

Math 122 HW #1

Section 2.4 # 15, 19, 24, 33, 40 a

2.4 #15

$$3^x = \frac{1}{81}$$

$$81 = 3^4$$

$$\text{so } 3^x = 3^{-4}$$

$$\text{so } \underline{x = -4}$$

2.4 #19

$$16^{x+3} = 64^{2x-5}$$

$$16 = 2^4 \quad \text{and} \quad 64 = 2^6$$

$$\text{so } (2^4)^{x+3} = (2^6)^{2x-5}$$

$$2^{4x+12} = 2^{12x-30}$$

$$4x+12 = 12x-30$$

$$42 = 8x$$

$$x = \frac{42}{8} = \frac{21}{4}$$

2.4 #24

$$2^{x^2-4x} = \left(\frac{1}{16}\right)^{x-4}$$

$$16 = 2^4$$

$$\text{so } 2^{x^2-4x} = (2^{-4})^{x-4}$$

$$2^{x^2-4x} = 2^{-4x+16}$$

$$x^2-4x = -4x+16$$

$$x^2 = 16$$

$$\underline{x = \pm 4}$$

2.4 #33c

$$A = P \left(1 + \frac{r}{m}\right)^{mt}$$

$$P = 10000$$

$$m = 4$$

$$t = 5$$

$$r = .04$$

$$A = 10000 \left(1 + \frac{.04}{4}\right)^{4 \cdot 5}$$

$$= 10000 (1 + .01)^{20} = 12,201$$

We end up with \$12201, so we got \$2201 interest.

2.4 #40a

$$A = P \left(1 + \frac{r}{m}\right)^{mt}$$

$$A = 30,000$$

$$P = 10,500$$

$$m = 4$$

$$t = 12$$

$$30000 = 10500 \left(1 + \frac{r}{4}\right)^{4 \cdot 12}$$

$$2.85 = \left(1 + \frac{r}{4}\right)^{48}$$

$$(2.85)^{\frac{1}{48}} = 1 + \frac{r}{4}$$

$$r = .088$$

so we need 8.8% interest.