

6.3 Evaluate using the half-angle identity.

14. $\sin 112.5^\circ = \sin \frac{225^\circ}{2}$

$$\sin \frac{\theta}{2} = \pm \sqrt{\frac{1 - \cos \theta}{2}}$$

$$= \sqrt{\frac{1 - \cos 225^\circ}{2}}$$

$$= \sqrt{\frac{1 - (-\frac{\sqrt{2}}{2})}{2}} = \sqrt{\frac{(1 + \frac{\sqrt{2}}{2}) \cdot \frac{2}{2}}{2}}$$

$$= \sqrt{\frac{(1 + \frac{\sqrt{2}}{2}) \cdot \frac{2}{2}}{2}} = \sqrt{\frac{2 \cdot 1 + \frac{2 \cdot \sqrt{2}}{2}}{2 \cdot 2}}$$

$$= \sqrt{\frac{2 + \sqrt{2}}{4}} = \frac{\sqrt{2 + \sqrt{2}}}{\sqrt{4}} = \boxed{\frac{\sqrt{2 + \sqrt{2}}}{2}}$$

p512 - 7.2

9, 11, 13

17-22 all

31-37 odd

39-46 all