

1. (1 pt) Suppose $xy = -1$ and $\frac{dy}{dt} = 1$. Find $\frac{dx}{dt}$ when $x = 4$.
 $\frac{dx}{dt} =$ _____

Answer(s) submitted:

- 16

(correct)

Correct Answers:

- 16

2. (1 pt) Suppose that $x = x(t)$ and $y = y(t)$ are both functions of t . If

$$x^2 + y^2 = 50,$$

and $dx/dt = 4$ when $x = 5$ and $y = 5$, what is dy/dt ?

$dy/dt =$ _____

Answer(s) submitted:

- -4

(correct)

Correct Answers:

- -4

3. (1 pt) Suppose that $x = x(t)$ and $y = y(t)$ are both functions of t . If

$$y^2 + xy - 3x = 6,$$

and $dy/dt = 4$ when $x = -2$ and $y = 2$, what is dx/dt ?

$dx/dt =$ _____

Answer(s) submitted:

- 8

(correct)

Correct Answers:

- 8

4. (1 pt) A particle is moving along the curve $y = 4\sqrt{4x+1}$. As the particle passes through the point $(2, 12)$, its x -coordinate increases at a rate of 4 units per second. Find the rate of change of the distance from the particle to the origin at this instant.

Answer(s) submitted:

- 11.18

(correct)

Correct Answers:

- 11.1791311367643

5. (1 pt) The radius of a spherical balloon is increasing at a rate of 4 centimeters per minute. How fast is the volume changing when the radius is 12 centimeters?

Note: The volume of a sphere is given by $V = (4/3)\pi r^3$.

Rate of change of volume = _____

Answer(s) submitted:

- 2304 pi

(correct)

Correct Answers:

- 7238.22947387136

6. (1 pt) Helium is pumped into a spherical balloon at a rate of 3 cubic feet per second. How fast is the radius increasing after 2 minutes?

Note: The volume of a sphere is given by $V = (4/3)\pi r^3$.

Rate of change of radius (in feet per second) = _____

Answer(s) submitted:

- 0.0122587

(correct)

Correct Answers:

- 0.0122584472639842

7. (1 pt) A street light is at the top of a 20 ft tall pole. A woman 6 ft tall walks away from the pole with a speed of 7 ft/sec along a straight path. How fast is the tip of her shadow moving when she is 40 ft from the base of the pole?

Note: You should draw a picture of a right triangle with the vertical side representing the pole, and the other end of the hypotenuse representing the tip of the woman's shadow. Where does the woman fit into this picture? Label her position as a variable, and label the tip of her shadow as another variable. You might like to use similar triangles to find a relationship between these two variables.

Answer(s) submitted:

- 10

(correct)

Correct Answers:

- 10

8. (1 pt) Water is leaking out of an inverted conical tank at a rate of 6600.0 cubic centimeters per min at the same time that water is being pumped into the tank at a constant rate. The tank has height 6.0 meters and the diameter at the top is 7.0 meters. If the water level is rising at a rate of 26.0 centimeters per minute when the height of the water is 5.0 meters, find the rate at which water is being pumped into the tank in cubic centimeters per minute. _____

Note: Let "R" be the unknown rate at which water is being

pumped in. Then you know that if V is volume of water, $\frac{dV}{dt} = R - 6600.0$. Use geometry (similar triangles?) to find the relationship between the height of the water and the volume of the water at any given time. Recall that the volume of a cone with base radius r and height h is given by $\frac{1}{3}\pi r^2 h$.

Answer(s) submitted:

- 6948590

(correct)

Correct Answers:

- 6955191.96597222