

Name: _____

Class: _____

Date: _____

1 If $y = 3x^3 + 5x$ and $\frac{dx}{dt} = 4$, find $\frac{dy}{dt}$ when $x = 4$.

- 2 A man starts walking north at 4 ft/s from a point P . Five minutes later, a woman starts walking south at 5 ft/s from a point 300 ft due east of P . At what rate are the people moving apart 25 min after the woman starts walking?

Round your answer to the nearest hundredth.

_____ ft/s

- 3 The altitude of a triangle is increasing at a rate of 2 cm/min while the area of the triangle is increasing at a rate of $1 \text{ cm}^2/\text{min}$. At what rate is the base of the triangle changing when the altitude is 5 cm and the area is 65 cm^2 .

_____ cm/min

- 4 A trough is 12 ft long and its ends have the shape of isosceles triangles that are 5 ft across at the top and have a height of 1 ft. If the trough is filled with water at a rate of $18 \text{ ft}^3/\text{min}$, how fast is the water level rising when the water is 3 inches deep?

a. 4.20 ft/min

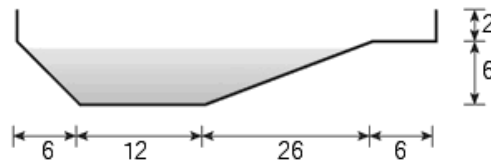
b. 2.20 ft/min

c. 1.20 ft/min

d. 3.20 ft/min

e. 5.20 ft/min

- 5 A swimming pool is 22 ft wide, 50 ft long, 2 ft deep at the shallow end, and 8 ft deep at its deepest point. A cross section is shown in the figure. If the pool is being filled at a rate of $0.8 \text{ ft}^3/\text{min}$, how fast is the water level rising when the depth at the deepest point is 5 ft?



Round your answer to the nearest hundred thousandth.

_____ ft/min

ANSWER KEY

Section 3.9 – Related Rates

1. 596 2. 9 3. -10 4. c 5. 0.00094