Mobile Jumpstarts For Calculus

Jason Holland
Abilene Christian University
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Background

ACU mobile initiative – Spring 2007 freshmen get mobile devices

Mobile tools developed: iphone friendly myacu page and NANO tools – Fall 2008

Mobile Fellows program – Fall 2009

All students to have mobile device in Fall 2010

Mobile Fellows renewed for Fall 2010

Mobile Fellow Project

Jumpstarts in Calculus

A jumpstart is a question, *usually* multiple choice, given at the beginning of class. Students use their mobile device to answer the question after being given a couple of minutes to think/work.

A jumpstart gives both me and the student instant anonymous feedback.

It was 5% of the final grade. To receive full credit requires faithful participation on the part of the student.

Two Sections

Section 1	Section 2	Comments
28 Jumpstarts (7 per test)	28 Jumpstarts (7 per test)	24 common
#4: Limit evaluation objective 1	#4: Limit theorem control	The objective question and the control question were covered in the presentation/lecture of the other section.
#12: Derivative calc. control	#12 Defn. of derivative objective 2	
#18: Optim. volume objective 3	#18: Extreme value control	
#25: Definite integral control	#25: Projectile motion objective 4	

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Jumpstart 25 (section 1)

Which of the following is an antiderivative for the function

$$f(x) = \sin(x) + \cos(x)\ ?$$

A. $F(x) = \cos(x) + \sin(x)$

B. $F(x) = -\cos(x) - \sin(x)$

C. $F(x) = -\cos(x) + \sin(x)$

D. $F(x) = \cos(x) - \sin(x)$

Jumpstart 25 (section 2)

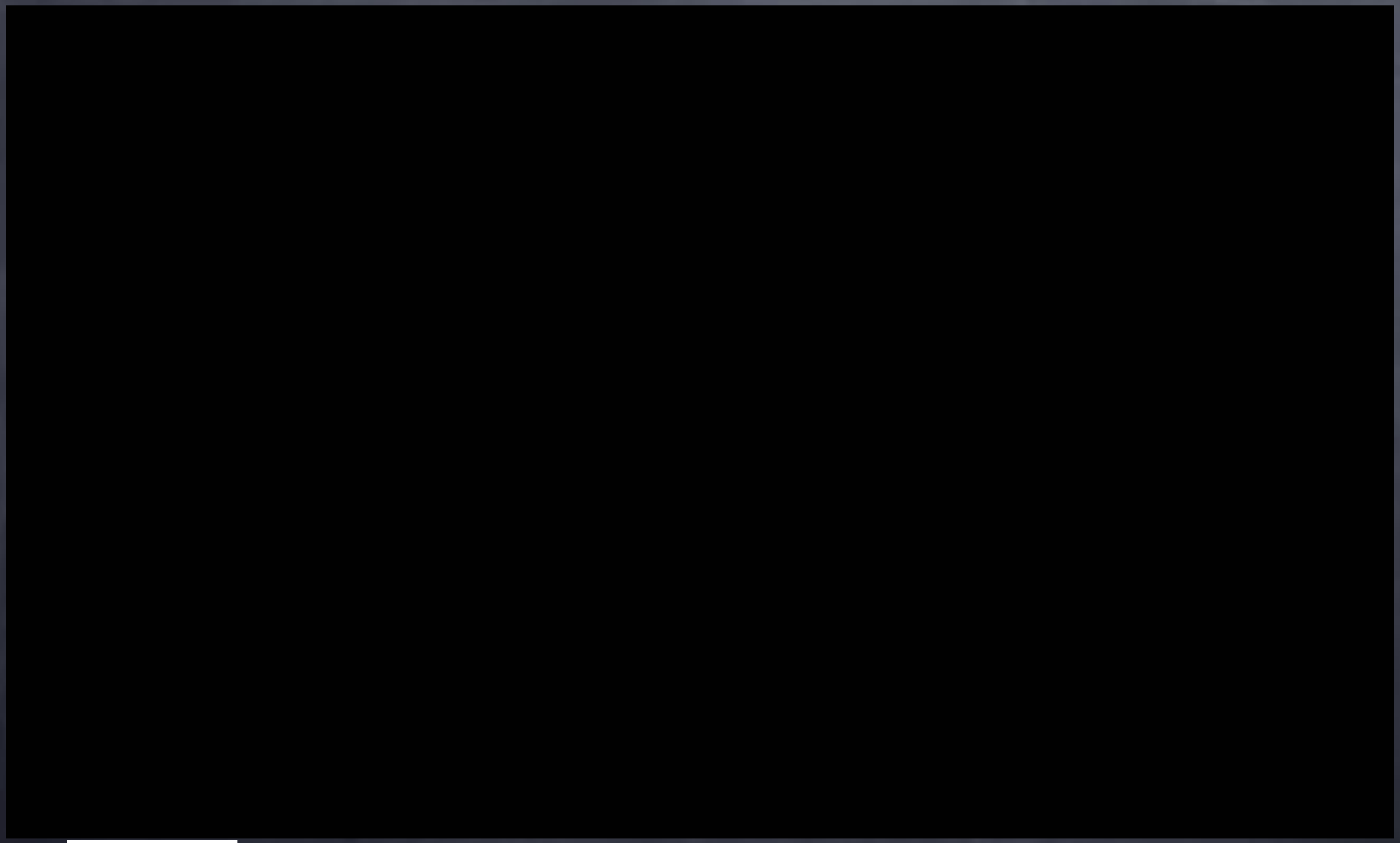
Given that acceleration due to gravity is -32 ft/s^2, what is the position function for a rock dropped from a height of 100 ft?

A. $p(t) = -16t^2 + 100$

B . $p(t) = -16t^2 + 100t$

C. $p(t) = -16t^2 + 100t + 100$

D. $p(t) = -16t^2 + 100t - 100$



youtube

Actual Test Question

Use calculus to find a model for the height of a ball that is launched from ground level with an initial upward velocity of 70 meters per second. Assume that the only force acting upon the ball is acceleration due to gravity (- 9.8 m/s^2). What is the maximum height of the ball? Explain.

The problem was graded as 0, 5 or 10. Names were hidden and the tests were shuffled.

Results

	Section 1 Average (n = 32)	Section 2 Average (n = 21)	Section 1 Objective Score /10	Section 2 Objective Score /10
Test 1	79	78	7.9	7.4
Test 2	76	71	6.3	8.1
Test 3	73	71	6.8	5.3
Test 4	76	79	2.6	4.2

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In each case, the section receiving the jumpstart related to the objective did better.

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Differences in test scores were never statistically significant.

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Statistically significant

Close but not quite significant

Student comments

“I liked starting class with the jumpstart question.”

“The jumpstart was a good way to gauge my readiness.”

“I wouldn’t mind more jumpstarts and definitely more videos.”

“More videos would be good.”

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Closing Thoughts

There are some obvious explanations for the success of a mobile jumpstart.

My future may involve the video jumpstart.

References

Corbeil, J. & Corbeil, M., *Are you Ready for Mobile Learning?*, Educause Quarterly, Volume 30, number 2, 2007.

Martyn, M., *Clickers in the Classroom: An Active Learning Approach*, Educause Quarterly, Volume 30, number 2, 2007.