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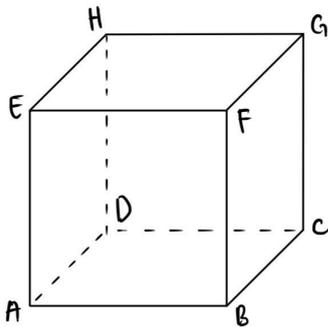
Cheryl Verena Efendi/XII MIPA 8/08

Jennifer Michaela Doho/XII MIPA 8/17

## DIMENSI TIGA

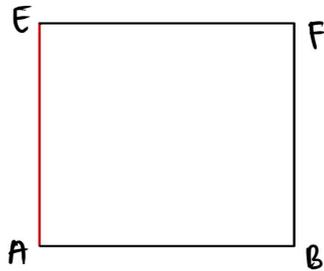
### 1. Ketegaklurusan dua garis

Diketahui kubus ABCD.EFGH, buktikan  $AE \perp BD$ !

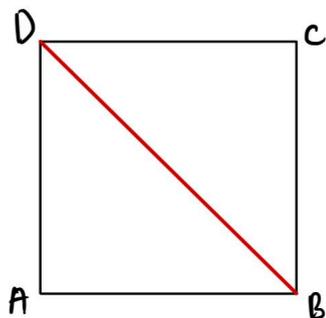


#### a. Tentukan bidang

AE pada ABFE

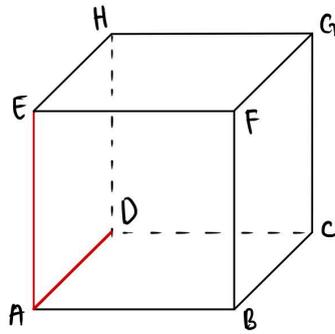


BD pada ABCD

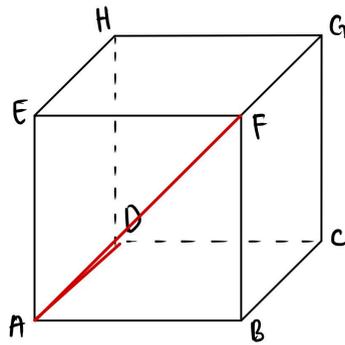


b. Buktikan

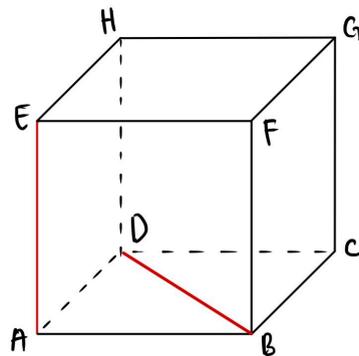
- 1)  $AD \perp EA$
- 2)  $AD \perp AB$
- 3)  $AD \perp EABF$



- 4)  $AD \perp AE \rightarrow AE \perp AD$
- 5)  $AF \perp AD$
- 6)  $AE \perp ABCD$

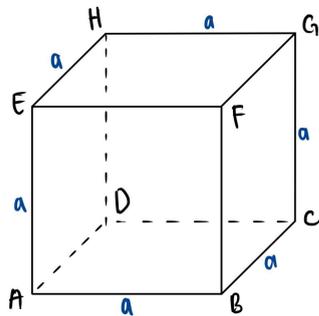


- 7)  $AE \perp BD$

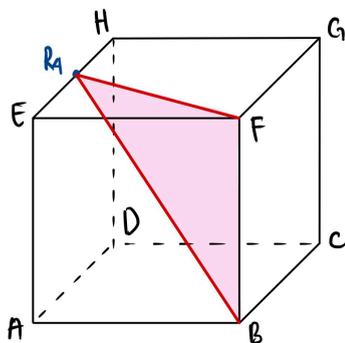


2. Jarak titik ke titik

Diketahui kubus ABCD.EFGH dengan panjang rusuk a cm. Hitung dan lukis jarak B ke R4!



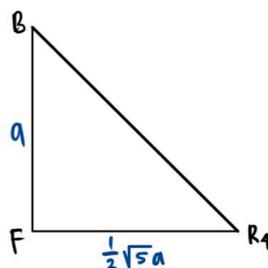
a. Tarik garis dari B ke R4 dan R4 ke F



b. Hitung panjang FR4

$$\begin{aligned}
 FR_4 &= \sqrt{(a)^2 + \left(\frac{1}{2}a\right)^2} \\
 &= \sqrt{a^2 + \frac{1}{4}a^2} \\
 &= \sqrt{\frac{5}{4}a^2} \\
 &= \frac{a}{2}\sqrt{5}
 \end{aligned}$$

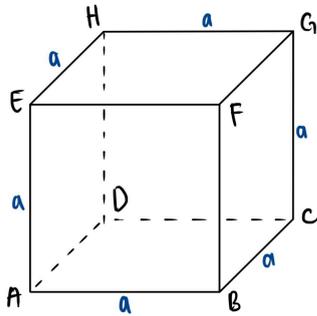
c. Gambar bidang 2 dimensi dan hitung jarak B ke R4



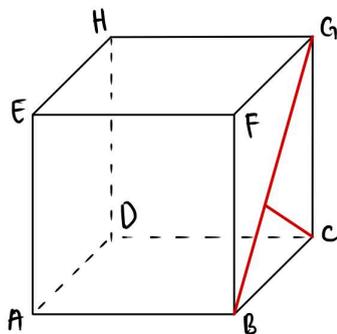
$$\begin{aligned}
 BR_4 &= \sqrt{(a)^2 + \left(\frac{\sqrt{5}}{2}\right)^2} \\
 &= \sqrt{a^2 + \frac{5}{4}a^2} \\
 &= \sqrt{\frac{9}{4}a^2} \\
 &= \frac{3}{2}a
 \end{aligned}$$

3. Jarak titik ke garis

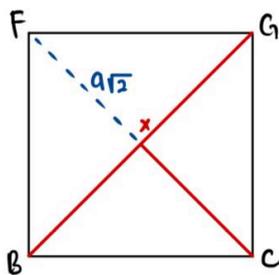
Diketahui kubus ABCD.EFGH dengan panjang rusuk a cm. Hitunglah jarak antara titik C ke garis BG!



a. Tarik garis C ke BG



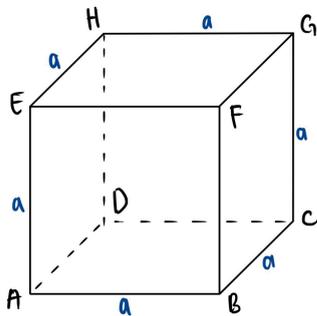
b. Gambar bidang 2 dimensi dan hitung jarak C ke BG



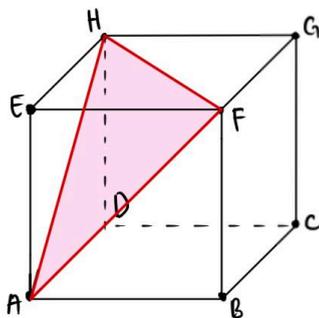
$$\begin{aligned} CX &= \frac{1}{2} CF \\ &= \frac{1}{2} a\sqrt{2} \end{aligned}$$

4. Jarak titik ke bidang

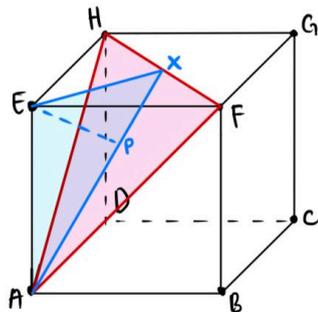
Pada kubus ABCD.EFGH dengan panjang rusuk a cm. Tentukan jarak titik E ke bidang AFH!



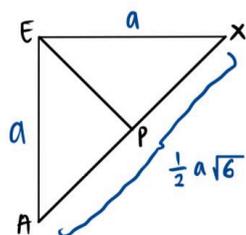
a. Gambar bidang AFH



b. Proyeksi titik E



c. Gambar bidang 2 dimensi dan hitung jarak titik E ke bidang AFH



$$\frac{1}{2} EP \cdot AX = \frac{1}{2} EX \cdot AE$$

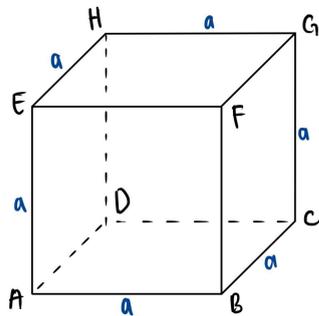
$$EP \cdot \frac{1}{2} a\sqrt{6} = a \cdot a$$

$$EP = \frac{2}{\sqrt{6}} a$$

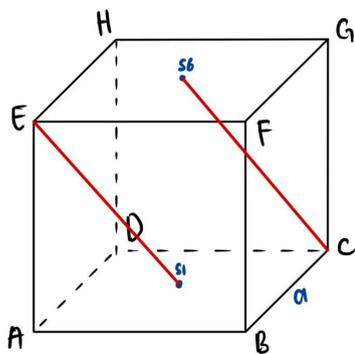
$$EP = \frac{1}{2} \sqrt{3} a$$

5. Jarak 2 garis sejajar

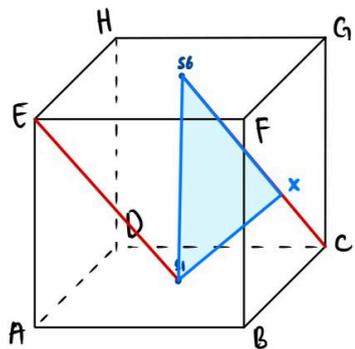
Diketahui kubus ABCD.EFGH dengan panjang rusuk  $a$  cm. Tentukan jarak antara garis ES1 dan garis CS6!



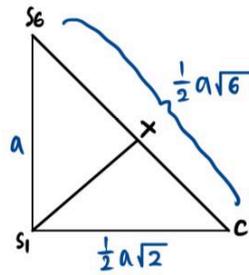
- a. Tarik garis dari E ke S1 dan dari C ke S6



- b. Karena garis ES1 dan CS6 sejajar, ambil titik sembarang di antara kedua garis tersebut yang membentuk sudut siku-siku.



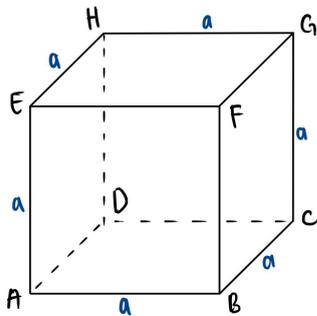
c. Cari jarak S1X menggunakan bantuan segitiga CS1S6



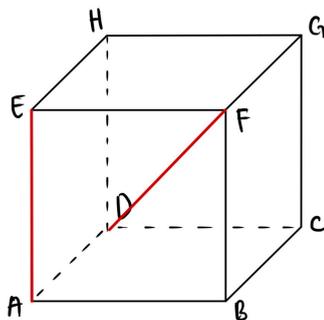
$$\begin{aligned} \frac{1}{2} CS1 \cdot S1S6 &= \frac{1}{2} CS6 \cdot S1X \\ \frac{1}{2} \cdot \frac{1}{2} a\sqrt{2} \cdot a &= \frac{1}{2} \cdot \frac{1}{2} a\sqrt{6} \cdot S1X \\ S1X &= \frac{a\sqrt{2}}{\sqrt{6}} \\ &= \frac{1}{6} a\sqrt{12} \end{aligned}$$

6. Jarak 2 garis bersilangan

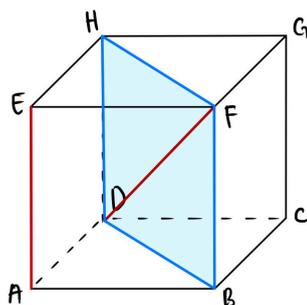
Diketahui kubus ABCD.EFGH dengan panjang rusuk a cm. Carilah panjang jarak garis AE ke DF!



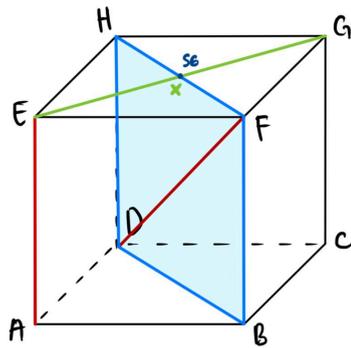
a. Tarik garis DF



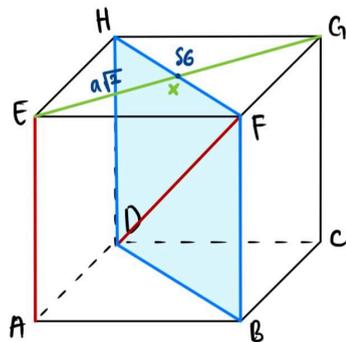
b. Buat garis bantu untuk membentuk bidang DF



- c. Tarik garis dari E ke G untuk menemukan tegak lurus nya



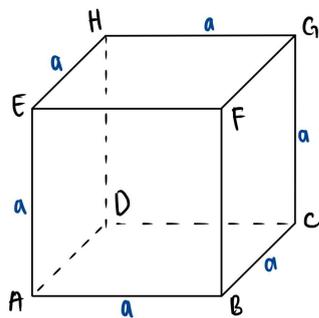
- d. Garis EG dan DF tegak lurus karena merupakan 2 diagonal bidang yang saling berpotongan. Oleh karena itu, jarak garis AE ke DF sama dengan jarak garis ES6.



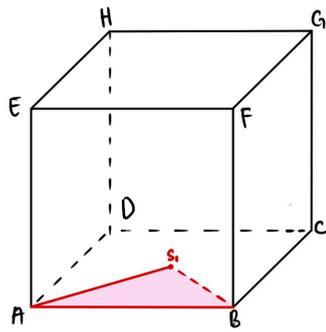
$$\begin{aligned} \text{Jarak } AE \text{ ke } DF &= \text{Jarak } ES_6 \\ &= a\sqrt{2} \end{aligned}$$

### 7. Proyeksi garis ke garis

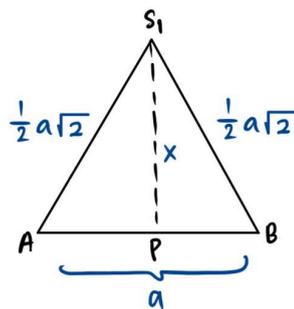
Pada kubus ABCD.EFGH dengan panjang rusuk a cm. Tentukan proyeksi dan hitung panjang proyeksi dari garis AS1 pada garis AB!



- a. Tarik garis A ke S1 dan A ke B



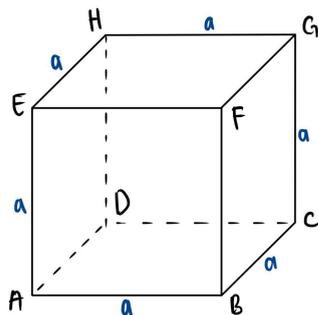
- b. Gambar bidang 2 dimensi dan hitung proyeksi garis AS1 pada garis AB



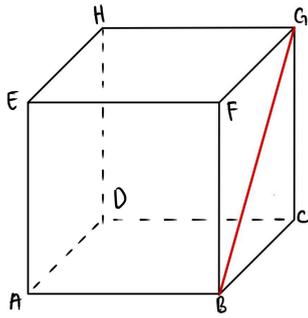
$$\begin{aligned} \frac{1}{2} a \sqrt{2} &= \sqrt{\left(\frac{1}{2} a^2\right) + (x)^2} \\ \left(\frac{1}{2} a \sqrt{2}\right)^2 &= \left(\sqrt{\left(\frac{1}{2} a^2\right) + (x)^2}\right)^2 \\ \frac{1}{2} a^2 &= \frac{1}{4} a^2 + x^2 \\ x^2 &= \frac{1}{2} a^2 - \frac{1}{4} a^2 \\ x^2 &= \frac{1}{4} a^2 \\ x &= \frac{1}{2} a \end{aligned}$$

8. Proyeksi garis ke bidang

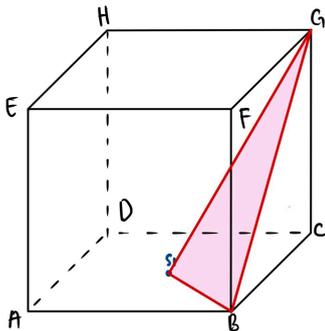
Pada kubus ABCD.EFGH dengan panjang rusuk a cm. Tentukan proyeksi dan panjang proyeksi garis BG pada bidang ACE!



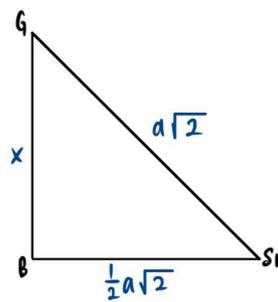
a. Tarik garis B ke G



b. Proyeksi ke S1



c. Gambar bidang 2 dimensi dan hitung proyeksi garis BG pada bidang ACGE



$$a\sqrt{2} = \sqrt{(x)^2 + \left(\frac{1}{2}a\sqrt{2}\right)^2}$$

$$(a\sqrt{2})^2 = \left(\sqrt{(x)^2 + \left(\frac{1}{2}a\sqrt{2}\right)^2}\right)^2$$

$$2a^2 = x^2 + \frac{1}{2}a^2$$

$$x^2 = 2a^2 - \frac{1}{2}a^2$$

$$x^2 = \frac{3}{2}a^2$$

$$x = a\sqrt{\frac{3}{2}}$$