

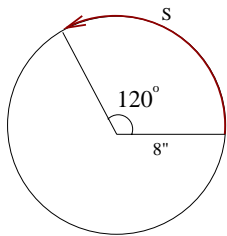
Review for EX III

MATH 150

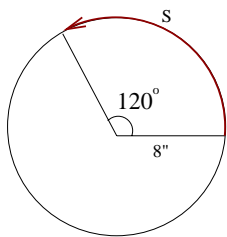
Chapters 6, 7, and 8

Drost-Fall 2004

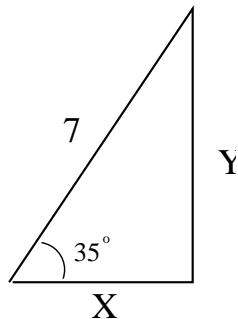
- Find the degree measure of angle $\theta = \frac{3}{5}\pi$
- Find the radian measure of angle $\beta = 225^\circ$.
- Find the length of the arc, s , of a circle of radius 8 inches if the arc subtends a central angle of 120° .



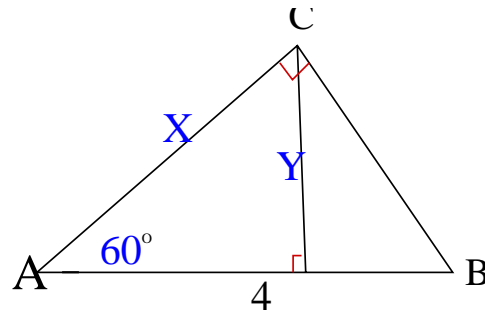
- How many revolutions will a car wheel of diameter $32''$ make over a period of 20 min if the car is traveling at 45 mph?
- Find the area of the sector in problem #3, with a 120° central angle.



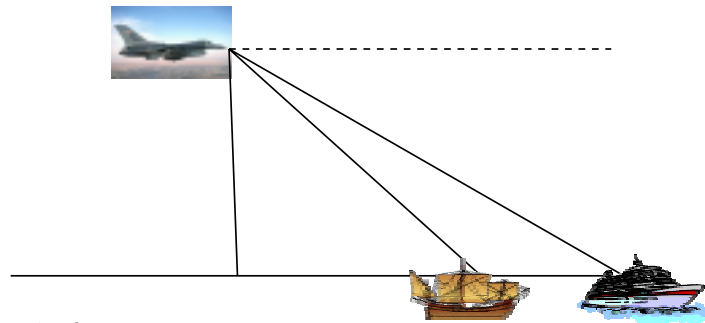
- Find the values of x and y rounded to two decimal places.



- Find the values of x and y , rounded to two decimal places.



- A pilot measures the angle of depression to two ships to be 35° and 52° . If the pilot is flying at an altitude of 32,000 feet, find the distance between the two ships.



- Find the exact value of:

a. $\cos \frac{5\pi}{6}$

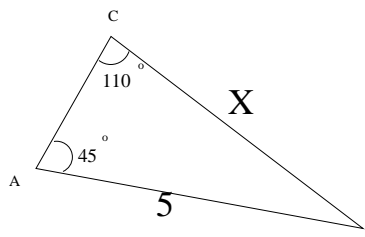
b. $\sec \frac{22}{3}\pi$

c. $\tan 585^\circ$

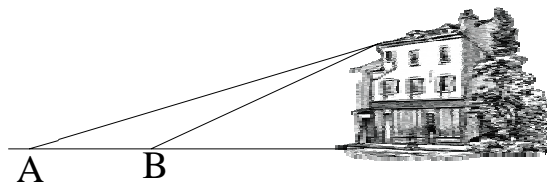
- Find $\sin \theta$, given $\sec \theta = \frac{-13}{5}$ and $\tan \theta > 0$.

11. Find $\sin 2\theta$, given $\cos \theta = \frac{-\sqrt{3}}{2}$, and $\frac{\pi}{2} < \theta < \pi$.

12. Find the side labeled x :



13. From point A, the angle of elevation to the top of the building is 18.6° . From point B, which is 150 feet closer to the building, the angle of elevation is 25.1° . How tall is the building?



14. Ship A leaves port at 10am traveling $N25^\circ W$ at 52 knots. Ship B leaves port at noon the same day heading $S75^\circ W$ at 40 knots. How far apart are they at 3pm?

15. Find the area of a triangle whose sides are of length 5, 6, and 8 inches?

16. Verify the identity:

$$\cos^2 x \csc x - \csc x = -\sin x$$

17. Verify the identity:

$$(\tan x + \cot x)^2 = \csc^2 x \cdot \sec^2 x$$

18. Solve the equation over the interval $[0, 2\pi)$:

$$4 \sin^2 x + 2 \cos^2 x = 3$$

19. Find all solutions for the following equation:

$$\frac{1 - \cos x}{1 + \cos x} = 5$$

20. Find all solutions on the interval $[0, 2\pi)$:
 $\tan 2x + \sec 2x = \sqrt{3}$

21. Find the **EXACT** value of $\cos 75^\circ$.

22. Find the **EXACT** value of $2 \sin \frac{\pi}{12} \cos \frac{\pi}{12}$.

23. Simplify: $\sin 5x \sin 2y - \cos 5x \cos 2y$

24. Find the **EXACT** value of $\sin(x + y)$ given $\sec x = \frac{3}{2}$ and $\csc y = 3$. $0 < x < \frac{\pi}{2}$, $0 < y < \frac{\pi}{2}$

25. Find the **EXACT** value of $\cos(\sin^{-1}(-\frac{3}{8}))$

Given $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$, $\mathbf{v} = 5\mathbf{i} + 12\mathbf{j}$, $\mathbf{w} = -2\mathbf{i} + 3\mathbf{j}$

26. Find $4\mathbf{u} - 2\mathbf{v}$

27. Find $\|\mathbf{w}\|$

28. Find the angle between \mathbf{v} and \mathbf{w} .

Given $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$, $\mathbf{v} = 5\mathbf{i} + 12\mathbf{j}$, $\mathbf{w} = -2\mathbf{i} + 3\mathbf{j}$

29. Find the position angle of \mathbf{u} .

30. Find the $\text{proj}_{\mathbf{u}} \mathbf{v}$

31. Are \mathbf{u} and \mathbf{w} orthogonal?

32. Find the work done by the force $\mathbf{F} = 4\mathbf{i} + 6\mathbf{j}$ in moving an object from point P (2,-5) to point Q (-1,10).

33. If a plane flying at 350 mph on a heading of $N20^\circ E$ encounters a wind of 45 mph moving $N80^\circ W$, what is the plane's resultant speed?

34. Solve the following system of equations:

$$\begin{cases} 6x - 8y = 15 \\ -\frac{3}{2}x + 2y = -4 \end{cases}$$

35. Solve the following system of equations:

$$\begin{cases} x^2 + y^2 = 8 \\ y = x + 2 \end{cases}$$

36. Graph the solution set:

$$\begin{cases} y - x^2 > 2 \\ x^2 + y^2 < 9 \end{cases}$$

37. Graph the solution:

$$\begin{cases} x + y \geq 6 \\ x < 2y + 3 \\ x \geq 1 \end{cases}$$

38. How many triangles are possible if:

$$\angle A = 60^\circ, b = 24, \text{ and } a = 21.$$

39. Creative Cabinets builds two types of cabinets. The regular model takes 4 hours to build and 30 minutes to sand. The deluxe model takes 6 hours to build and 45 minutes to sand. If the staff for building the cabinets must work at least 60 hours per week, and the sanding (done by different personnel) has available up to 12 hrs each week, set up the system of inequalities which satisfies the conditions.

40. If Creative Cabinets makes \$125 on each regular cabinet and \$175 on each deluxe model, how many should they make of each model to maximize profits?

ANSWERS:

1. 108°

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

3. $s = \frac{16}{3}\pi$

4. $s \approx 9453.8$ revolutions

5. $A = \frac{64}{3}\pi$ sq in

6. $x \approx 5.73, y \approx 4.02$

7. $x = 2, y \approx 1.73$

8. $d \approx 20,700$ feet, or 3.92 miles

9a. $\frac{-\sqrt{3}}{2}$

9b. -2

9c. 1

10. $\frac{-12}{13}$

11. $\frac{-\sqrt{3}}{2}$

12. $x \approx 3.8$

13. height ≈ 179 feet

14. distance ≈ 267 nautical miles

15. Area ≈ 15 square inches

16. $-\sin x = -\sin x$

17. $\csc^2 x \cdot \sec^2 x = \csc^2 x \cdot \sec^2 x$

18. $x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

19. $x \approx 131.8^\circ + 360^\circ \cdot n, 228.2^\circ + 360^\circ \cdot n$

20. $x = 15^\circ, 195^\circ$ or $x = \frac{\pi}{12}, \frac{13\pi}{12}$

21. $\frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4}$

22. $\frac{1}{2}$

23. $-\cos(5x + 2y)$

24. $\frac{2\sqrt{10}}{9} + \frac{2}{9}$

25. $\frac{\sqrt{55}}{8}$

26. $< 2, -40 >$

27. $\sqrt{13}$

28. $\theta \approx 56.3^\circ$

29. $\theta \approx 306.9^\circ$

30. $< \frac{-99}{25}, \frac{132}{25} >$

31. no, not orthogonal

32. 78

33. speed ≈ 345 mph

34. no solution

35. $(-1 + \sqrt{3}, 1 + \sqrt{3}), (-1 - \sqrt{3}, 1 - \sqrt{3})$

36. parabola and a circle

37. intersecting straight lines

38. 2 triangles are possible

$$\angle A = 60^\circ, \angle B_1 = 81.8^\circ, \angle C_1 = 38.2^\circ, a = 21, b = 24, c_1 = 15$$

$$\angle A = 60^\circ, \angle B_2 = 98.2^\circ, \angle C_2 = 21.8^\circ, a = 21, b = 24, c_2 = 9$$

39. r = the number of regular cabinets, d = the number of deluxe cabinets

$$4r + 6d \geq 60$$

$$\frac{1}{2}r + \frac{3}{4}d \leq 12$$

$$r \geq 0, d \geq 0$$

40. They should build 24 regular cabinets and 0 deluxe cabinets.