Honors Math II
Unit 9 midchapter review

Name Key
Period_____ Date_____

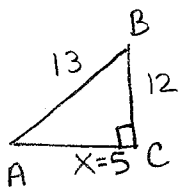
1. Given: $\sin A = \frac{12}{13}$ Find: $\cos B = ?$ $12/13$

$x^2 + 12^2 = 13^2$

$x = 5$

$\tan A = ?$ $12/5$

$\sin B = ?$ $5/13$



C = the right angle

2. Given: $\tan B = \frac{2}{3}$ Find: $\sin A = ?$ $\frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$

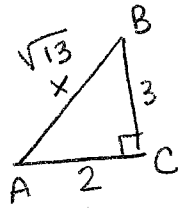
$2^2 + 3^2 = x^2$

$x = \sqrt{13}$

$\cot A = ?$ $2/3$

$\cos B = ?$

$\frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$



C = the right angle

Use the given point on the terminal side of an angle θ in standard position to evaluate the six trigonometric functions of θ. And then state the angle rotated θ to reach the terminal side and the reference angle θ'.

3. $(1, 3)$

$\sin\theta = 3/\sqrt{10} = \frac{3\sqrt{10}}{10}$

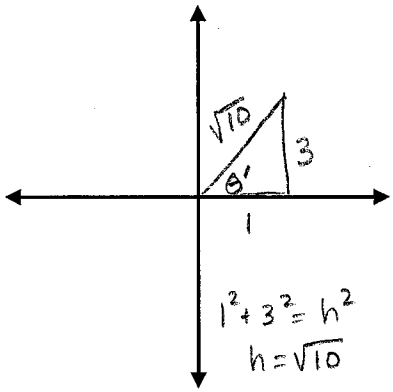
$\cos\theta = \frac{1}{\sqrt{10}} = \frac{\sqrt{10}}{10}$

$\tan\theta = \frac{3}{1} = 3$

$\csc\theta = \sqrt{10}/3$

$\sec\theta = \sqrt{10}$

$\cot\theta = 1/3$



$1^2 + 3^2 = h^2$

$h = \sqrt{10}$

reference $\angle\theta' = \tan^{-1}(3) = \theta'$ $\theta' = 71.6°$

$\theta = 71.6°$

In Quad I θ & θ' are the same

4. $(-5, 12)$

$\sin\theta = 12/13$

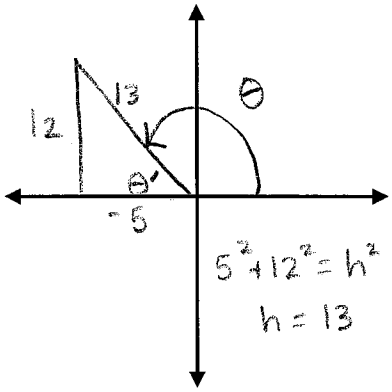
$\cos\theta = -5/13$

$\tan\theta = -12/5$

$\csc\theta = 13/12$

$\sec\theta = -13/5$

$\cot\theta = -5/12$



$5^2 + 12^2 = h^2$

$h = 13$

reference angle always positive

$\tan^{-1}(12/5) = \theta'$ $\theta' = 67.4°$

$\theta = 112.6°$

5. $(-4, -5)$

$\sin\theta = \frac{-5}{\sqrt{41}} = \frac{-5\sqrt{41}}{41}$

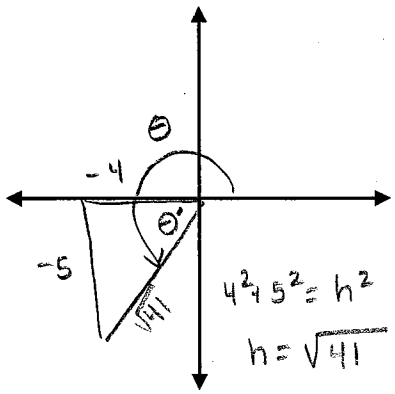
$\cos\theta = \frac{-4}{\sqrt{41}} = \frac{-4\sqrt{41}}{41}$

$\tan\theta = 5/4$

$\csc\theta = -\frac{\sqrt{41}}{5}$

$\sec\theta = -\frac{\sqrt{41}}{4}$

$\cot\theta = 4/5$



$4^2 + 5^2 = h^2$

$h = \sqrt{41}$

ref $\angle\theta' = 51.3°$ $\theta = 231.3°$

6. $(5, -3)$

$\sin\theta = \frac{-3}{\sqrt{34}} = \frac{-3\sqrt{34}}{34}$

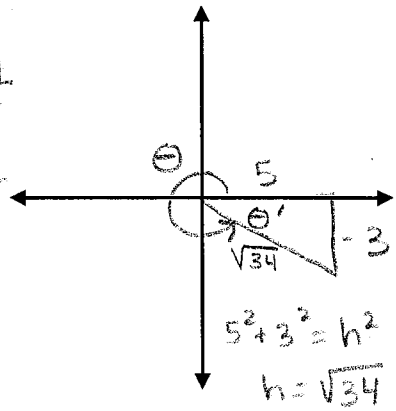
$\cos\theta = \frac{5}{\sqrt{34}} = \frac{5\sqrt{34}}{34}$

$\tan\theta = -3/5$

$\csc\theta = -\frac{\sqrt{34}}{3}$

$\sec\theta = \frac{\sqrt{34}}{5}$

$\cot\theta = -5/3$



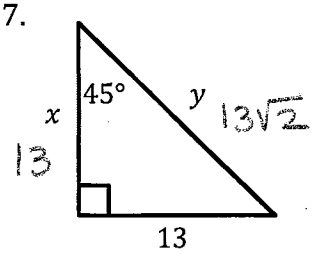
$5^2 + 3^2 = h^2$

$h = \sqrt{34}$

ref $\angle\theta' = 31°$ $\theta = 329°$

Use the special patterns to solve for x and y. (no calculator)

7.



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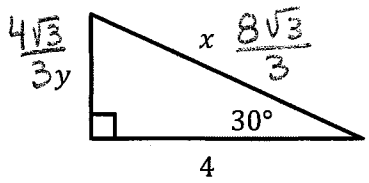
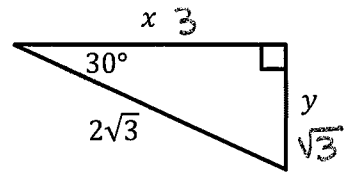
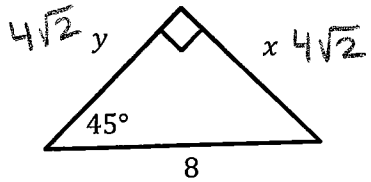


$\frac{4}{\sqrt{3}}$

9.

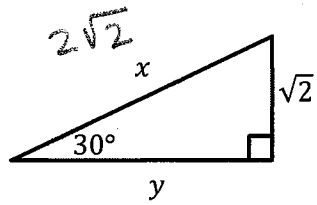


10.



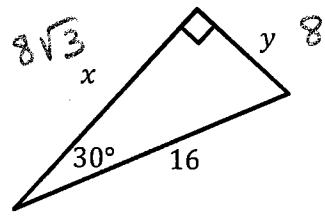
$\frac{8}{\sqrt{2}}$

11.

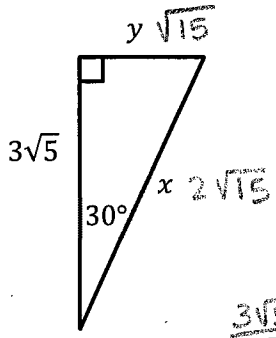


$\sqrt{6}$

12.

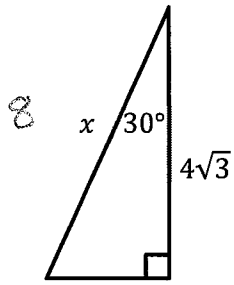


13.



$\frac{3\sqrt{5}}{\sqrt{3}} \frac{\sqrt{3}}{\sqrt{3}}$

14.



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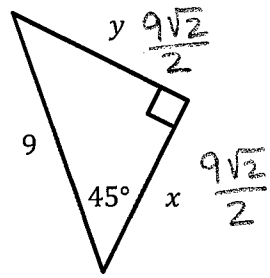
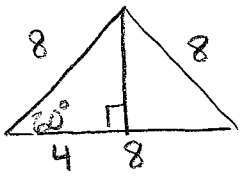
15.



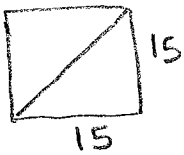
$\frac{9}{\sqrt{2}}$

16. An equilateral triangle has a side length of 8 inches. Find the length of the triangles altitude.



$h = 4\sqrt{3}$

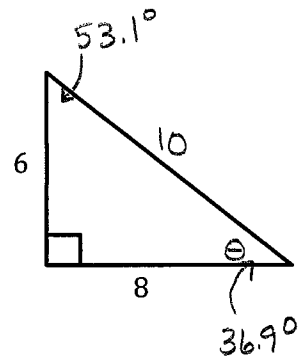
17. The perimeter of a square is 60 cm. Find the length of a diagonal.



diagonal $15\sqrt{2}$

Solve the following triangles.

18.



$6^2+8^2=h^2$

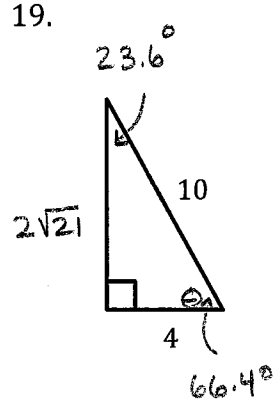
$h=10$

$\tan\theta=\frac{6}{8}$

$\tan^{-1}(6/8)=\theta$

$\theta=36.9°$

19.



$x^2+4^2=10^2$

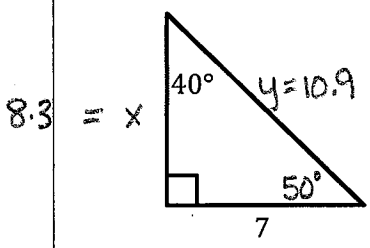
$x=\sqrt{84}=2\sqrt{21}$

$\cos\theta=\frac{4}{10}$

$\cos^{-1}(4/10)=\theta$

$\theta=66.4°$

20.



$\tan 50°=\frac{x}{7}$

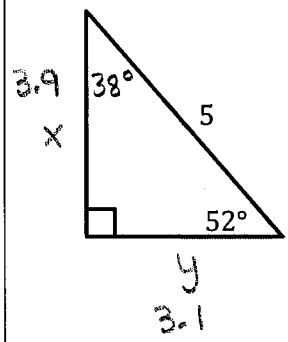
$7\tan 50°=x$

$x=8.3$

$\cos 50°=\frac{7}{y}$

$y=\frac{7}{\cos 50°}=10.9$

21.



$\sin 52°=\frac{x}{5}$

$5\sin 52°=x$

$x=3.9$

$\cos 52°=\frac{y}{5}$

$5\cos 52°=y$

$y=3.1$

Convert the following angles from degrees to radians or radians to degrees.

22. 120°

$120°(\pi/180°)=\frac{2\pi}{3}$

23. −250°

$-250°\left(\frac{\pi}{180°}\right)=\frac{-25\pi}{18}$

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

$\frac{2\pi}{3}\left(\frac{180°}{\pi}\right)=120°$

25. 5.67

$5.67\left(\frac{180°}{\pi}\right)=$

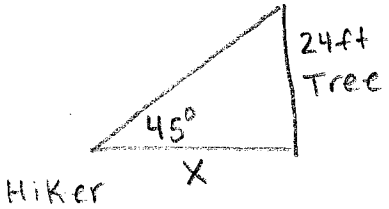
26. $\frac{11\pi}{6}$

$\frac{11\pi}{6}\left(\frac{180°}{\pi}\right)=330°$

27. 45°

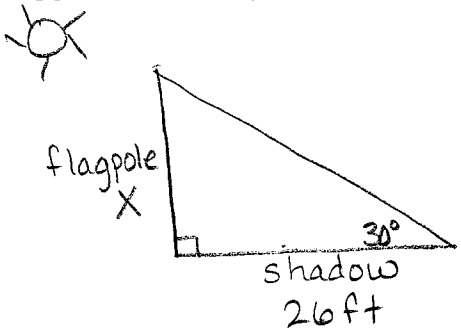
$45°\left(\frac{\pi}{180°}\right)=\frac{\pi}{4}$

28. A hiker stands x feet from the base of a 24 foot tall tree. The angle of elevation to the top of the tree is 45° . How far is the hiker from the base of the tree?



$x=24$ ft

29. A flagpole projects a show that is 26 feet long. The angle of elevation to the sun is 30°. What is the approximate height of the flagpole?

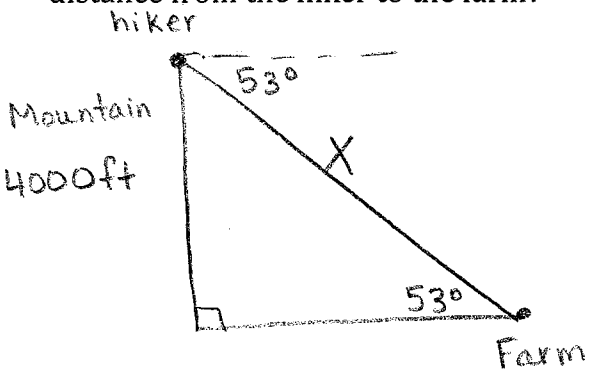


$\tan 30° = \frac{x}{26}$

$x = 26 \tan 30°$

$x = 15.01$ ft or $\frac{26\sqrt{3}}{3}$ if use special patterns

30. A hiker at the top of a 4000 foot mountain sees a farm at an angle of depression of 53°. What is the distance from the hiker to the farm?



$\sin 53° = \frac{4000}{x}$

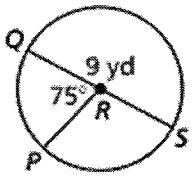
$x = \frac{4000}{\sin 53°}$

$x = 5008.5$ ft

31. Find:

arc length of $\widehat{PQ}$

$75°\left(\frac{\pi}{180°}\right) = \frac{5\pi}{12}$



$S = 4.5\left(\frac{5\pi}{12}\right)$

$S = \frac{15\pi}{8}$ or

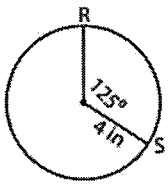
$S = 5.9$ yd

diameter: 9

Radius: 4.5

32. Find arc length $\widehat{RS}$

$125°(\pi/180°)$



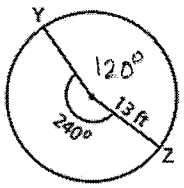
$S = 4\left(\frac{25\pi}{36}\right)$

$S = \frac{25\pi}{9}$ or

$S = 8.7$ in

33. Find arc length $\widehat{YZ}$ ← shortest arc length

$120°(\pi/180°)$



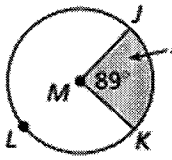
$S = 13\left(\frac{2\pi}{3}\right)$

$S = \frac{26\pi}{3}$ or

$S = 27.2$ ft

34. Find the radius.

$A = \frac{1}{2} r^2 \theta$



$(89°)(\pi/180°)$

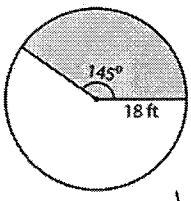
$12.36 = \frac{1}{2} r^2 \left(\frac{89\pi}{180}\right)$

$24.72 = \left(\frac{89\pi}{180}\right) r^2$

$r^2 = (24.72)\left(\frac{180}{89\pi}\right)$

$r^2 = 15.91$ $r = 3.98$m

35. Find the area of the shaded region.



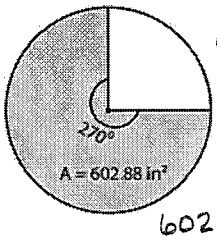
$\theta = 145°(\pi/180°)$

$\theta = \frac{29\pi}{36}$

$A = \frac{1}{2}(18)^2\left(\frac{29\pi}{36}\right)$

$A = 409.97$ ft²

36. Find the radius.



$\theta = 270°\left(\frac{\pi}{180°}\right)$

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

$602.88 = \frac{1}{2} r^2 \left(\frac{3\pi}{2}\right)$

$1205.76 = r^2 (3\pi/2)$

$r^2 = 1205.76 (2/3\pi)$

$r^2 = 255.87$

$r = 15.99$ in