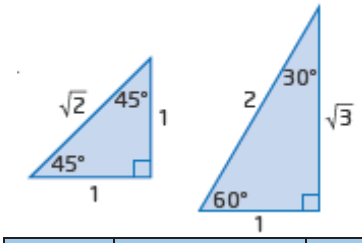
Section 2.1 Page 83 Question 7

	Reference Angle	Quadrant	Angle in Standard Position
a)	72°	IV	360° − 72° = 288°
b)	56°	II	180° − 56° = 124°
c)	18°	III	180° + 18° = 198°
d)	35°	IV	360° − 35° = 325°

Section 2.1 Page 83 Question 8

To complete the table, refer to the special triangles shown.



θ	sin θ	cos θ	tan θ
30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$
45°	$\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$	$\frac{1}{\sqrt{2}}$ or $\frac{\sqrt{2}}{2}$	1
60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$

Section 2.1 Page 84 Question 9

180° − 20.4° = 159.6°
The angle measured in standard position is 159.6°.

Section 2.1 Page 84 Question 10

a) The coordinates of the other three trees are found using symmetries of the diagram: flowering dogwood (−3.5, 2), river birch (−3.5, −2), white pine (3.5, −2).

b) For the red maple,

$$\tan\theta = \frac{2}{3.5}$$

$$\theta = \tan^{-1}\left(\frac{2}{3.5}\right)$$

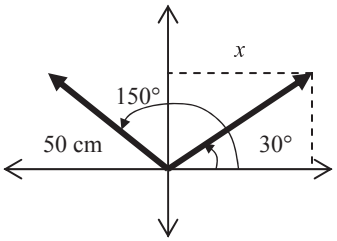
$$\theta = 29.744...$$

The angle in standard position for the red maple is 30°, to the nearest degree.

Then, the angle in standard position for the flowering dogwood is 180° − 30° or 150°, to the nearest degree. The angle in standard position for the river birch is 180° + 30° or 210°, to the nearest degree. The angle in standard position for the white pine is 360° − 30° or 330°, to the nearest degree.

c) On the grid, there are 4 vertical units of distance between the red maple and the white pine. Since each grid mark represents 10 m, the distance between these two trees is 40 m.

Section 2.1 Page 84 Question 11



$$\cos 30° = \frac{x}{50}$$
$$\frac{\sqrt{3}}{2} = \frac{x}{50}$$
$$x = 25\sqrt{3}$$

By symmetry, the horizontal distance that the tip of the wiper travels in one swipe will be $2x$, or $50\sqrt{3}$ cm.

Section 2.1 Page 84 Question 12

a) Using the symmetries of the diagram, the coordinates are A′$(x, -y)$, A″$(-x, y)$ and A‴$(-x, -y)$.

b) A′ is in quadrant IV, so $\angle A'OC = 360° - \theta$.
A″ is in quadrant II, so $\angle A''OC = 180° - \theta$.
A‴ is in quadrant III, so $\angle A'''OC = 180° + \theta$.

Section 2.1 Page 84 Question 13

$$\sin 60° = \frac{v_1}{10}$$
$$\frac{\sqrt{3}}{2} = \frac{v_1}{10}$$
$$v_1 = 5\sqrt{3}$$

$$\sin 30° = \frac{v_2}{10}$$
$$\frac{1}{2} = \frac{v_2}{10}$$
$$v_2 = 5$$

Then, $v_1 - v_2 = 5\sqrt{3} - 5$.

The exact vertical displacement of the boom is $\left(5\sqrt{3} - 5\right)$ m.

Section 2.1 Page 85 Question 14

The 72° angle is in quadrant III, so in standard position the angle is 180° + 72 ° or 252°.