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> restart:
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$$> \quad simplify\left(\int_0^{2\cdot\pi} \int_{\frac{d}{2}}^{\frac{Dia}{2}} r\cdot\cos(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta \right);$$

$$\frac{1}{2}\,\frac{1}{kn^2}\left(\int_0^{2\pi} \frac{1}{\cos(psin-\theta)^2}\left(-2\cos\left(\frac{1}{2}\,kn\,d\cos(psin-\theta)\right) \right.\right. \tag{1}$$

$$\left. -d\sin\left(\frac{1}{2}\,kn\,d\cos(psin-\theta)\right)kn\cos(psin-\theta) + 2\cos\left(\frac{1}{2}\,kn\,Dia\cos(psin\right.\right.$$

$$\left.\left.\left. -\theta)\right) + Dia\sin\left(\frac{1}{2}\,kn\,Dia\cos(psin-\theta)\right)kn\cos(psin-\theta)\right)d\theta\right)$$

$$> \quad simplify\left(\int_0^{2\cdot\pi} \int_{\frac{d}{2}}^{\frac{Dia}{2}} r\cdot\sin(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta \right);$$

$$-\frac{1}{2}\,\frac{1}{kn^2}\left(\int_0^{2\pi} \frac{1}{\cos(psin-\theta)^2}\left(2\sin\left(\frac{1}{2}\,kn\,d\cos(psin-\theta)\right) \right.\right. \tag{2}$$

$$\left. -d\cos\left(\frac{1}{2}\,kn\,d\cos(psin-\theta)\right)kn\cos(psin-\theta) - 2\sin\left(\frac{1}{2}\,kn\,Dia\cos(psin\right.\right.$$

$$\left.\left.\left. -\theta)\right) + Dia\cos\left(\frac{1}{2}\,kn\,Dia\cos(psin-\theta)\right)kn\cos(psin-\theta)\right)d\theta\right)$$

$$> \quad simplify\left(\lim_{Dia\to 0}\frac{4}{\pi\cdot Dia^2}\cdot\int_0^{2\cdot\pi}\int_0^{\frac{Dia}{2}} r\cdot\cos(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta \right);$$

$$1 \tag{3}$$

$$> \quad simplify\left(\lim_{Dia\to 0}\frac{4}{\pi\cdot Dia^2}\cdot\int_0^{2\cdot\pi}\int_0^{\frac{Dia}{2}} r\cdot\sin(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta \right);$$

$$0 \tag{4}$$

$$> \quad simplify\left(\lim_{Dia\to \infty}\frac{4}{\pi\cdot Dia^2}\cdot\int_0^{2\cdot\pi}\int_0^{\frac{Dia}{2}} r\cdot\cos(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta \right);$$

$$\lim_{Dia\to\infty}\frac{1}{kn^2\,\pi\,Dia^2}\left(2\left(\int_0^{2\pi}\left(-2\cos(psin-\theta)^2 + 4\cos\left(\frac{1}{2}\,kn\,Dia\cos(psin\right.\right.\right.\right. \tag{5}$$

$$\left.\left. -\theta)\right)\cos(psin)^2\cos(\theta)^2 + 4\cos\left(\frac{1}{2}\,kn\,Dia\cos(psin\right.\right.$$

$$-\theta\Big)\Big)\cos(psin)\cos(\theta)\sin(psin)\sin(\theta) + 2\cos\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)$$

$$-2\cos\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)\cos(\theta)^2 - 2\cos\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin\right.$$

$$\left.-\theta\right)\Big)\cos(psin)^2 + 2\,Dia\,\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)kn\cos(psin$$

$$-\theta)\cos(psin)^2\cos(\theta)^2 + 2\,Dia\,\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)kn\cos(psin$$

$$-\theta)\cos(psin)\cos(\theta)\sin(psin)\sin(\theta) + Dia\,\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin\right.$$

$$\left.-\theta\right)\Big)kn\cos(psin-\theta) - Dia\,\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)kn\cos(psin$$

$$-\theta)\cos(\theta)^2 - Dia\,\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)kn\cos(psin$$

$$\left.-\theta)\cos(psin)^2\right)\Big/\Big((2\cos(psin)^2\cos(\theta)^2$$

$$+2\cos(psin)\cos(\theta)\sin(psin)\sin(\theta) + 1 - \cos(\theta)^2 - \cos(psin)^2)$$

$$\cos(psin-\theta)^2\Big)\,d\theta\Big)\Big)$$

> $simplify\!\left(\displaystyle\lim_{Dia\to\infty}\frac{4}{\pi\cdot Dia^2}\cdot\int_0^{2\cdot\pi}\int_0^{\frac{Dia}{2}} r\cdot\sin(kn\cdot r\cdot\cos(psin-\theta))\,dr\,d\theta\right);$

$$\lim_{Dia\to\infty}\left(-\frac{1}{\pi\,Dia^2\,kn^2}\left(2\left(\int_0^{2\pi}\frac{1}{\cos(psin-\theta)^2}\left(-2\sin\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)\right.\right.\right.\right. \tag{6}$$

$$\left.\left.\left.\left.+\,Dia\,\cos\!\left(\frac{1}{2}\,kn\,Dia\,\cos(psin-\theta)\right)kn\cos(psin-\theta)\right)d\theta\right)\right)\right)\right)$$

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