

C 3.3

Dreieck AMS:

$$\sphericalangle ASM = 180^\circ - 90^\circ - 64,80^\circ = 25,20^\circ$$

Kosinus-Satz im Dreieck P₁NS:

$$\overline{P_1N}^2 = \overline{SP_1}^2 + \overline{SN}^2 - 2 \cdot \overline{SP_1} \cdot \overline{SN} \cdot \cos 25,20^\circ$$

$$\Leftrightarrow \overline{P_1N}^2 = (2,5^2 + 5^2 - 2 \cdot 2,5 \cdot 5 \cdot \cos 25,20^\circ) \text{ cm}^2$$

$$\Leftrightarrow \overline{P_1N}^2 = 8,63 \text{ cm}^2$$

$$\Leftrightarrow \overline{P_1N} = 2,94 \text{ cm}$$

$$\overline{SP_1}^2 = \overline{P_1N}^2 + \overline{SN}^2 - 2 \cdot \overline{P_1N} \cdot \overline{SN} \cdot \cos \sphericalangle SNP_1$$

$$\Leftrightarrow \cos \sphericalangle SNP_1 = \frac{\overline{SP_1}^2 - \overline{P_1N}^2 - \overline{SN}^2}{-2 \cdot \overline{P_1N} \cdot \overline{SN}}$$

$$\Leftrightarrow \cos \sphericalangle SNP_1 = \frac{2,5^2 - 2,94^2 - 5^2}{-2 \cdot 2,94 \cdot 5} = 0,93 \quad \Leftrightarrow \sphericalangle SNP_1 = 21,29^\circ$$

C 3.4

Dreieck P₀NS:

$$\sin \sphericalangle ASM = \frac{\overline{P_0N}}{\overline{SN}}$$

$$\Leftrightarrow \overline{P_0N} = \sin \sphericalangle ASM \cdot \overline{SN} \text{ cm} = \sin 25,20^\circ \cdot 5 \text{ cm} = 2,13 \text{ cm}$$

$$A = 0,5 \cdot \overline{EF} \cdot \overline{P_0N} = 0,5 \cdot 3,19 \cdot 2,13 \text{ cm}^2 = 3,40 \text{ cm}^2$$

C 3.5

Dreieck HMN:

$$\tan \sphericalangle SMA = \frac{\overline{HN}}{\overline{HM}}$$

$$\Leftrightarrow \overline{HN} = \tan \sphericalangle SMA \cdot \overline{HM} \text{ cm}$$

$$\Leftrightarrow \overline{HN} = \tan \sphericalangle SMA \cdot (\overline{AM} - \overline{P_0N}) \text{ cm}$$

$$\Leftrightarrow \overline{HN} = \tan 64,80^\circ \cdot (4 \text{ cm} - 2,13 \text{ cm}) = 3,97 \text{ cm}$$

$$V_{ABDN} = \frac{1}{3} \cdot 0,5 \cdot \overline{BD} \cdot \overline{AM} \cdot \overline{HN}$$

$$\Leftrightarrow V_{ABDN} = \frac{1}{3} \cdot 0,5 \cdot 6 \cdot 4 \cdot 3,97 \text{ cm}^3 = 15,88 \text{ cm}^3$$

$$V_{ABCDS} = \frac{1}{3} \cdot 0,5 \cdot \overline{BD} \cdot \overline{AC} \cdot \overline{AS}$$

$$\Leftrightarrow V_{ABCDS} = \frac{1}{3} \cdot 0,5 \cdot 6 \cdot 11 \cdot 8,5 \text{ cm}^3 = 93,50 \text{ cm}^3$$

$$15,88 : 93,50 = 0,1698 \Rightarrow 16,98 \%$$