

INSTRUCTIONS: Books, notes, and electronic devices are **not** permitted. Write (1) **your full name**, (2) **1350/Exam 2**, (3) **lecture number/instructor name** and (4) **SPRING 2019** on the front of your bluebook. Make a **grading table** for 4 problems and a total. Do all problems. **Start each problem on a new page.** **Box** your answers. A correct answer with incorrect or no supporting work may receive no credit, while an incorrect answer with relevant work may receive partial credit. **Justify your answers, show all work.**

1. (28pts) The following problems are not related.

(a)(12pts) Use limits to find all *vertical asymptotes* of $f(x) = \frac{x^2 - 4}{x^2 + 5x - 14}$. Justify your answer with limits.

(b)(12pts) Use the Quotient Rule to find the derivative of $g(x) = \frac{2x + 1}{x^2 - 1}$. Simplify your answer, show all work.

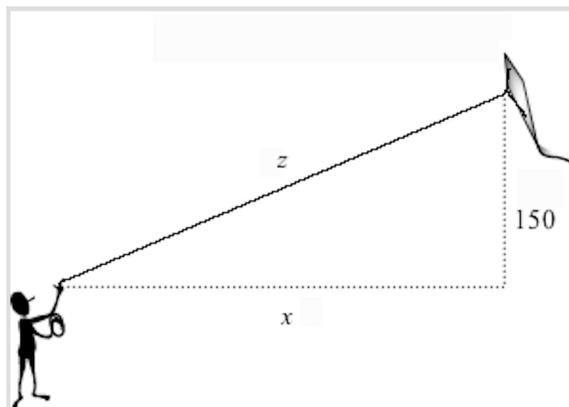
(c)(4pts) The function $h(x) = \sqrt{1 - x^2}$ has a *vertical tangent* at which choice below? **Choose only one answer, no justification necessary, copy down the entire answer. If you do not copy down the entire answer, points will be deducted.**

(A) $x = -1, 0, 1$ (B) $x = -1, 1$ (C) $x = \frac{1}{2}$ (D) $-1 \leq x \leq 1$ (E) None of these

2. (24pts) The following problems are not related.

(a)(12pts) The position function of a particle (in meters) at time t seconds is given by $s(t) = t^3 - 4.5t^2 - 7t$, $t \geq 0$. When does the particle reach a velocity of 5 meters/sec? Show all work.

(b)(12pts) Chip flies a kite at a constant height of 150 ft above the ground with the wind carrying the kite horizontally away from Chip at a rate of 25 ft/sec. How fast must Chip let out the string when 250 ft of string is out? Simplify your answer.



Problem 2: Figure for problem 2(b). The kite is kept at a constant height of 150ft above the ground

3. (28pts) The following problems are not related.

(a)(12pts) The radius of a circular disk is given as 12 cm with a maximum error in measurement of +0.2 cm. Use differentials to estimate the maximum error in the calculated area of the disk. Show all work. Simplify your answer, you may give your answer in terms of π .

(b)(12pts) Find dy/dx by implicit differentiation given that $\cos(xy) = 1 + \sin(y)$. Simplify your answer.

(c)(4pts) The function $f(x) = \frac{3x + 1}{x + \sqrt{4x^2 + 5}}$ has a *horizontal asymptote* at which choice below? **Choose only one answer, no justification necessary, copy down the entire answer. If you do not copy down the entire answer, points will be deducted.**

(A) $y=3$ (B) $y=1$ (C) $y=3$ and $y=1$ (D) $y=-3$ and $y=1$ (E) None of these

4. (20pts) The following problems are not related.

(a)(12pts) Find the absolute minimum and maximum values of $f(x) = x\sqrt{3 + 2x}$ on the interval $[-1.5, 3]$. Give your answer in the form (x, y) . Show all work, justify your answers and clearly label your answers.

(b)(8pts) If $f'(x) = \lim_{h \rightarrow 0} \frac{\sec(x+h) - \sec(x)}{h}$, find $f'(\pi/4)$. Justify your answer, show all work.

THE LIST OF APPM 1350 LECTURE NUMBERS/INSTRUCTOR NAMES FOR THE FRONT OF YOUR BLUE BOOK:

Lecture #	Instructor	Class Time	Class Location
120	Susan HALLOWELL	MWF 9-9:50	FLMG 104
130	Sujeet BHAT	MWF 10-10:50	ECCR 200
150	Sujeet BHAT	MWF 12-12:50	ECCR 1B51
170	Sandra WILLIAMS	MWF 2-2:50	ECCR 108

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