

1. (1 point) set5/golden_math1210fall2002_p5_18.pg

The radius of a spherical balloon is increasing at the rate of 0.25 inch per second. If the radius is 0 at time $t = 0$, find the rate of change in the volume at time $t = 3$.

Rate of change in volume at $t = 3$: _____
inch³/second.

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- 1.767145867875

2. (1 point) set6/ur_dr_25_10.pg

Use implicit differentiation to find the slope of the tangent line to the curve

$$\frac{y}{x+7y} = x^9 - 7$$

at the point $(1, \frac{-6}{43})$.

$m =$ _____

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- -0.134667387777177

3. (1 point) set6/c2s8p1.pg

A street light is at the top of a 14.000 ft. tall pole. A man 5.700 ft tall walks away from the pole with a speed of 7.000 feet/sec along a straight path. How fast is the tip of his shadow moving when he is 41.000 feet from the pole? _____

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- 11.8072289156626

4. (1 point) set6/s2_8_5.pg

A spherical snowball is melting in such a way that its diameter is decreasing at the rate of 0.1 cm/min. At what rate is the volume of the snowball decreasing when the diameter is 9 cm? (Note the answer is a positive number).

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- 12.7234502325

5. (1 point) set6/s2_8_21a.pg

Gravel is being dumped from a conveyor belt at a rate of 10 cubic feet per minute.

It forms a pile in the shape of a right circular cone, such that the ratio of the base diameter to the height is always equal to 1.

How fast is the height of the pile increasing when the pile is 19 feet high?

Recall that the volume of a right circular cone with height h and radius of the base r is given by

$$V = \frac{1}{3}\pi r^2 h$$

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- 0.0352697934829685

6. (1 point) set6/c2s9p7.pg

Use linear approximation to estimate the amount of paint in cubic centimeters needed to apply a coat of paint 0.070000 cm thick to a hemispherical dome with a diameter of 30.000 meters.

Answer(s) submitted:

•

(incorrect)

Correct Answers:

- 989601.669

7. (1 point) set6/s2_9_13.pg

Let $y = 2x^2$.

Find the change in y , Δy when $x = 3$ and $\Delta x = 0.1$ _____

Find the differential dy when $x = 3$ and $dx = 0.1$ _____

Answer(s) submitted:

•

•

(incorrect)

Correct Answers:

- 1.22
- 1.2

8. (1 point) set6/s2_9_20.pg

Use linear approximation, i.e. the tangent line, to approximate $\sqrt[3]{1.2}$ as follows:

Let $f(x) = \sqrt[3]{x}$. The equation of the tangent line to $f(x)$ at $x = 1$ can be written in the form $y = mx + b$ where m is: _____ and where b is: _____

Using this, we find our approximation for $\sqrt[3]{1.2}$ is _____

Answer(s) submitted:

-
-
-

(incorrect)

Correct Answers:

- 0.3333333333333333
- 0.6666666666666667
- 1.0666666666666667

9. (1 point) set6/c3s3p1.pg

The function

$$f(x) = 6x^3 - 36x^2 - 216x - 5$$

is decreasing on the interval (_____ , _____).

It is increasing on the interval ($-\infty$, _____) and the interval (_____ , ∞).

The function has a local maximum at _____.

Answer(s) submitted:

-
-
-
-
-

(incorrect)

Correct Answers:

- -2
- 6
- -2
- 6
- -2

10. (1 point) set6/c3s3p4.pg

For $x \in [-15, 15]$ the function f is defined by

$$f(x) = x^4(x-1)^3$$

On which two intervals is the function increasing?

_____ to _____

and

_____ to _____

Find the region in which the function is positive: _____ to _____

Where does the function achieve its minimum? _____

Answer(s) submitted:

-
-
-

-
-
-
-

(incorrect)

Correct Answers:

- -15
- 0
- 0.571428571428571
- 15
- 1
- 15
- -15

11. (1 point) set6/golden-math1210fall2001-ps6-q10.pg

The hands on a clock are of lengths 5 inches (minute hand) and 4 inches (hour hand). How fast is the distance between the tips of the hands changing at 3:00.

Rate of change of distance at 3:00 between the tips of the hands: _____ inch(es) per minute.

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- -0.299832098559149

12. (1 point) set6/golden-math1210fall2001-ps6-q11.pg

Einstein's Special Theory of Relativity says that mass m is related to velocity v by the formula

$$m = \frac{m_0}{\sqrt{1 - v^2/c^2}} = m_0 \left(1 - \frac{v^2}{c^2}\right)^{-1/2}.$$

Here, m_0 is the rest mass and c is the velocity of light. Use differentials to determine the percent increase in mass of an object when its velocity increases from $0.6c$ to $0.62c$.

Approximate percent increase: _____

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 1.875

13. (1 point) set6/golden-math1210fall2001-ps6-q12.pg

Identify the critical points and find the maximum value and minimum value of the following function on the given interval.

$$f(x) = x^3 - 3x + 1, \text{ over } [-3/2, 3].$$

Critical Points: _____, _____.

Maximum: _____.

Minimum: _____.

Instructions:

- 1) When entering the critical points, please enter them in the order that they appear on the real line.
- 2) If the function has no critical points, enter the string NONE in all answer boxes for critical points.

Answer(s) submitted:

-
-
-
-

(incorrect)

Correct Answers:

- -1
- 1
- 19
- -1

14. (1 point) set6/golden-math1210fall2001-ps6-q13.pg

Identify the critical points and find the maximum value and minimum value of the following function on the given interval.

$$f(x) = \sqrt[3]{x}, \text{ over } [-1, 27].$$

Critical Points: _____, _____.

Maximum: _____.

Minimum: _____.

Instructions:

- 1) When entering the critical points, please enter them in the order that they appear on the real line.
- 2) If the function has no critical points, enter the string NONE in all answer boxes for critical points.

Answer(s) submitted:

-
-

-
-

(incorrect)

Correct Answers:

- NONE
- NONE
- 3
- -1

15. (1 point) set6/golden-math1210fall2001-ps6-q14.pg

What number exceeds its square by the maximum amount? Begin by convincing yourself that this number is on the interval $[0, 1]$.

Answer: _____.

Answer(s) submitted:

-

(incorrect)

Correct Answers:

- 0.5

16. (1 point) set6/golden-math1210fall2001-ps6-q15.pg

A rectangle is to be inscribed in a semicircle of radius r with its base touching that of the semicircle. What are the dimensions of rectangle if its area is to be maximized?

Dimensions: _____ $r \times$ _____ r .

Answer(s) submitted:

-
-

(incorrect)

Correct Answers:

- 0.707106781186547
- 0.707106781186547