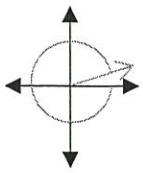
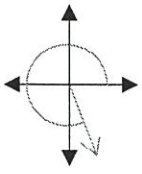
Name: Key

4.2 Angles Only

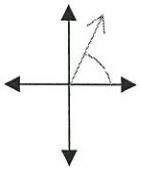
Estimate each angle below. (Answers may vary)

1) 

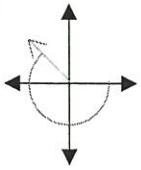
-350°

2) 

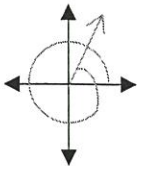
290°

3) 

60°

4) 

-225°

5) 

430°

For 7-10, identify all angles that are coterminal with each angle. Then, find one positive and one negative angle that are coterminal with each angle.

7) 75°

$75° + 360°n$

-285°

435°

8) -251°

$-251° + 360°n$

-611°

109°

9) $\frac{11\pi}{6}$

$\frac{11\pi}{6} + 2\pi n$

$-\frac{\pi}{6}$

$\frac{23\pi}{6}$

10) $-\frac{2\pi}{3}$

$-\frac{2\pi}{3} + 2\pi n$

$-\frac{8\pi}{3}$

$\frac{4\pi}{3}$

(Answers may vary)

For 11-14, convert from radians to degrees or degrees to radians respectfully. When applicable leave in terms of π.

11) $\frac{11\pi}{30}\left(\frac{180°}{\pi}\right)$

66°

12) $\frac{13\pi}{10}\left(\frac{180°}{\pi}\right)$

234°

13) 291° $\left(\frac{\pi}{180°}\right)$

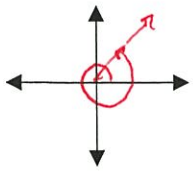
$\frac{97\pi}{60}$

14) -197° $\left(\frac{\pi}{180°}\right)$

$\frac{-197\pi}{180}$

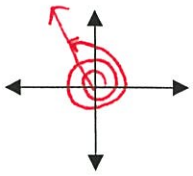
For 15-18, draw each angle. Then, if each angle is in standard position, determine a coterminal angle that is between 0° and 360°. Finally, state the quadrant in which the terminal sides lies.

15) 422°



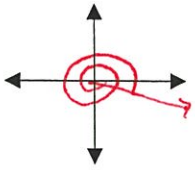
Q1, 62°

16) 840°



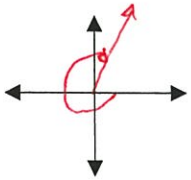
Q2, 120°

17) -724°



Q4, -356°

18) -290°



Q1, 70°

For 19-24, find the measure of each reference angle.

19) 301°

59°

20) 132°

48°

21) 623°

83°

22) -490°

50°

23) $\frac{7\pi}{4}$

$\frac{\pi}{4}$

24) $-\frac{4\pi}{3}$

$\frac{\pi}{3}$