Alg 2 Ch 13 Test Review

Sec 13-1 to 13-5, 13-7, Unit Circle Spring 2019

Round decimal answers to the nearest hundredth unless otherwise noted. Give degree answers to the nearest hundredth and radian answers as reduced fractions and in terms of π.

1. Find both a positive and a negative coterminal angle for the given angle. Give your answer in the same form as the original angle.

a) $-\frac{56\pi}{13}$ b) $752°$ c) $-1960°$ d) $\frac{18\pi}{7}$

2. Find the measure of an angle between $0°$ and $360°$ (0 to 2π) that is coterminal with each given angle. Give your answer in the same form as the original angle.

a) $745°$ b) $-395°$ c) $\frac{19\pi}{4}$ d) $\frac{-25\pi}{6}$

3. Convert each radian measure into degrees. Round to the nearest hundredth when needed.

a) $\frac{7\pi}{15}$ b) $\frac{13\pi}{8}$

4. Convert each degree measure into radians. Leave answer in term of π and reduce.

a) $600°$ b) $72°$

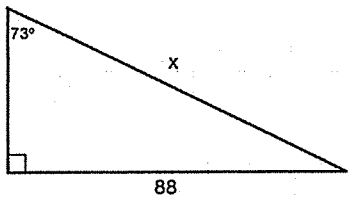
5. Use the Unit Circle to find the exact values of each. Simplify and rationalize fractions as necessary.

a) $\sin 630°$ b) $\cos 510°$ c) $\tan\frac{2\pi}{3}$ d) $\cos\frac{10\pi}{3}$ e) $\sin(-30°)$ f) $\tan 9\pi$

g) $\tan 270°$ h) $\tan\frac{5\pi}{4}$ i) $\sin\frac{13\pi}{4}$ j) $\cos(-\frac{7\pi}{6})$ k) $\tan\frac{\pi}{6}$

6. Find the value of x in each triangle to the nearest hundredth.

a)



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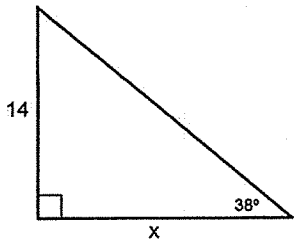

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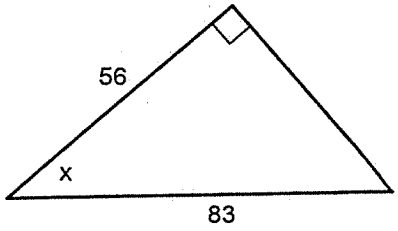

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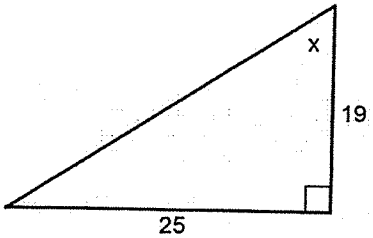

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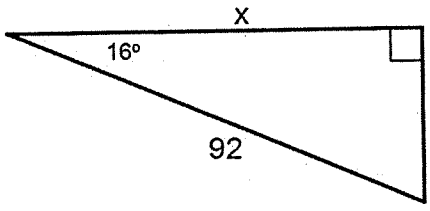

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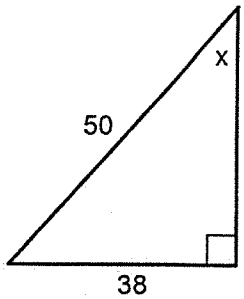

7. To get a motorcycle into the back of a truck the owner needs a ramp. The back of the truck is 42 inches off the ground. The ramp is designed to make a $35°$ with the ground. Find the length of a board needed to make the ramp.

8. As a plane just crosses over the local river the pilot sees the end of the runway with an angle of depression of $21°$. At that instant the plane is at an altitude of 1500 ft. How far from the end of the runway is the river?

9. A scientist holding onto the rope attached to a weather balloon at eye level sees the balloon with an angle of elevation of $77°$. The scientists eyes are 6ft aboe the ground. If the rope is 200 feet long find the height of the balloon.

10. Are these angles coterminal?

a) $-841°$ and $1859°$ b) $-\frac{17\pi}{6}$ and $\frac{31\pi}{6}$ c) $2540°$ and $4700°$ d) $\frac{11\pi}{13}$ and $\frac{102\pi}{13}$

11. State in which Quadrant or on which Axis the terminal side of each angle is located?

a) $1702°$ b) $\frac{25\pi}{2}$ c) $-793°$ d) $1955°$ e) $-2610°$

f) $-\frac{37\pi}{3}$ g) $\frac{50\pi}{7}$ h) $2880°$ i) 41π j) $\frac{74\pi}{11}$

12. Find all angles between $0°$ and $360°$ that meet the given condition.

a) $\text{Sin}\theta = \frac{1}{2}$ b) $\text{Cos}\theta = -\frac{\sqrt{2}}{2}$ c) $\text{Sin}\theta = -1$ d) $\text{Tan}\theta = \sqrt{3}$

e) $\text{Cos}\theta = 0$ f) $\text{Tan}\theta = -\frac{\sqrt{3}}{3}$ g) $\text{Sin}\theta = \frac{\sqrt{3}}{2}$ h) $\text{Tan}\theta$ is undefined.

i) $\text{Cos}\theta = -\frac{1}{2}$ j) $\text{Tan}\theta = 1$ k) $\text{Cos}\theta = \frac{\sqrt{3}}{2}$ m) $\text{Tan}\theta = 0$

13. Given $\text{Tan}\theta > 0$ and $\text{Sin}\theta = -\frac{\sqrt{3}}{2}$, Find the measure of θ $(0° \leq \theta \leq 360°)$.

14. Given $\text{Tan}\theta = -\sqrt{3}$ and $270° \leq \theta \leq 360°$ find $\text{Sin}\theta$.

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15. State the amplitude and period of each function. Give the period in radians.

a) $y = 5\sin(8x)$ b) $y = 7\cos(\frac{4x}{5})$

16. Graph one period of each. Label the coordinates of all maximums, minimums, and pts on the midline.

a) $y = 3\text{Sin}(3x)$ b) $y = -4\text{Cos}\left(\frac{x}{5}\right)$

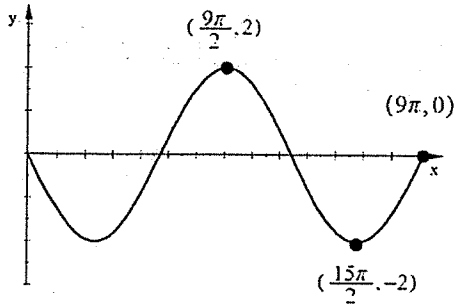
17. State the Phase Shift(distance and direction) and the equation of the midline for each function.

a) $y = 6\sin(4(x - \frac{\pi}{4})) + 7$ b) $y = -3\cos(\frac{1}{4}(x + \pi)) - 2$

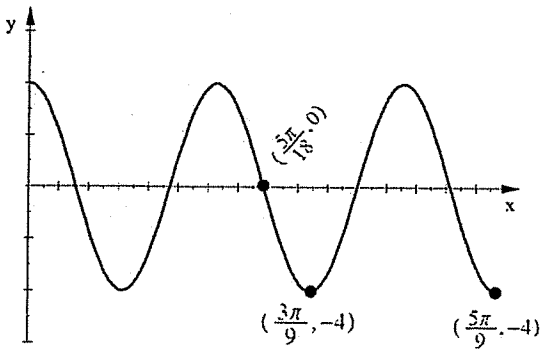
18.Graph one period of each. State the coordinates of all maximums, minimums, and pts on the midline.

a) $y = -5\text{Sin}(6(x - \frac{5\pi}{6})) + 2$ b) $y = 9\text{Cos}(7(x + \frac{\pi}{4})) - 5$

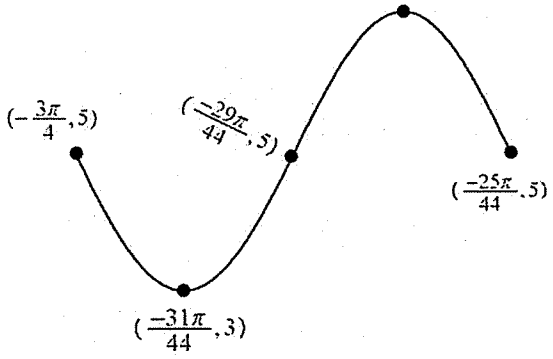
19. Write a Sin equation for this graph



20. Write a Cos equation for this graph.

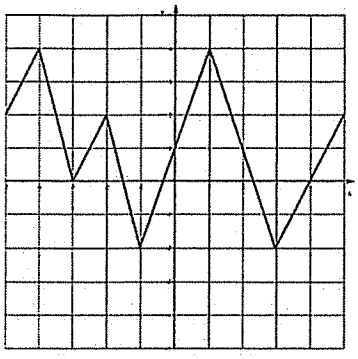


21. Write both a sine and cosine equation for this function.



22. State if each function is periodic. If yes, state the amplitude, period, and eq for midline

a)



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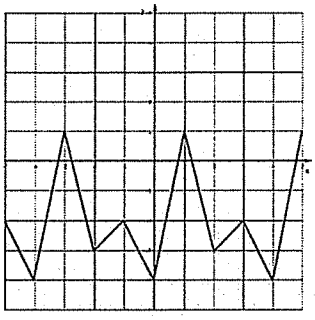

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ANSWERS

1. There is an infinite number of possible answers. Some of the more common answers are given.

a) *Pos* : $\frac{22\pi}{13}, \frac{48\pi}{13}, \ldots$ *Neg* : $\frac{-4\pi}{13}, \frac{-30\pi}{13}, \frac{-82\pi}{13}, \ldots$ b) *Pos* : $32°, 392°, 1112°, \ldots$ *Neg* : $-328°, -688°, \ldots$

c) *Pos* : $200°, 560°, \ldots$ *Neg* : $\ldots -1600° - 2320°, \ldots$ d) *Pos* : $\frac{4\pi}{7}, \frac{32\pi}{7}, \ldots$ *Neg* : $\frac{-10\pi}{7}, \frac{-24\pi}{7}, \ldots$

2. a) $25°$ b) $325°$ c) $\frac{3\pi}{4}$ d) $\frac{11\pi}{6}$ 3. a) $84°$ b) $292.5°$ 4. a) $\frac{10\pi}{3}$ b) $\frac{2\pi}{5}$

5. a) -1 b) $\frac{-\sqrt{3}}{2}$ c) $-\sqrt{3}$ d) $-\frac{1}{2}$ e) $-\frac{1}{2}$ f) 0 g) *Undefined* h) 1 i) $\frac{-\sqrt{2}}{2}$ j) $\frac{-\sqrt{3}}{2}$ k) $\frac{\sqrt{3}}{3}$

6. a) $x = 92.02$ b) $x = 17.92$ c) $x = 47.57°$ d) $x = 52.77°$ e) $x = 88.44$ f) $x = 49.46°$

7. Ramp=73.22 inches long

8. $x = 3907.63$ ft

9. $x = 194.87$ ft Total height above the ground $= 194.87 + 6 = 200.87$ ft

10. a) No b) Yes c) Yes d) No

11. a) Quad III b) Pos y-axis c) Quad IV d) Quad II e) Neg y-axis f) Quad IV
g) Quad III h) Pos x-axis i) Neg x-axis j) Quad II

12. a) $30°, 150°$ b) $135°, 225°$ c) $270°$ d) $60°, 240°$ e) $90°, 270°$ f) $150°, 330°$ g) $60°, 120°$
h) $90°, 270°$ i) $120°, 240°$ j) $45°, 225°$ k) $30°, 330°$ m) $0°, 180°, 360°$

13. $\theta = 240°$ 14. $\text{Sin}\theta = -\frac{\sqrt{3}}{2}$

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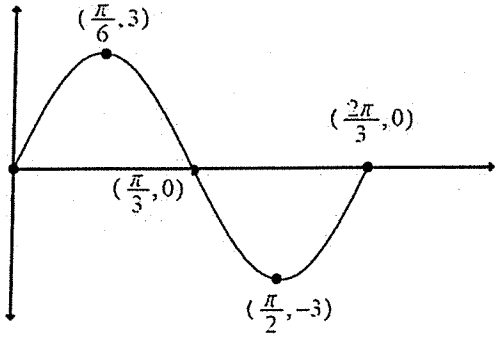
15. a) Amp= 5 Period= $\frac{\pi}{4}$ b) Amp= 7 Period= $\frac{5\pi}{2}$

16a)



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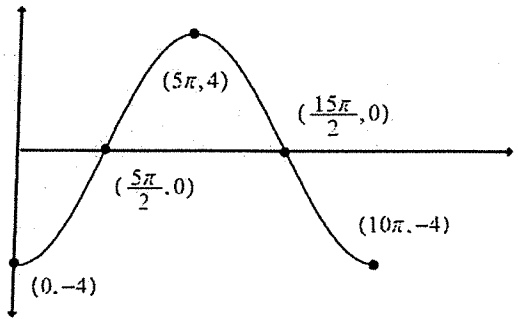
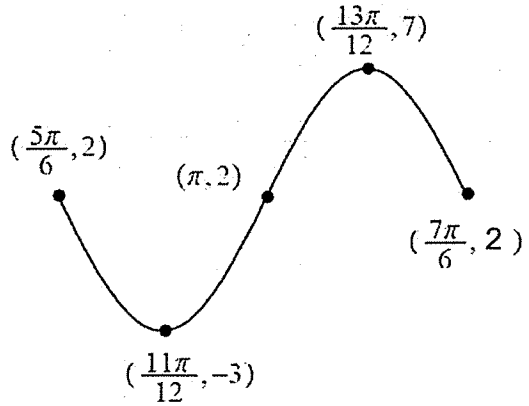


17. a) Phase Shift: $\frac{\pi}{4}$ right, Midline: $y = 7$ b) Phase Shift: π left, Midline: $y = -2$

18. a)



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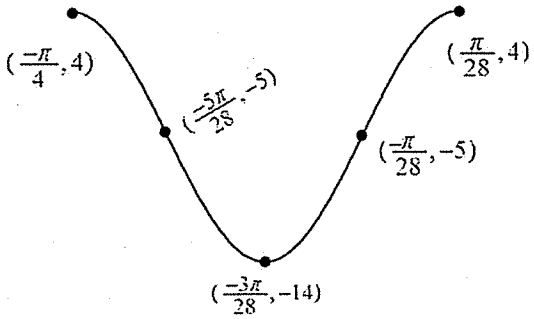

19. $y = -2\text{Sin}\left(\frac{x}{3}\right)$ 20. $y = 4\text{Cos}9x$

21. Other answers are possible depending on the starting point you pick. Below are some example answers.
$y = -2\text{Sin}(11(x + \frac{3\pi}{4})) + 5$ $y = -2\text{Cos}(11(x + \frac{31\pi}{44})) + 5$

22. a) Not Periodic b) Periodic. Amp= 2.5, Period= 4, Midline: $y = -1.5$