

Math 189 – Strategy for Solving First-Order DEs

Strategy

1. Try desperately to separate the variables.
2. Look to see if it fits the pattern for linear:

$$\frac{dy}{dx} + P(x)y = Q(x)$$

3. Look for patterns (integrating combinations):
 - a) Is there an ugly term that you can't deal with? Like $\sqrt{x^3 + 2y^2}$? If so, try substituting $u = x^3 + 2y^2$ and see if you can make it work.
 - b) Otherwise, write down the differentials for the following and see if you can spot any of these patterns in your DE.

$$d(x + y)$$

$$d(x - y)$$

$$d(xy)$$

$$d\left(\frac{x}{y}\right)$$

$$d\left(\frac{y}{x}\right)$$

$$d(x^2 \pm y^2)$$