**Question 1:**

- Astronomical unit (AU) - average distance between earth and the Sun.

$$1AU = 1.496 \times 10^{8}$$

(to 4 s.f)

- Solar radius ($R_{\odot}$)

$$1R_{\odot} = 6.955 \times 10^{5}\,\text{km}$$

(to 4 s.f) $\odot$ is used to notate quantities related to the Sun.

- Light-year (ly), distance light travels in a year through empty space.

$$1ly = 9.461 \times 10^{12}\,\text{km}$$

(to 4s.f)

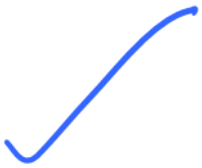
- Parsec (pc)

$$1pc = 3.086 \times 10^{13}\,\text{km}$$

(to 4s.f)

- kilo $= 10^{3}$
- mega $= 10^{6}$
- giga $= 10^{9}$

About 5 mins to read and make notes.



Good

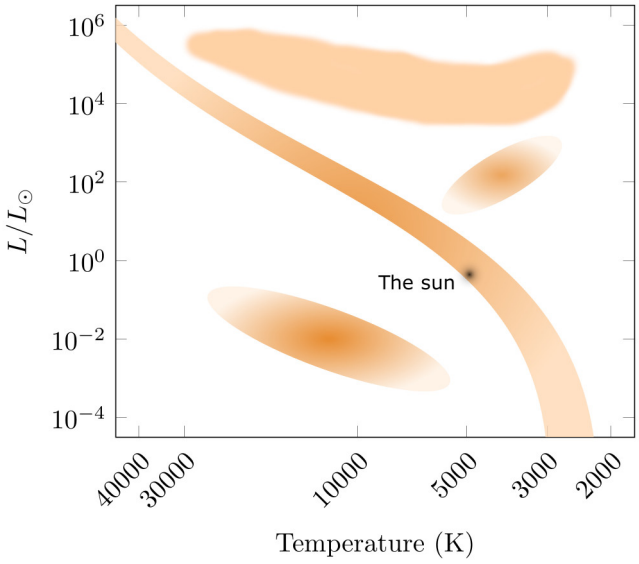
**Question 2:**

$$\theta^2 = (\Delta\alpha)^2(\cos\delta)^2 + (\Delta\delta)^2$$

Excellent use of equation editor, spot on.

**Question 3:**

**Part (a):**




Remember to give all your images and diagrams a title, and reference too if appropriate.

**Part (b):**

Also give a title and reference - what are we looking at?

**Part (c):**

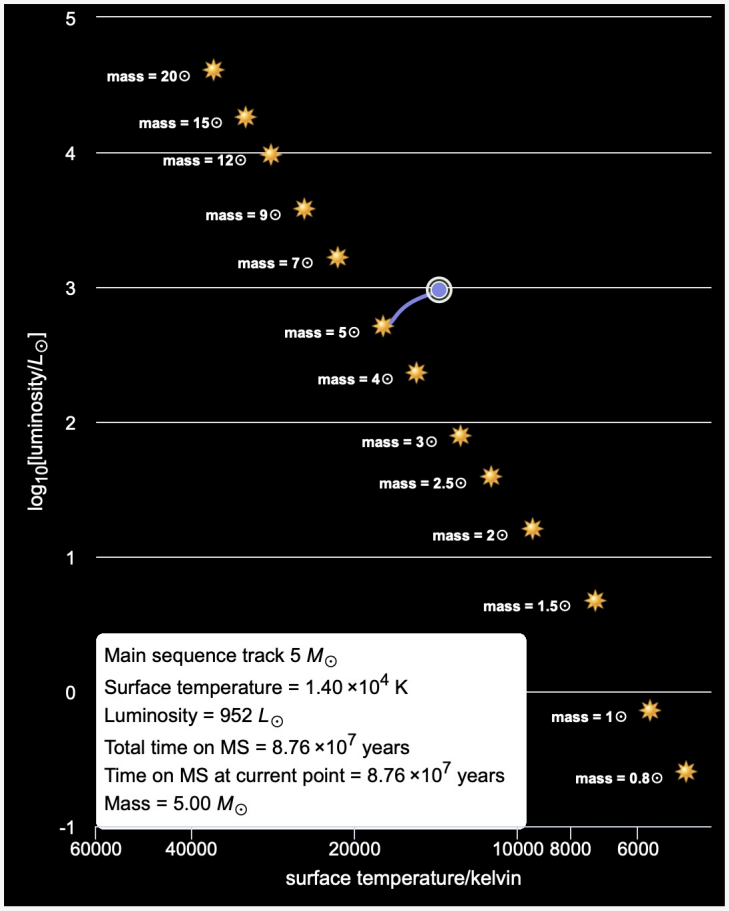



**Figure 2.9** Interactive H–R diagram for main sequence stars.

Investigating the properties of stars on the main sequence, Copyright © 2023, The Open University, Available at: `https://learn2.open.ac.uk/mod/oucontent/view.php?id=2288312&section=2.2.1` (13/10/24)

**Question 4:**

| Star | Apparent magnitude($m$) | Distance ($d/pc$) |
|---|---|---|
| Alpha Cygni | 1.25 | 800 |
| Beta Cygni | 2.93 | 130 |
| Gamma Cygni | 2.23 | 560 |
| Delta Cygni | 2.87 | 51 |
| Epsilon Cygni | 2.48 | 22 |

Good.

**Question 5:**

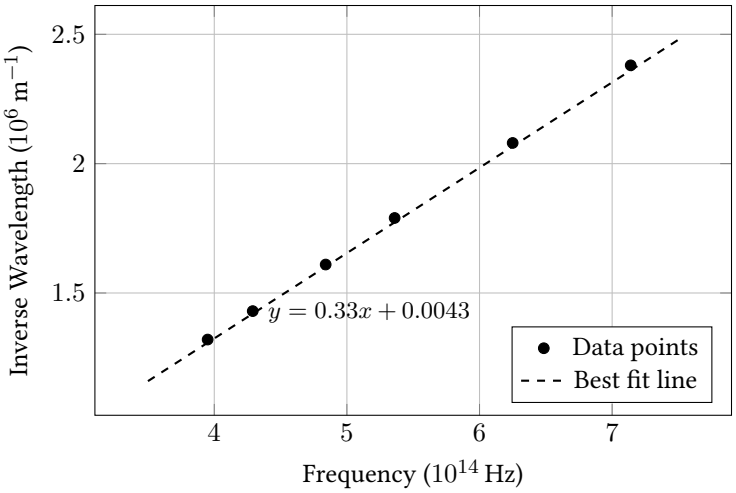



Figure 1: Plot of inverse wavelength versus frequency with a best fit line

Okay, but better to swap your axes here, as the gradient then equals the speed of light

$paulallen@Pauls - AirTMA00$
$python3line_of_best_fit.py$
$Slope$ : 0.3325256100466257
$Intercept$ : 0.004284972035984325

$$\begin{aligned} c &= \lambda f \\ f &= \frac{c}{\lambda} \\ \frac{1}{\lambda} &= \frac{f}{c} \end{aligned} \tag{1}$$

Using;

$$c \approx \frac{1}{gradient} \approx 3.01 \times 10^8 \,\mathrm{m\,s^{-1}}$$

**Grand Total: 100/100**