

Math 2471 – Test 1 Group Review

Names \_\_\_\_\_

Group 1) A boat is pulled into a dock by means of a winch 60 feet above the deck of the boat. If the winch pulls the rope at a rate of 4 feet per second, determine the speed of the boat when there is 100 feet of rope out.

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Group 2) The radius of a sphere is increasing at a rate of 2 in/min. Find the rate of change of the volume when  $r = 12$  inches. Volume of a sphere is:  $V = \frac{4}{3}\pi r^3$

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Group 3) A ladder 25 feet long is leaning against the wall of a house. The base of the ladder is pulled away from the house at a rate of 2 feet/sec. How fast is the ladder moving down the wall when the base is 7 feet from the house?

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Group 4) Find the **second** derivative of  $y^2 = x^3$ .

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Group 5) Find  $f'(x)$  when  $f(x) = \frac{4x^{\frac{1}{3}}}{x^2 + x}$ .

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Group 6) Find the derivative of  $f(x) = (9x^2 + 2)^{\frac{5}{3}}$

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Group 7) Find  $dy/dx$  of:  $18 = x^3 + y^3$ .

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Group 8) Find the derivative of  $y = \frac{\cos x}{x}$

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Group 9) Find the derivative of  $y = \frac{\sin xy}{\cos xy}$