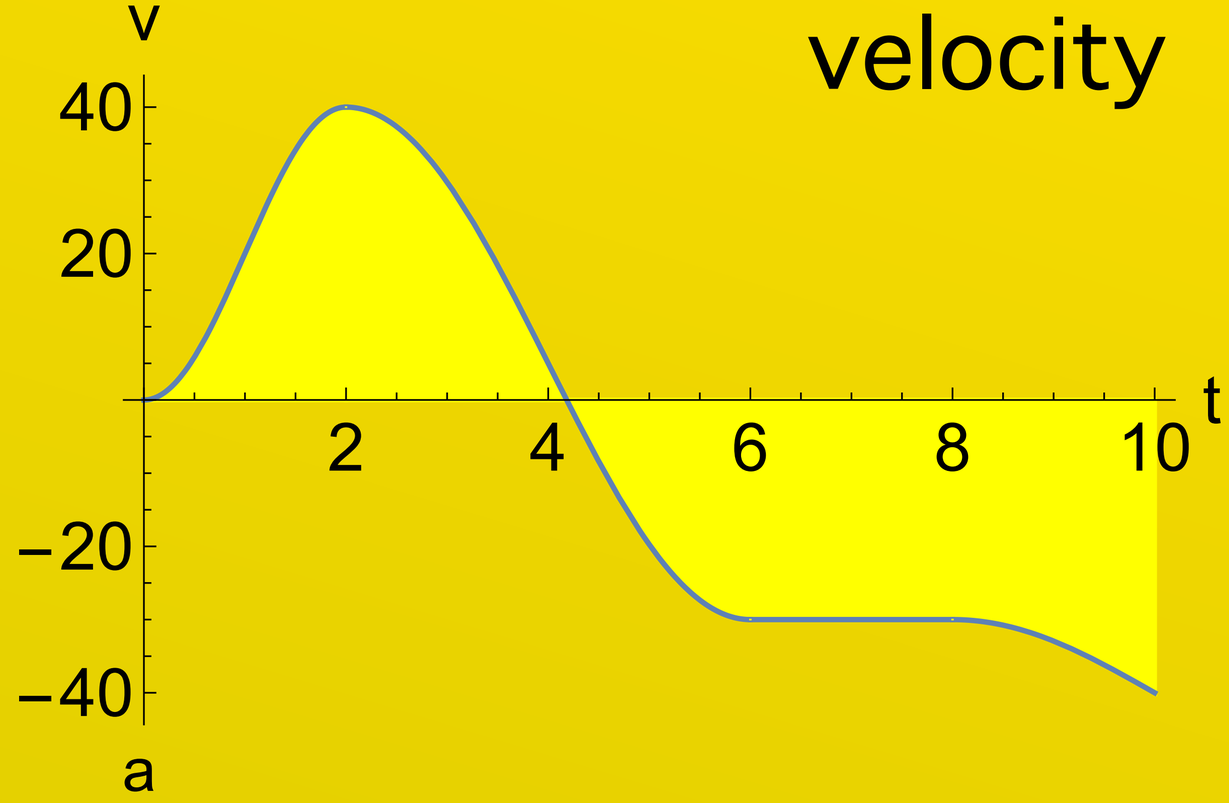

40
20
−20
−40
−4
−2
2
4
position


10
5
−5
−10
−4
−2
2
4
acceleration

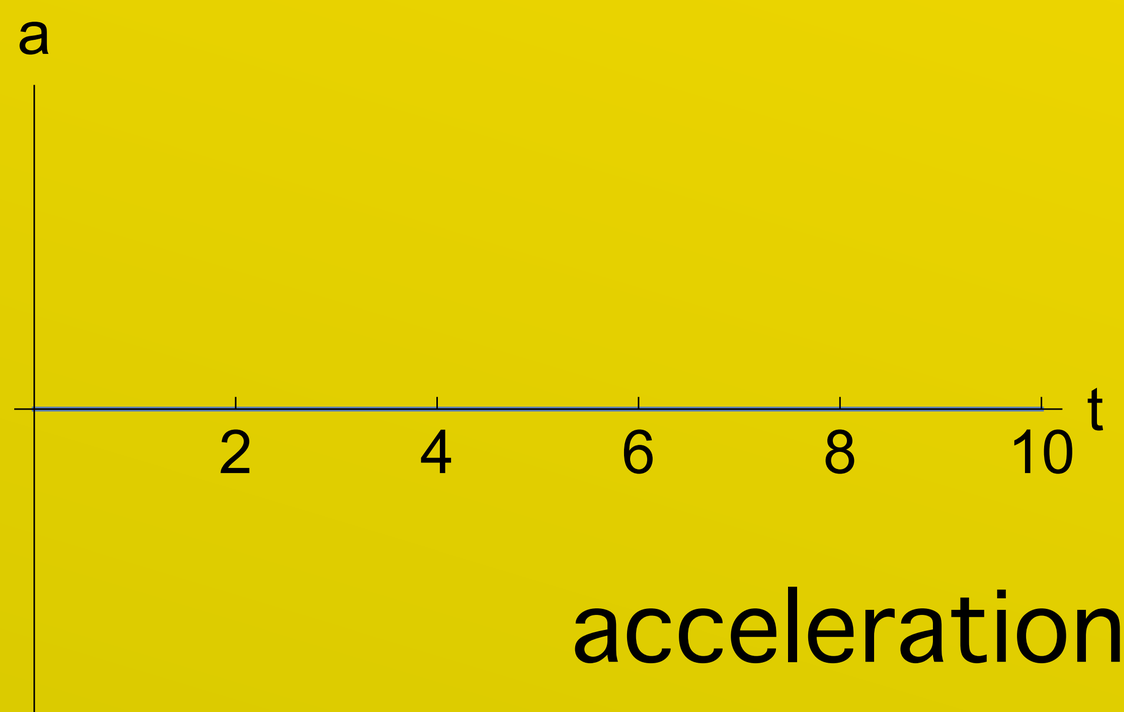

velocity
velocity
position
acceleration
x
a
t
1.0
0.5
−0.5
−1.0
2.0
1.5
2
4
6
8
10

CAR TRIP JAM


v
velocity
40
20
−20
−40
2
4
6
8
10
t


v
velocity
40
20
−20
−40
2
4
6
8
10
t

x
2
4
6
8
10
t
position


a
2
4
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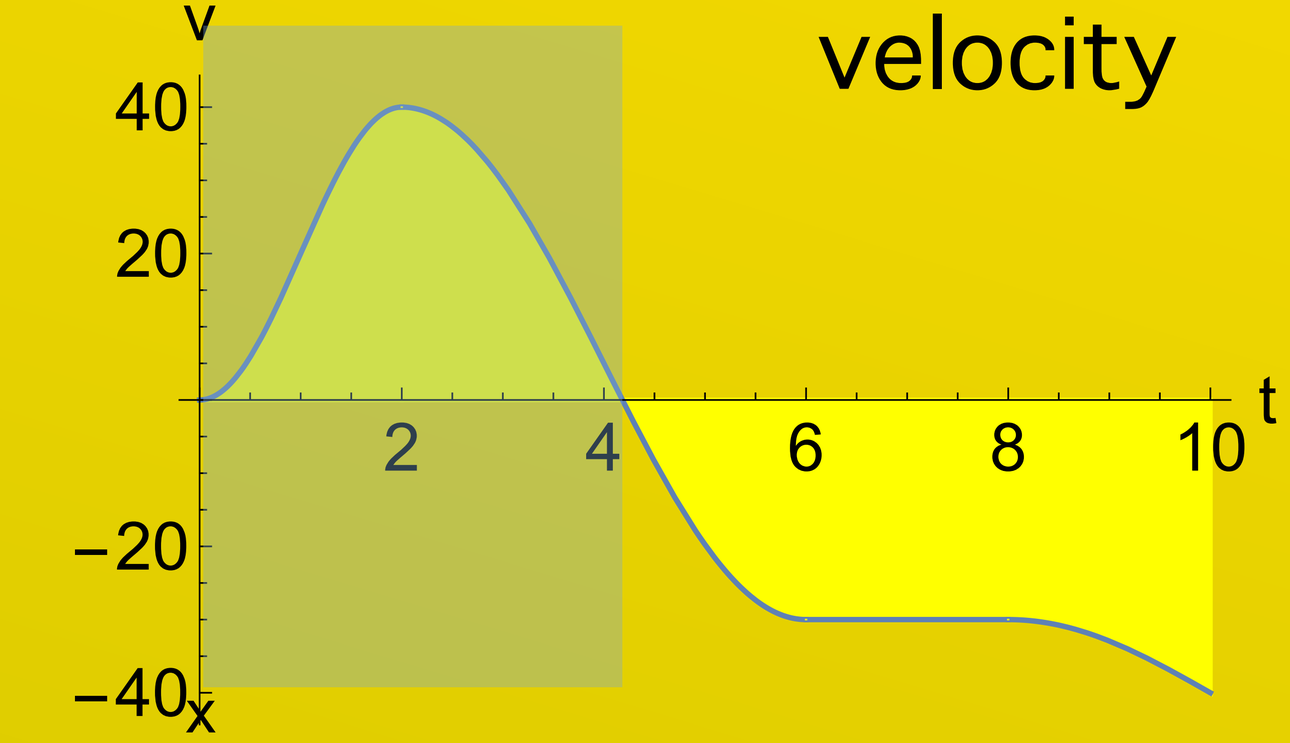
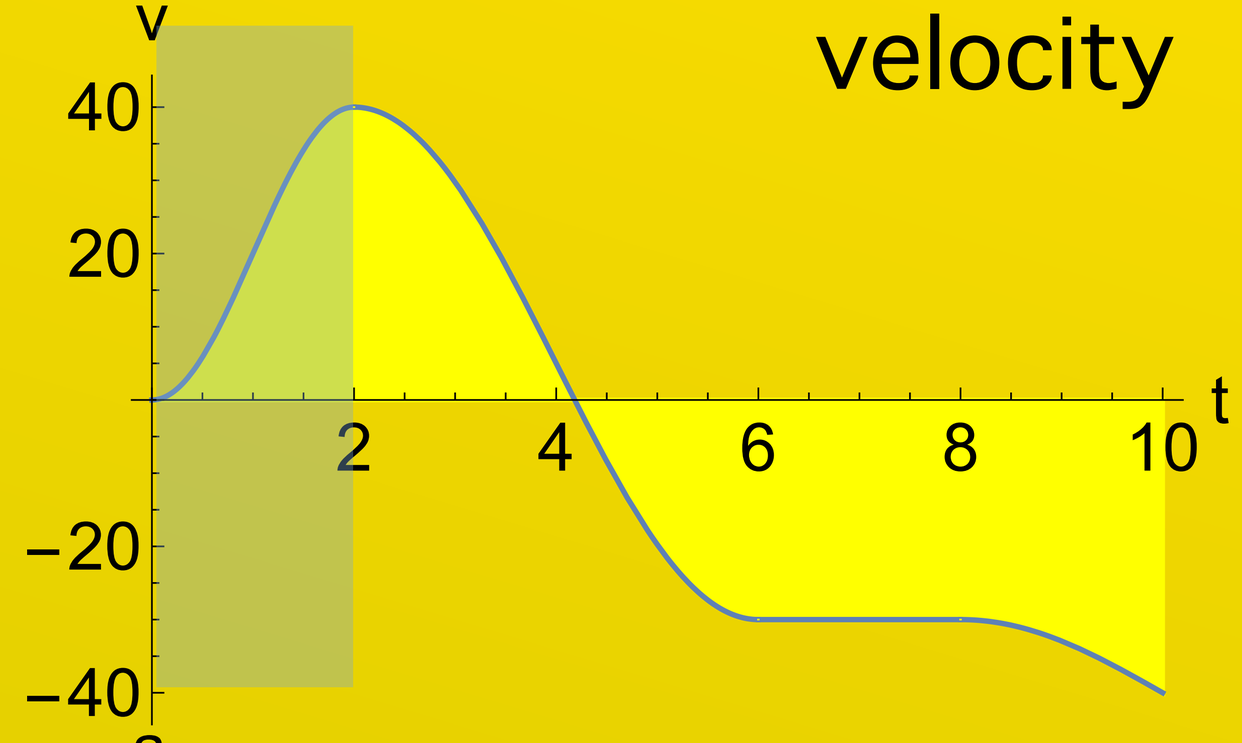
t
acceleration


v
velocity
40
20
−20
−40
2
4
6
8
10
t


v
velocity
40
20
−20
−40
2
4
6
8
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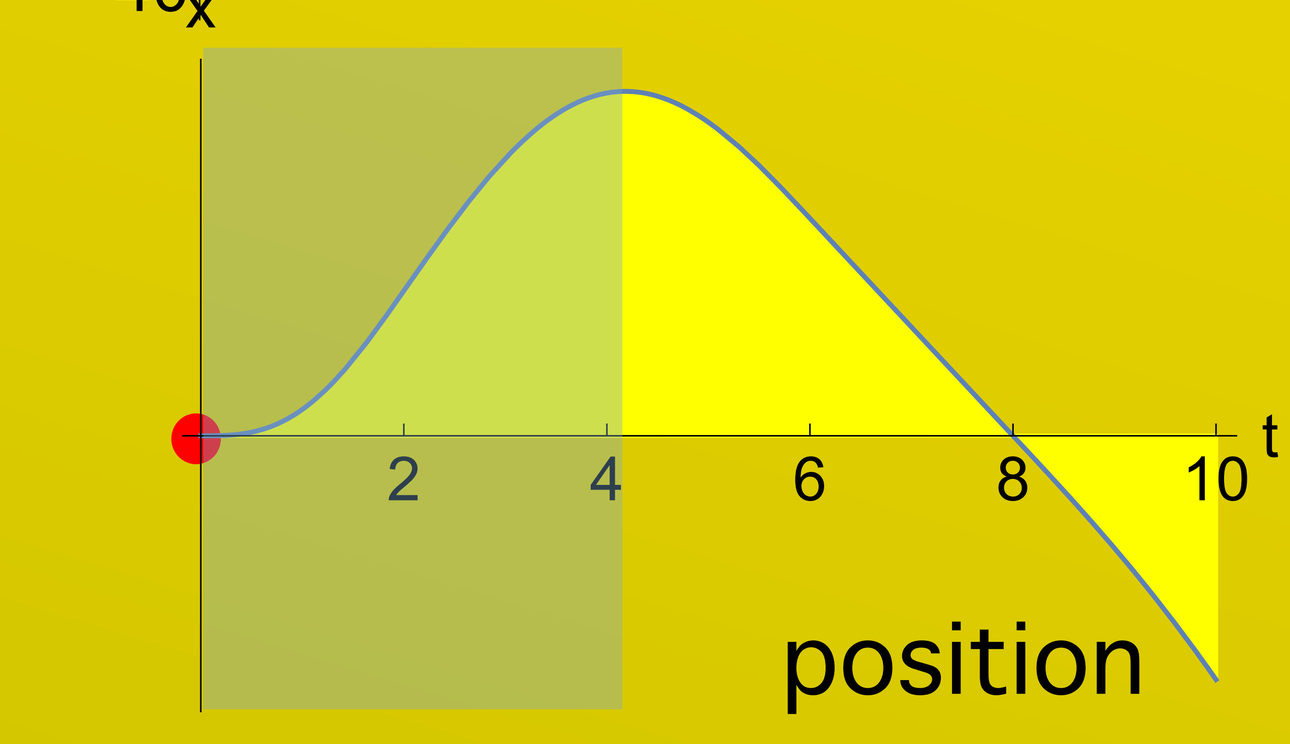
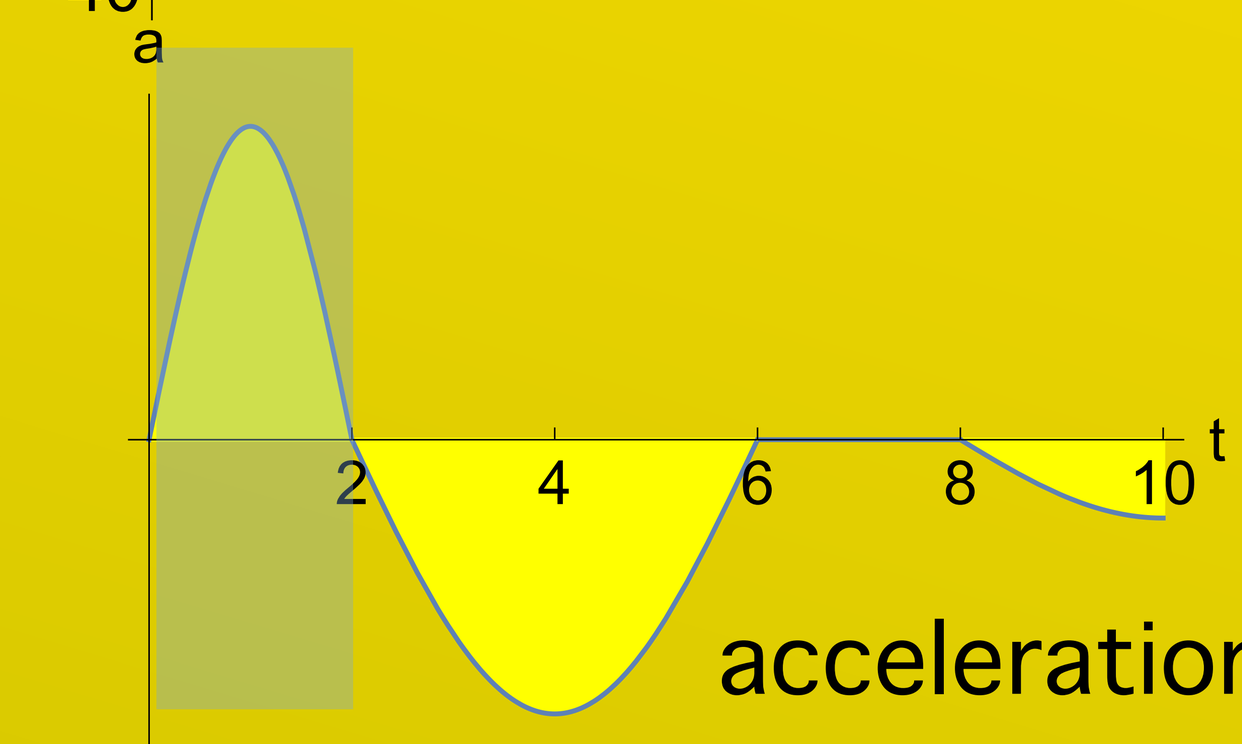
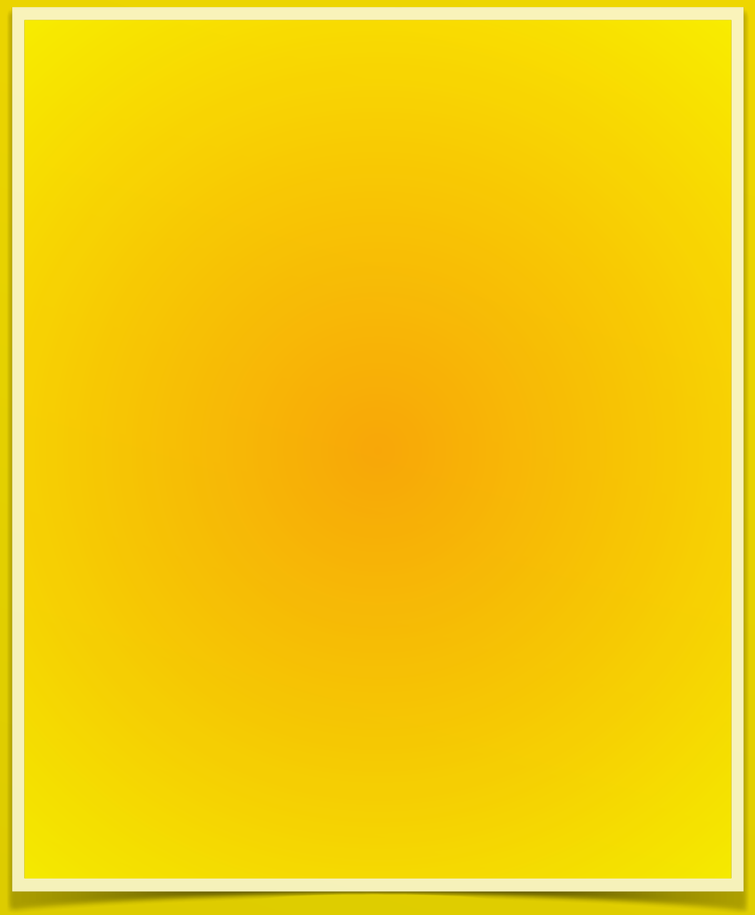
t


x
2
4
6
8
10
t
position


a
2
4
6
8
10
t
acceleration

RELATIONS



	f	f'	f''
positive			
negative			
zero			

RELATIONS

	f	f'	f''
positive	above x axes	positive slope	concave up
negative	below x axes	negative slope	concave down
zero	root	flat point	inflection point or very flat point

THE END