Math 3A HW #6

Answers must be submitted via Moodle before 9:30AM on Friday October 28th, 2016.

Good luck!

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem. Round your answer, if appropriate.

1) A ladder is slipping down a vertical wall. If the ladder is 20 ft long and the top of it is slipping at the constant rate of 4 ft/s, how fast is the bottom of the ladder moving along the ground when the bottom is 16 ft from the wall? 1) _____

A) 3.0 ft/s B) 0.25 ft/s C) 0.8 ft/s D) 5.0 ft/s

2) A man flies a kite at a height of 120 m. The wind carries the kite horizontally away from him at a rate of 10 m/sec. How fast is the distance between the man and the kite changing when the kite is 130 m away from him? 2) _____

A) 120.4 m/sec B) 4.5 m/sec C) 10 m/sec D) 7.3 m/sec

3) Water is falling on a surface, wetting a circular area that is expanding at a rate of 6 mm^2/s. How fast is the radius of the wetted area expanding when the radius is 128 mm? (Round your answer to four decimal places.) 3) _____

A) 0.0149 mm/s B) 0.0469 mm/s
C) 0.0075 mm/s D) 134.0412 mm/s

4) Water is being drained from a container which has the shape of an inverted right circular cone. The container has a radius of 3.00 inches at the top and a height of 6.00 inches. At the instant when the water in the container is 3.00 inches deep, the surface level is falling at a rate of 2 in./sec. Find the rate at which water is being drained from the container. 4) _____

A) 22.0 $in.^3s$ B) 13.5 $in.^3/s$ C) 14.1 $in.^3/s$ D) 23.6 $in.^3/s$

5) A man 6 ft tall walks at a rate of 7 ft/sec away from a lamppost that is 13 ft high. At what rate is the length of his shadow changing when he is 70 ft away from the lamppost? (Do not round your answer) 5) _____

A) $\frac{245}{3}$ ft/sec B) 6 ft/sec C) $\frac{42}{19}$ ft/sec D) $\frac{21}{19}$ ft/sec

6) A piece of land is shaped like a right triangle. Two people start at the right angle of the triangle at the same time, and walk at the same speed along different legs of the triangle. If the area formed by the positions of the two people and their starting point (the right angle) is changing at 2 m^2/s, then how fast are the people moving when they are 4 m from the right angle? (Round your answer to two decimal places.) 6) _____

A) 0.25 m/s B) 1.00 m/s C) 8.00 m/s D) 0.50 m/s

7) Boyle's law states that if the temperature of a gas remains constant, then PV = c, where P = pressure, V = volume, and c is a constant. Given a quantity of gas at constant temperature, if V is decreasing at a rate of 14 in. ^{3}/sec, at what rate is P increasing when P = 60 lb/in.^{2} and V = 20 in.^{3}? (Do not round your answer.) 7) _____

A) 42 lb/in.^{2} per sec

B) 9 lb/in.^{2} per sec

C) $\frac{14}{3}$ lb/in.^{2} per sec

D) $\frac{600}{7}$ lb/in.^{2} per sec

Identrify the critical points and find the maximum and minimum value on the given interval I.

8) $f(x) = x^3 - 12x + 1$; I =[−3, 5] 8) _____

A) Critical points: −2, 2; no maximum value; minimum value −15
B) Critical points: −3, −2, 2, 5; maximum value 66; minimum value 10
C) Critical points: −2, 2; maximum value 17; minimum value −15
D) Critical points: −3, −2, 2, 5; maximum value 66; minimum value −15

9) $g(t) = t^{2/3}$; I = [−1, 8] 9) _____

A) Critical points: 0; no maximum value; minimum value 0
B) Critical points: −1, 0, 8; maximum value 4; minimum value 0
C) Critical points: −1, 0, 8; maximum value 1; minimum value 0
D) Critical points: −1, 8; maximum value 4; minimum value 3

Find the absolute extreme values of the function on the interval.

10) $f(x) = \ln(x+2) + \frac{1}{x}$, $1 \le x \le 5$ 10) _____

A) absolute minimum value is $\ln 4 + \frac{1}{2}$ at $x = 2$; absolute maximum value is $\ln 3 + 1$ at $x = 1$

B) absolute minimum value is $\ln 4 + \frac{1}{2}$ at $x = 2$; absolute maximum value is $\ln 7 + \frac{1}{5}$ at $x = 5$

C) absolute minimum value is -1 at $x = -1$; absolute maximum value is $\ln 7 + \frac{1}{5}$ at $x = 5$

D) absolute minimum value is $\ln 3 + 1$ at $x = 1$; absolute maximum value is $\ln 7 + \frac{1}{5}$ at $x = 5$

11) $f(x) = -5e^{-x^2}$, $-\infty < x < \infty$ 11) _____

A) absolute minimum value is -5 at $x = 0$; absolute maximum value is $-\frac{5}{e}$ at $x = 1$

B) absolute maximum value is -5 at $x = 0$; no minimum value
C) absolute minimum value is -5 at $x = 0$; no maximum value
D) no minimum value and no maximum value