

No notes or calculators. Show all work.

1. (3 points) Solve the equation for x .

$$3 = 27^{2x-1}$$

$$3^1 = 3^{3(2x-1)}$$

$\Rightarrow$ exponents must be equal

$$1 = 3(2x-1)$$

$$1 = 6x - 3$$

$$4 = 6x \rightarrow$$

$$x = \frac{4}{6} = \frac{2}{3}$$

2. (4 points) Solve the equation for x .

$$7^{x^2-x} = 1$$

Method 1

$$7^{x^2-x} = 7^0$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

$$\Rightarrow \boxed{x=0, x=1}$$

Method 2

$$\log_7(7^{x^2-x}) = \log_7(1)$$

$$x^2 - x^2 = 0$$

$$x(x-1) = 0$$

$$\Rightarrow \boxed{x=0, x=1}$$

3. (3 points) Solve the equation for x .

$$\log_3(2x+9) = 2$$

$$3^{\log_3(2x+9)} = 3^2$$

$$2x+9 = 9$$

$$2x = 0$$

$$\boxed{x=0}$$