CHAPTER 13+ ANSWERS

GEOMETRY REVIEW

1. $x = \dfrac{\sqrt{2}}{2}$, $y = \dfrac{\sqrt{2}}{2}$ 2. $x = 2$, $y = 2\sqrt{2}$ 3. $x = \dfrac{\sqrt{6}}{2}$, $y = \dfrac{\sqrt{6}}{2}$

4. $x = 2\sqrt{2}$, $y = 2\sqrt{2}$ 5. $x = \sqrt{6}$, $y = 2\sqrt{3}$ 6. $x = \dfrac{1}{4}$, $y = \dfrac{\sqrt{2}}{4}$

7. $x = 3\sqrt{3}$, $y = 6$ 8. $x = \dfrac{\sqrt{3}}{3}$, $y = \dfrac{2\sqrt{3}}{3}$ 9. $x = \dfrac{1}{2}$, $y = \dfrac{\sqrt{3}}{2}$

10. $x = \dfrac{3\sqrt{2}}{2}$, $y = \dfrac{3\sqrt{6}}{2}$ 11. $x = 2\sqrt{5}$, $y = \sqrt{15}$ 12. $x = \sqrt{2}$, $y = 2\sqrt{2}$

13. $x = 13.75$, $y = 25.94$ 14. $x = 25.55$, $y = 26.43$ 15. $x = 48.28$, $y = 69.51$

16. $x = 14.30$, $y = 18.67$ 17. $x = 55.43$, $y = 114.34$ 18. $x = 21.06$, $y = 27.95$

19. No… reasons may vary

PROBLEM SET 13-2

1. 25° 2. 215° 3, 315° 4. 4°

5. 140° 6. 150° 7. 55° 8. 180°

9. 1.00, 0.00 10. .85, .53 11. .71, – .71 12. – .87, .50

13. – .09, – 1.00 14. .98, – .17 15. – .90, .44 16. .00, 1.00

Fill in The Unit Circle

Positive:
Negative:

Positive:
Negative:

$(0, 1)$

$90°$ ___

$\left(\frac{-1}{2}, \frac{\sqrt{3}}{2}\right)$

$\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

$\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ ___

$\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

$120°$

$60°$ ___

$\left(\frac{-\sqrt{3}}{2}, \frac{1}{2}\right)$ ___

$135°$

$45°$

$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ Ex

$150°$

$30°$

$(-1, 0)$ ___ $180°$

$0°$ ___
$360°$ ___ $(1, 0)$

$210°$

$330°$

$225°$

$315°$

$\left(\frac{-\sqrt{3}}{2}, \frac{-1}{2}\right)$ ___

$240°$

$300°$ ___

$\left(\frac{\sqrt{3}}{2}, \frac{-1}{2}\right)$

$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$ ___

$\left(\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right)$

$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right)$

$270°$ ___

$\left(\frac{1}{2}, \frac{-\sqrt{3}}{2}\right)$

$(0, -1)$

Positive:
Negative:
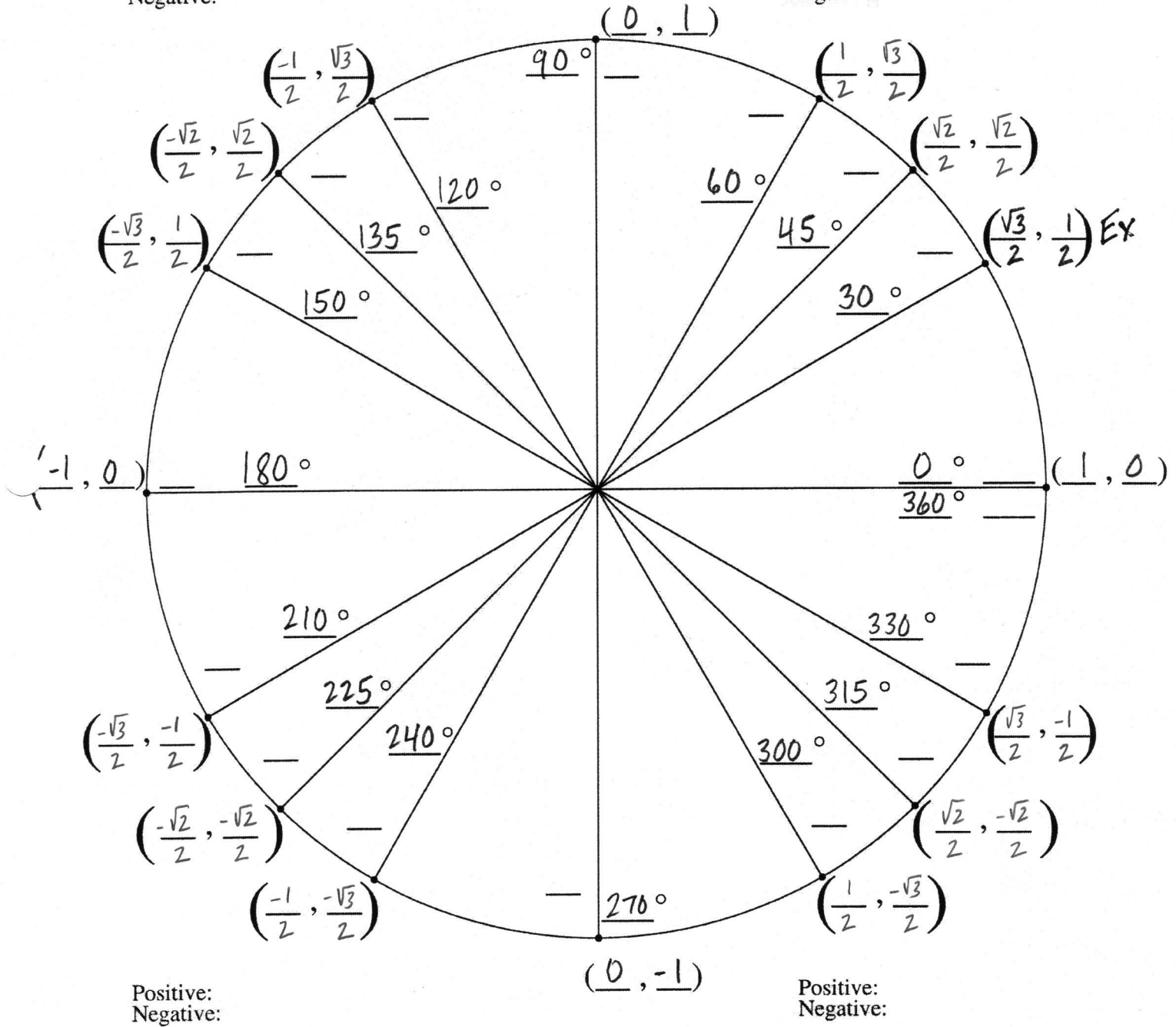
Positive:
Negative:

PROBLEM SET 13-3

1. $-\dfrac{5\pi}{3}$ **2.** $\dfrac{5\pi}{6}$ **3.** $-\dfrac{\pi}{2}$

4. $-\dfrac{\pi}{3}$ **5.** $\dfrac{8\pi}{9}$ **6.** $\dfrac{\pi}{9}$

7. $540°$ **8.** $198°$ **9.** $-120°$

10. $-172°$ **11.** $90°$ **12.** $270°$

13. III **14.** II **15.** positive *y*-axis

16. II **17.** negative *x*-axis **18.** III

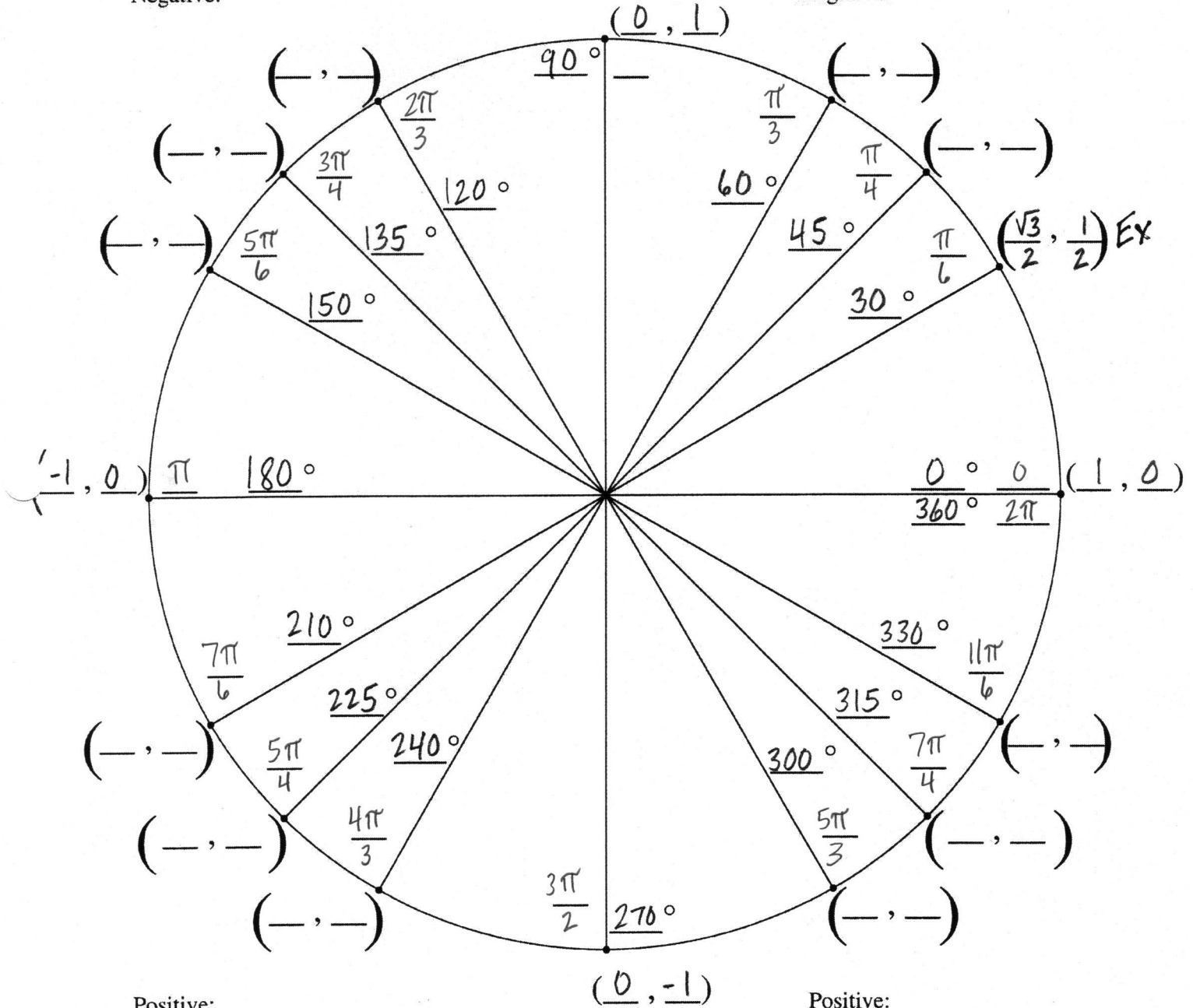**19.** $-\dfrac{3\pi}{2}$ radians **20.** $-\dfrac{11\pi}{3}$ radians **21.** $\dfrac{4\pi}{3}$ radians

22. $\dfrac{35\pi}{6}$ radians

Fill in The Unit Circle

Positive:
Negative:

Positive:
Negative:

$(0, 1)$

$90°$ ___

$(-, -)$

$\frac{2\pi}{3}$

$\frac{\pi}{3}$

$(-, -)$

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

$120°$

$60°$

$\frac{\pi}{4}$

$(-, -)$

$\frac{5\pi}{6}$

$135°$

$45°$

$\frac{\pi}{6}$

$(-, -)$

$150°$

$30°$

$\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$ Ex

$(-1, 0)$ π $180°$

$\frac{0°}{360°}$ $\frac{0}{2\pi}$ $(1, 0)$

$210°$

$330°$

$\frac{7\pi}{6}$

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

$225°$

$315°$

$(-, -)$

$\frac{5\pi}{4}$

$240°$

$300°$

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

$(-, -)$

$(-, -)$

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

$\frac{5\pi}{3}$

$(-, -)$

$\frac{3\pi}{2}$ $270°$

$(-, -)$

$(-, -)$

$(0, -1)$

Positive:
Negative:

Positive:
Negative:

PROBLEM SET 14-1 (Solutions may vary)

1. $\sec \cdot \cot = \dfrac{1}{\cos} \cdot \dfrac{\cos}{\sin} = \dfrac{1}{\sin} = \csc$ ✔

2. $\sin \cdot \sec = \sin \cdot \dfrac{1}{\cos} = \dfrac{\sin}{\cos} = \tan$ ✔

3. $\cot + \tan = \dfrac{\cos}{\sin} + \dfrac{\sin}{\cos} = \dfrac{\cos^2 + \sin^2}{\sin \cdot \cos} = \dfrac{1}{\sin \cdot \cos} = \dfrac{1}{\sin} \cdot \dfrac{1}{\cos} = \sec \cdot \csc$ ✔

4. $\sec^2 - \csc^2 = (1 + \tan^2) - (1 + \cot^2) = \tan^2 - \cot^2$ ✔

5. $\sin^2 \cot^2 + \cos^2 \tan^2 = \sin^2 \left(\dfrac{\cos^2}{\sin^2} \right) + \cos^2 \left(\dfrac{\sin^2}{\cos^2} \right) = \cos^2 + \sin^2 = 1$ ✔

6. $\sin \cdot \cot = \sin \cdot \dfrac{\cos}{\sin} = \cos$ ✔

7. $\dfrac{\sin}{\tan} = \sin \div \dfrac{\sin}{\cos} = \sin \cdot \dfrac{\cos}{\sin} = \cos$ ✔

8. $\sec - \cos = \dfrac{1}{\cos} - \cos = \dfrac{1 - \cos^2}{\cos} = \dfrac{\sin^2}{\cos} = \dfrac{\sin}{\cos} \cdot \sin = \tan \cdot \sin$ ✔

9. $(1 + \cos)(1 - \cos) = 1 - \cos^2 = \sin^2$ ✔

10. $\cos(\sec + \cos \cdot \csc^2) = \cos \cdot \sec + \cos^2 \cdot \csc^2 = \cos \left(\dfrac{1}{\cos} \right) + \cos^2 \left(\dfrac{1}{\sin^2} \right) = 1 + \cos^2 \left(\dfrac{1}{\sin^2} \right) =$

$1 + (1 - \sin^2) \left(\dfrac{1}{\sin^2} \right) = 1 + \left(\dfrac{1}{\sin^2} \right) - \left(\dfrac{\sin^2}{\sin^2} \right) = 1 + \left(\dfrac{1}{\sin^2} \right) - 1 = \left(\dfrac{1}{\sin^2} \right) = \csc^2$ ✔

11. $\left(\dfrac{1 + \tan^2}{\csc^2} \right) = \dfrac{\sec^2}{\csc^2} = \dfrac{1}{\cos^2} \div \dfrac{1}{\sin^2} = \dfrac{1}{\cos^2} \cdot \dfrac{\sin^2}{1} = \dfrac{\sin^2}{\cos^2} = \tan^2$ ✔

12. $\dfrac{\sec}{\sin} - \dfrac{\sin}{\cos} = \dfrac{\frac{1}{\cos}}{\sin} - \dfrac{\sin}{\cos} = \dfrac{1}{\cos \cdot \sin} - \dfrac{\sin}{\cos} = \dfrac{1}{\cos \cdot \sin} - \dfrac{\sin^2}{\cos \cdot \sin} = \dfrac{1 - \sin^2}{\cos \cdot \sin} = \dfrac{\cos^2}{\cos \cdot \sin} = \dfrac{\cos}{\sin} = \cot$ ✔

13. $\dfrac{\tan}{\csc} + \dfrac{\sin}{\tan} = \dfrac{\frac{\sin}{\cos}}{\frac{1}{\sin}} + \dfrac{\sin}{\frac{\sin}{\cos}} = \dfrac{\sin^2}{\cos} + \dfrac{\sin \cdot \cos}{\sin} = \dfrac{\sin^2}{\cos} + \dfrac{\cos}{1} = \dfrac{\sin^2}{\cos} + \dfrac{\cos^2}{\cos} = \dfrac{\sin^2 + \cos^2}{\cos} = \dfrac{1}{\cos} = \sec$ ✔