Week 8 Questions and Answer Key

- Day 1, Logarithms 16-21
- Day 2, Review (Logarithms)
- Day 3, Test Logarithms
- Day 4, Circles 1-5
- Day 5, Circles 6 & 7

16. A video tuner amplifier has an input impedance of 300 ohms and an output impedance of 3,500 ohms. When a $300mV$ signal is applied at the input, a $250V$ signal appears at the output.

    (a) What is the power output of the amplifier?
    $P_{out} = 17.857$ watts

    (b) What is the power gain in dB?
    $\Delta_{dB} = 47.75dB$

    (c) What is the voltage gain of the amplifier?
    $\Delta V = 833.333$

17. Given the following specifications for a 2N45 transistor, What is the power input?

    - Collector Voltage $= -20V$
    - Emitter Current $= 5mA$
    - Input Impedance $= 10\Omega$
    - Source Impedance $= 50\Omega$
    - Load Impedance $= 4.5K\Omega$
    - Power Output $= 45mW$
    - Power Gain $= 23dB$

    $P_{In} = 225.534\mu W$

18. The input power to a 50Km line is $10mW$. The output of this line is $40\mu W$ What is the attenuation (dB) of the line per kilometer?

    $Attenuation = -0.4796db/Km$

19. What is the dB gain necessary to produce a $60\mu W$ signal in a 600Ω telephone if the received signal supplies $9\mu V$ to the 80Ω line that feeds the receiver?

    $Gain_{necessary} = 77.727dB$

20. In problem 19, if the overall gain is increased to $96dB$ what received signal will produce the $60\mu W$ signal in the telephone?

    $Signal_{Voltage} = 1.098\mu V$

21. The voltage across a 600Ω telephone is adjusted to 1.73 volts. When an audio filter is installed in the circuit, the voltage drops to 1.44 volts. What is the insertion loss of the filter?

    $-1.594dB$

Find the Center and Radius for the following Circles:

1. $x^2 + y^2 = 16$

   Center=(0,0) & Radius = 4

2. $x^2 + y^2 + 6x - 8y - 39 = 0$

   Center=(-3,4) & Radius = 8

3. $x^2 + y^2 - 8x + 12y - 8 = 0$

   Center=(4,-6) & Radius = $2\sqrt{15}$ or $\sqrt{60}$

4. $x^2 + y^2 - 12x - 2y - 12 = 0$

   Center=(6,1) & Radius = 7

5. $x^2 + y^2 + 7x + 13y - 9 = 0$

   Center=(-3.5,-6.5) & Radius = $\sqrt{63.5}$

6. The Center is on the y-axis, with Points (1,4) & (-3, 2).

   Center=(0,1) & Radius = $\sqrt{10}$

7. Points (3,1) & (0,0) & (8,4).

   Center=(-5,20) & Radius = $\sqrt{425}$ or 20.615