

Geometry Accelerated Spring Final Exam Study Guide 2025 Mr. Murphy

A.M.D.G.

To prepare for the exam, you should:

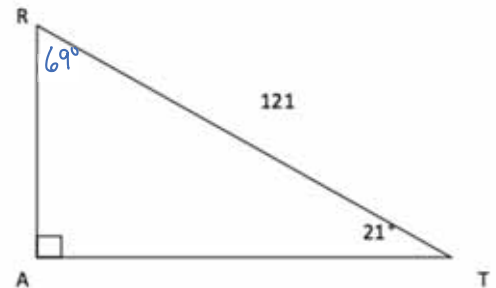
- Do these practice problems.
 - Bring your pencil, calculator, and hand-written-by-you note card no bigger than a half sheet of paper (can be front and back).
- NO LENDING OR BORROWING DURING THE EXAM!**
- Get enough sleep and eat a good breakfast.

1. Solve the right triangle below. Round your answers at 3 decimal places.

$$\frac{AR}{121} = \sin 21^\circ$$

$$AR = 121 \sin 21^\circ = 43.363$$

$$AT = \sqrt{121^2 - 43.363^2} \approx 112.963$$

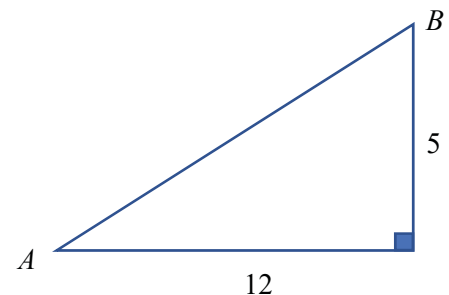


2. Solve the right triangle below including the angles. Round your answers at 3 decimal places.

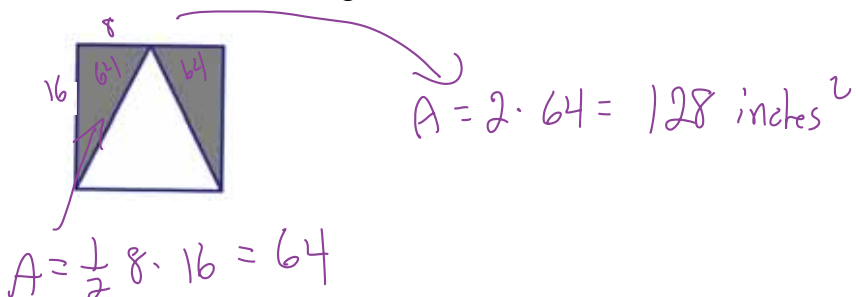
$$\tan A = \frac{5}{12} \quad \tan B = \frac{12}{5}$$

$$m\angle A = \tan^{-1}\left(\frac{5}{12}\right) \approx 22.62^\circ$$

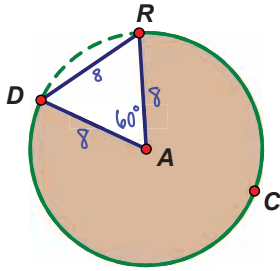
$$m\angle B = \tan^{-1}\left(\frac{12}{5}\right) \approx 67.38^\circ$$



3. Below is a triangle inside of a square. The square has a side length of 16 inches. Use this information to find the area of the shaded region.



4. In Circle A given that $\triangle RAD$ is equilateral with side lengths 8", find the exact **length** of $\widehat{RCD}$ and the area of the shaded region.

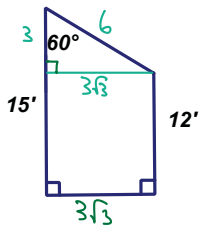


$$m \widehat{RCD} = 300^\circ$$

$$\text{So arc length } L = 300 \cdot \frac{2\pi}{360} \cdot 8 = \frac{5\pi}{3} \cdot 8 = \frac{40\pi}{3} \text{ inches}$$

$$\text{Area} = \frac{300^\circ}{360^\circ} \cdot 8^2 = \frac{5\pi}{3} \cdot 64 = \frac{160\pi}{3} \text{ inches}^2$$

5. Find the area of the trapezoid.



$$A_T = \frac{1}{2}(h_1 + h_2)b$$

$$A = \frac{1}{2}(15 + 12) 3\sqrt{3}$$

$$= \frac{1}{2}(27) 3\sqrt{3}$$

$$= \frac{81\sqrt{3}}{2}$$

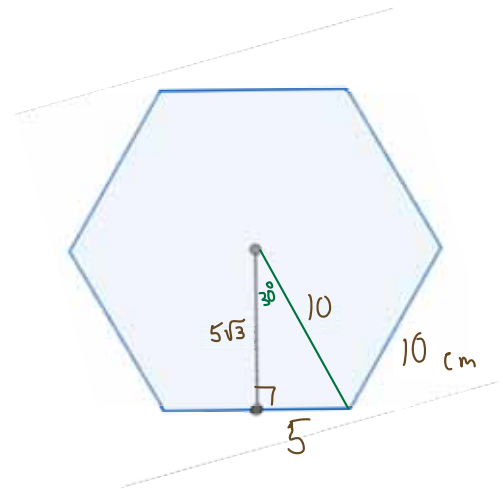
8. Find the area of a regular hexagon with side lengths of 10 cm.

$$A = \frac{1}{2} a P$$

$$= \frac{1}{2} (5\sqrt{3}) 60$$

$$= 30(5\sqrt{3})$$

$$= 150\sqrt{3} \text{ cm}^2$$



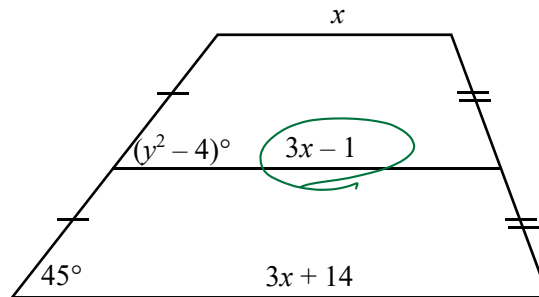
9. Find the values of x & y in the trapezoid.

$$\frac{1}{2}(x + 3x + 14) = 3x - 1$$

$$\frac{1}{2}(4x + 14) = 3x - 1$$

$$2x + 7 = 3x - 1$$

$$8 = x$$

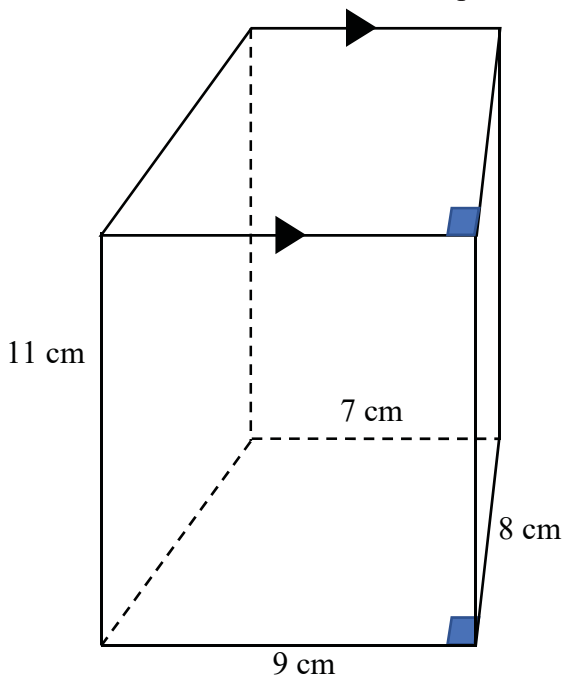


$$y^2 - 4 = 45$$

$$y^2 = 49$$

$$y = \pm 7$$

10. Find the volume of the trapezoidal prism shown below.



$$V = A_{\text{Base}} \cdot h = A_{\text{Trapezoid}} \cdot h$$

$$= \frac{1}{2}(7 + 9)8 \cdot 11 = \frac{1}{2}(16)(8) \cdot 11$$

$$= 64 \cdot 11 = 704 \text{ cm}^3$$

10. Use the values on the unit circle above to find the exact values of each of the trig expressions below.

a. $\cos 135^\circ = -\frac{\sqrt{2}}{2}$ (ref angle 45°)

QII

b. $\sin(-210^\circ) = \sin 150 = \frac{1}{2}$ (ref angle 30°)

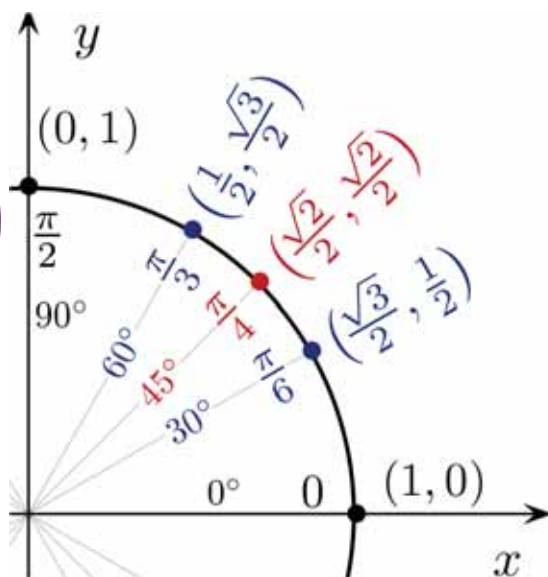
QII

c. $\cos\left(-\frac{11\pi}{6}\right) = \frac{\sqrt{3}}{2}$ (ref angle $\frac{\pi}{6}$)

QI

d. $\cos \frac{2\pi}{3} = -\frac{1}{2}$ (ref angle $\frac{\pi}{3}$)

QII



11. If $\csc A = -\frac{2}{\sqrt{3}}$ and is in quadrant IV, find each of the following:

$y = -\sqrt{3}$ $r = 2$
 $x = 1$ (QIV $x > 0$)

$\sin A = -\frac{\sqrt{3}}{2}$

$\cos A = \frac{1}{2}$

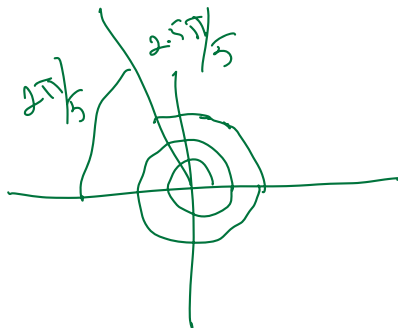
$\tan A = -\sqrt{3}$

$\csc A = -\frac{2}{\sqrt{3}}$

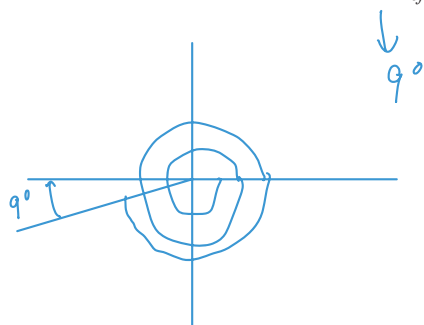
$\sec A = 2$

$\cot A = -\frac{1}{\sqrt{3}}$

12. Sketch the angle $\frac{23\pi}{5}$ and find $m\theta_{ref}$. Express all answers in radians.



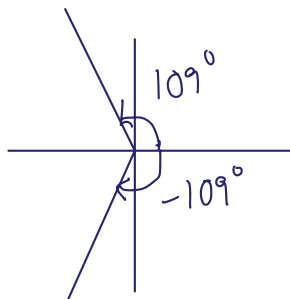
13. Sketch the angle -891° and find $m\theta_{ref}$. Express all answers in degrees



14. Find all angles in degrees:

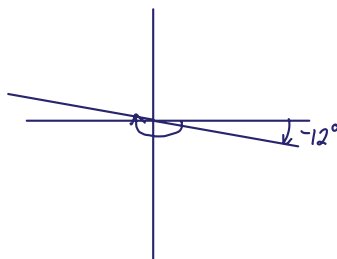
a) $\cos^{-1}(-0.3255681545)$

$\pm 109^\circ \pm 360^\circ n$



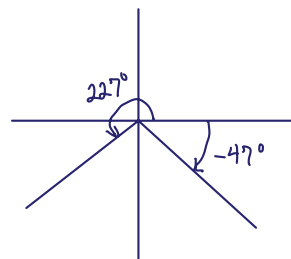
b) $\tan^{-1}(-0.2125565617)$

$-12^\circ \pm 180^\circ n$



c) $\sin^{-1}(-0.7313537017)$

$-47^\circ \pm 360^\circ n$
 $227^\circ \pm 360^\circ n$



15. Quinn, convinced that she and other classmates are being left out of math problems, takes a long walk in GG Park to calm herself. Katherine and Kiana, trying to catch up with her, get lost in the park. After entering at the south west end of the park near Ocean Beach, they first go 1.1 miles with a direction of 22° . Katherine says that if they turn and walk 1 mile with a direction of 256° , they will find her but Kiana thinks that this will take them all the way out of the park. Who is correct? How far from their starting location will they end up? Sketch the solution vectors to demonstrate your answer.

$$\vec{V} = (1.1 \cos 22^\circ) \mathbf{i} + (1.1 \sin 22^\circ) \mathbf{j}$$

$$\vec{W} = (1 \cos 256^\circ) \mathbf{i} + (1 \sin 256^\circ) \mathbf{j}$$

$$\begin{aligned} \vec{V} + \vec{W} &= (1.1 \cos 22^\circ + 1 \cos 256^\circ) \mathbf{i} + \\ &\quad (1.1 \sin 22^\circ + 1 \sin 256^\circ) \mathbf{j} \\ &= (0.7798...) \mathbf{i} + (-0.5582...) \mathbf{j} \end{aligned}$$

distance from where they started = magnitude

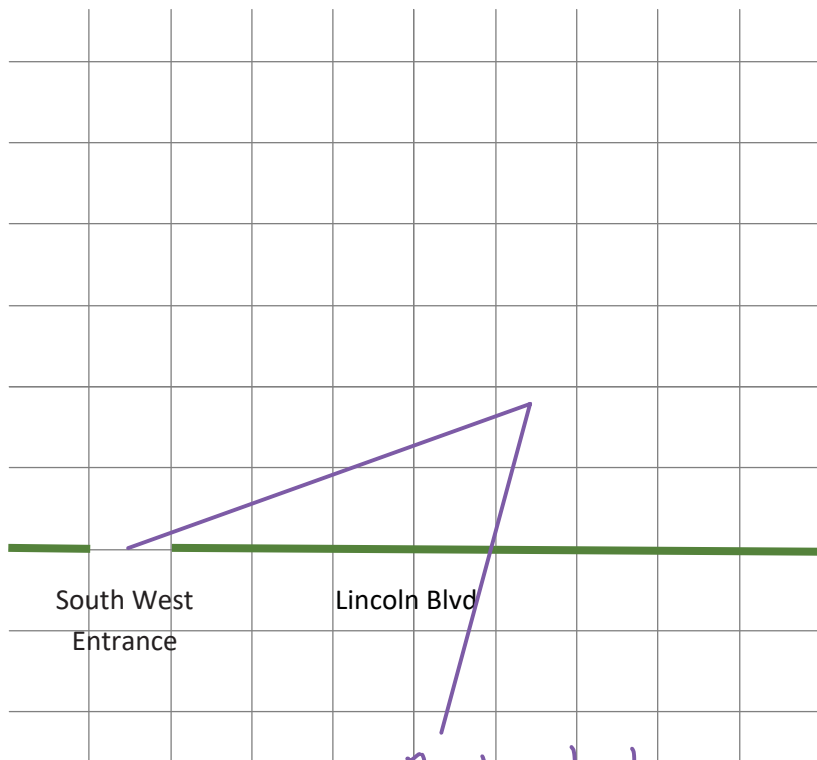
$$= \sqrt{(0.7798...) ^2 + (-0.5582...) ^2}$$

$$\approx 0.958 \text{ miles}$$

$$\text{direction } \theta = \cos^{-1} \left(\frac{0.7798...}{0.95753...} \right) \approx -35.661^\circ$$

↑
because
y is negative

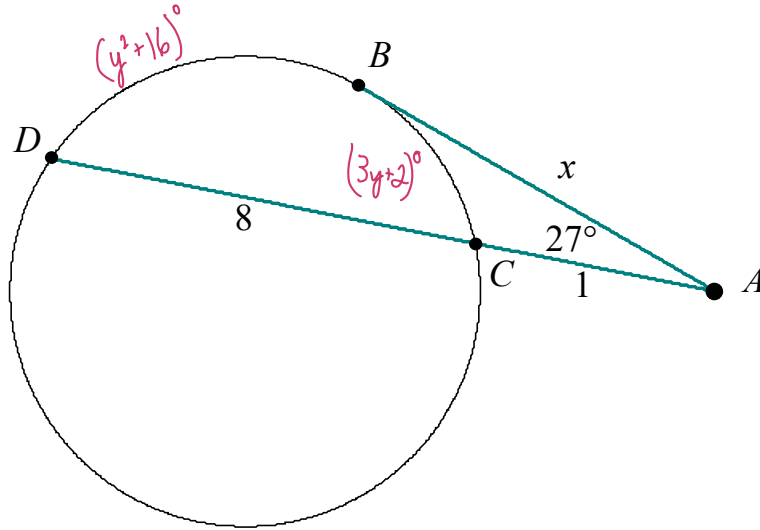
↓
this means that
they end up south east
of the entrance so



They're clearly
left the park

16. Circles

- a) Given $\overline{AB}$ is tangent to the given circle, $m\widehat{DB} = y^2 + 16$, and $m\widehat{BC} = 3y + 2$ solve for x and y



$$y^2 + 16 - (3y + 2) = 2(27^\circ)$$

$$y^2 + 16 - 3y - 2 = 54$$

$$y^2 - 3y - 40 = 0$$

$$(y + 5)(y - 8) = 0$$

$$y = -5, 8$$

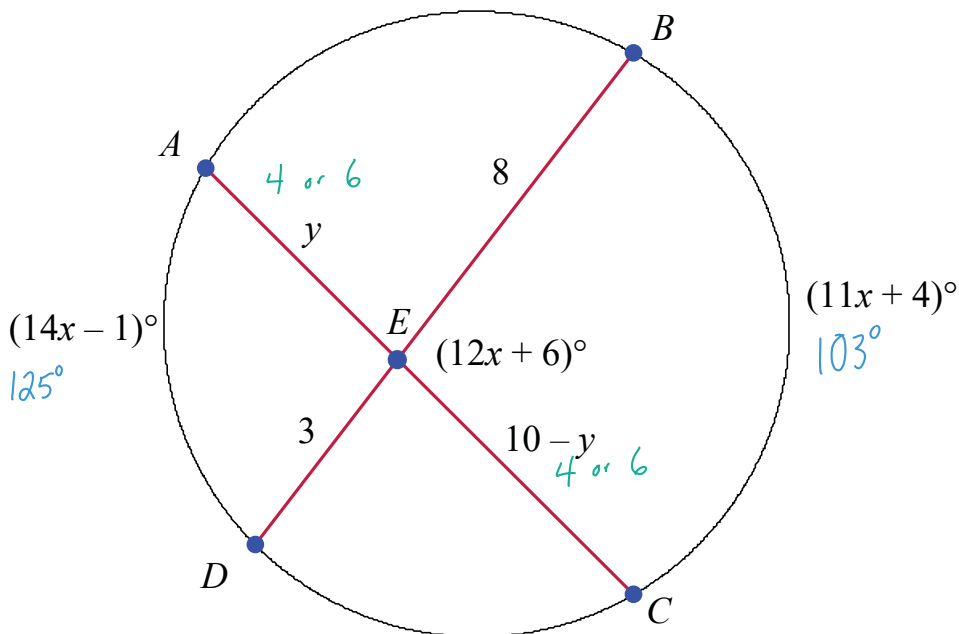
↑
produces
negative
angles

$$y = 8$$

$$m\widehat{DB} = 8^2 + 16 = 64 + 16 = 80^\circ$$

$$m\widehat{BC} = 3y + 2 = 24 + 2 = 26^\circ$$

- b) Solve for x and y



$$11x + 4 + 14x - 1 = 2(12x + 6)$$

$$25x + 3 = 24x + 12$$

$$x = 9$$

$$y(10 - y) = 3 \cdot 8$$

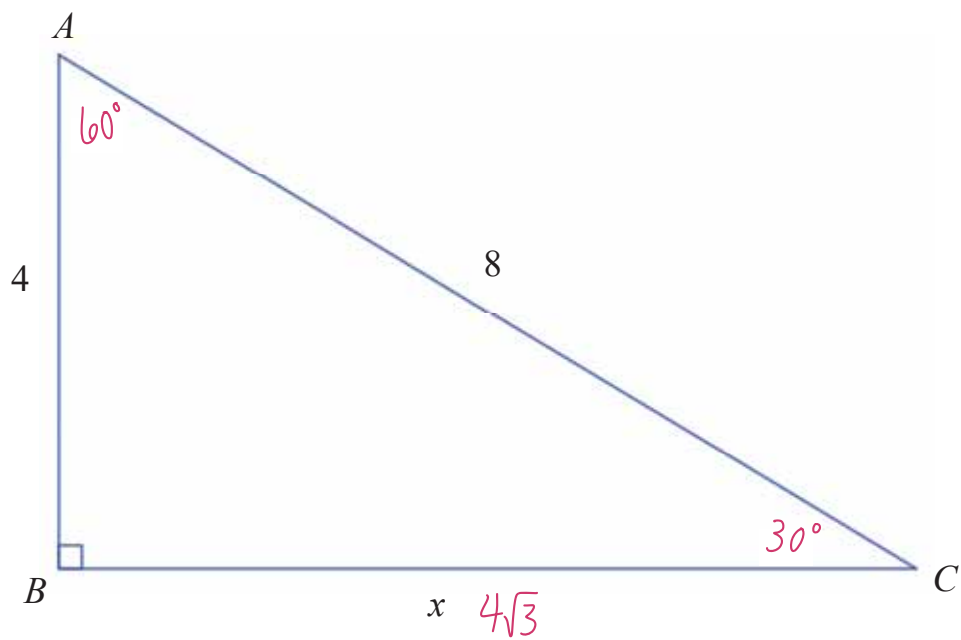
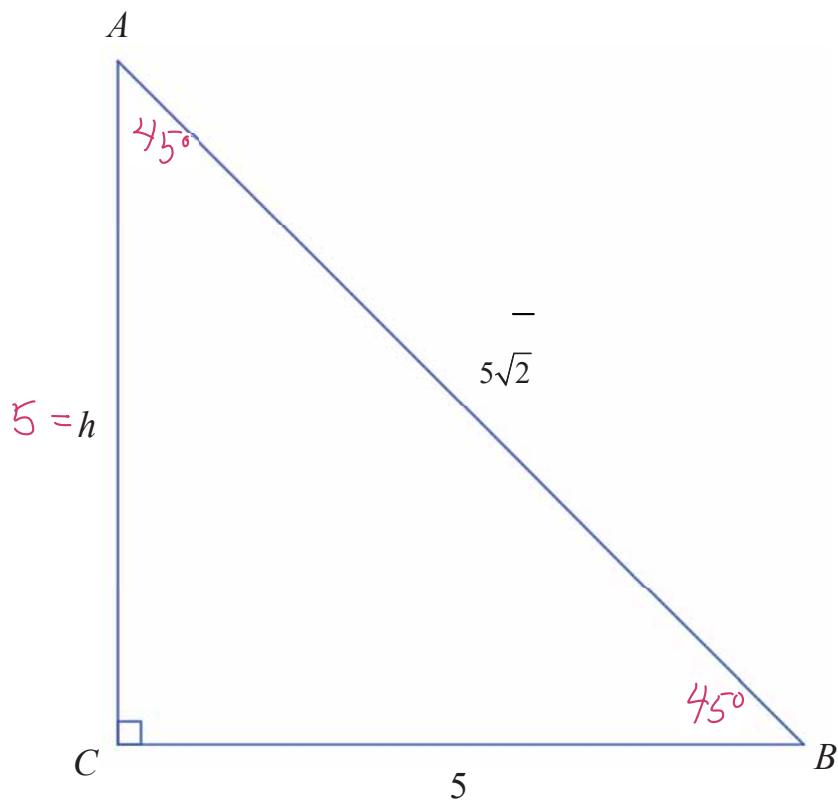
$$10y - y^2 = 24$$

$$0 = y^2 - 10y + 24$$

$$0 = (y - 6)(y - 4)$$

both values work

17. Solve for the missing sides and angles without using your calculator and expressing answers without decimals.



Standards for the Spring Final

7c	Use properties to find side lengths and angles of parallelograms
7e	Identify and verify parallelograms
7g	Use properties of special parallelograms
7h	Use properties of diagonals of special parallelograms
8b	Apply similarity relationships in right triangles to solve problems.
8c	Find the sine, cosine, and tangent of an acute angle
8d	Use trigonometric ratios to find side lengths in right triangles and to solve real-world problems
	9a-q, 10a-m, all of Chapter 11
9a	Use the Pythagorean Theorem
9d	Find Side Lengths in Special Right Triangles
9i	Use the Tangent Ratio
9l	Use the Sine and Cosine Ratios
9o	Use Inverse Trig Ratios
9p	Solve Right Triangles Completely
10c	Use properties of tangents to solve problems
10d	Apply properties of arcs
10e	Apply properties of chords
10f	Find the area of sectors
10g	Find arc lengths
10h	Find the measure of an inscribed angle
10j	Find the measures of angles formed by lines that intersect circles
10l	Find the lengths of segments formed by lines that intersect circles
10m	Use the lengths of segments in circles to solve problems
11a	Use arc lengths to find measures
11b	Express angles in degrees and radians
11c	Use the Formulas for Area of a Circle and Area of a Sector
11e-m	Areas of Polygons and Volumes of Solids
A1a	Express angles in radian measure
A1b	Convert from degrees to radians and vice versa
A2a	Measure angles as rotations
A2b	Determine reference angles
A3a	Determine trigonometric ratios for special angles in standard position
A3b	Determine the coordinates on the unit circle for terminal rays of selected rotations
A3c	Find exact values of trigonometric expressions without a calculator

A4a	Find all six exact trigonometric ratios for an angle given a coordinate point on its terminal ray
A4b	Use a calculator to find approximate trig values for a given angle
A4c	Use a calculator to find all approximate angle measures for a given trig value
A5	Prove Trigonometric Identities and use them to simplify Trigonometric equations
A6a	Find and draw a resultant vector from other component vectors.
A6b	Find the direction angle of a resultant vector from other component vectors.