Name: ....ANSWERS........................

ASTRONOMY 1102 - Section 1

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Spring 1999

Homework # 3 due Mon. Feb. 22

More about the Stars

1) What is the distance in parsecs (pc) and in light years (LY) to stars having the following measured parallaxes:

a) 1 arc second (1.0”)	*1 pc*
b) one half of an arc second (0.5”)	*2 pc*
c) one third of an arc second (0.3333”)	*3 pc*
d) one quarter of an arc second (0.25”)	*4 pc*
e) 0.1”	*10 pc*

2) A nearby star of spectral type A2V has a parallax of 0.2” and a measured luminous flux ℓ in some arbitrary units. Another star has been found to have the same spectral type but its luminous flux is only 0.01ℓ in the same units. What is the distance in parsecs to this star?

parallax 0.2” means d = 5 pc. So flux = l at 5 pc.
A star of the same spectral type has the same luminosity. Since we only observe a flux 0.01l = l/100, then by the inverse-square law, it must be 10 times farther than the first star.
Hence d = 50 pc

3) Two stars in a distant stellar cluster have different spectral types and appear to shine with different brightnesses. One of the stars has the same spectral type as our Sun (G2V) and a measured luminous flux ℓ in some arbitrary units. The other star is white-blue and shines with a luminous flux 80ℓ in the same units. What is the luminosity of this second star? Justify.

Same cluster means the stars are at the same distance approximately.
If one appears 80 times brighter then it must be 80 time more luminous.
Since the first star is G2V, its luminosity is 1 $L_\odot$. Therefore the brighter star has a luminosity of 80 $L_\odot$.