

3.9 Challenge Problems

1) Find x . $x^2 + 2x(2)^2 + (2)^3 = 8$

$$x^2 + 8x = 0$$

$$x(x+8) = 0$$

$$x=0 \quad x=-8$$

Find $\frac{dx}{dt}$

$$2x \frac{dx}{dt} + 2 \frac{dx}{dt} y^2 + 2x \cdot 2y \frac{dy}{dt} + 3y^2 \frac{dy}{dt} = 0$$

for $x=0$ we get.

$$0 + 2(2)^2 \frac{dx}{dt} + 0 + 3(2)^2(-3) = 0$$

$$8 \frac{dx}{dt} - 36 = 0 \implies 8 \frac{dx}{dt} = 36$$

$$\frac{dx}{dt} = \frac{36}{8}$$

for $x=-8$ we get

$$-16 \frac{dx}{dt} + 8 \frac{dx}{dt} + 192 + (-36) = 0$$

$$-8 \frac{dx}{dt} + 156 = 0 \implies \frac{dx}{dt} = \frac{156}{8} = 19.5$$