Name: J Jones Class: Date:

Math Analysis REVIEW 4.3-4.7 E

S | A
T | C

Indicate the answer choice that best completes the statement or answers the question.

1. Suppose θ is an angle in the standard position whose terminal side is in Quadrant IV and $\cot\theta = -\frac{9}{18}$. Find the exact values of the five remaining trigonometric functions of θ.

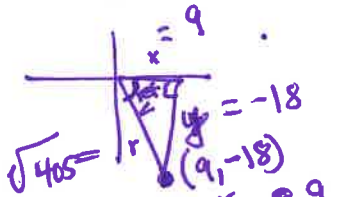
Not SRF

a. $\sin\theta = \frac{\sqrt{405}}{18}, \cos\theta = -\frac{\sqrt{405}}{9}, \csc\theta = \frac{18}{\sqrt{405}}, \sec\theta = -\frac{9}{\sqrt{405}}, \tan\theta = -\frac{9}{18}$

b. $\sin\theta = -\frac{9}{\sqrt{405}}, \cos\theta = \frac{18}{\sqrt{405}}, \csc\theta = -\frac{\sqrt{405}}{9}, \sec\theta = \frac{\sqrt{405}}{18}, \tan\theta = -\frac{18}{9}$

c. $\sin\theta = -\frac{18}{\sqrt{405}}, \cos\theta = \frac{9}{\sqrt{405}}, \csc\theta = -\frac{\sqrt{405}}{18}, \sec\theta = \frac{\sqrt{405}}{9}, \tan\theta = -\frac{18}{9}$

d. $\sin\theta = -\frac{18}{\sqrt{405}}, \cos\theta = \frac{9}{\sqrt{405}}, \csc\theta = -\frac{\sqrt{405}}{9}, \sec\theta = \frac{\sqrt{405}}{18}, \tan\theta = -\frac{18}{9}$



$\sqrt{405}$

$\cot\theta = \frac{x}{y} = \frac{9}{-18}$

$r = \sqrt{9^2 + 18^2}$

$r = \sqrt{405}$

$\sin\theta = \frac{-18}{\sqrt{405}}$ $\cos\theta = \frac{9}{\sqrt{405}}$ $\csc\theta = -\frac{\sqrt{405}}{18}$ $\sec\theta = \frac{\sqrt{405}}{9}$ $\tan\theta = \frac{-18}{9}$

2. Find the exact value of $\cos\left(\frac{9\pi}{4}\right)$.

a. 1 b. $\frac{\sqrt{2}}{2}$

c. $\frac{\sqrt{3}}{2}$ d. 0

Ref ∠ $\frac{9\pi}{4} - 2\pi$

$\frac{9\pi}{4} - \frac{8\pi}{4}$

$\frac{\pi}{4}$

ref ∠ $= \frac{\pi}{4}$ cos θ is pos

$\cos\left(\frac{9\pi}{4}\right) =$

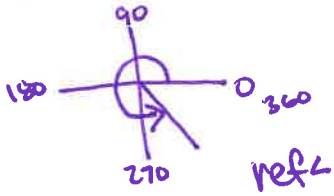
$= + \cos\frac{\pi}{4}$

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

3. Find the reference angle for 293°.

a. 84° b. 54°

c. 67° d. 113°



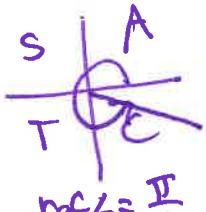
ref ∠ = 360 − 293

= 67°

4. Find the exact value of $\cos\frac{11\pi}{6}$.

a. $\frac{1}{2}$ b. $-\frac{\sqrt{3}}{2}$

c. $\frac{\sqrt{3}}{2}$ d. undefined



Ref ∠

$2\pi - \frac{11\pi}{6}$

$\frac{12\pi}{6} - \frac{11\pi}{6}$

$\frac{\pi}{6}$

ref ∠ $= \frac{\pi}{6}$

cos θ is pos

$\cos\frac{11\pi}{6} = + \cos\frac{\pi}{6}$

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

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5. Find the amplitude, period, and phase shift of $f(x) = -2\sin(3x - 9)$.

a. amplitude $= -2$, period $= 2\pi$, phase shift $= -3$

b. amplitude $= 4$, period $= \frac{\pi}{3}$, phase shift $= 3$

c. amplitude $= -2$, period $= \frac{2\pi}{3}$, phase shift $= -3$

d. amplitude $= 2$, period $= \frac{2\pi}{3}$, phase shift $= 3$

$y = a\sin(bx+c) + d$

amp $= |a| = 2$

period $= \frac{2\pi}{|b|} = \frac{2\pi}{3}$

phase shift $= -\frac{c}{|b|} = \frac{--9}{3} = 3$

(vert. shift is d)

6. Write an equation of the cosine function with amplitude 3 and period 6π.

a. $y = -3\cos\left(\frac{1}{6}x\right)$ b. $y = -\frac{1}{3}\cos\left(\frac{1}{3}x\right)$

c. $y = 3\cos\left(\frac{1}{3}x\right)$ d. $y = \frac{1}{3}\cos\left(\frac{1}{6}x\right)$

$a = 3$ period $= \frac{2\pi}{|b|}$

$|b| = \frac{2\pi}{\text{period}} = \frac{2\pi}{6\pi} = \frac{1}{3}$

$y = 3\cos\left(\frac{1}{3}x\right)$

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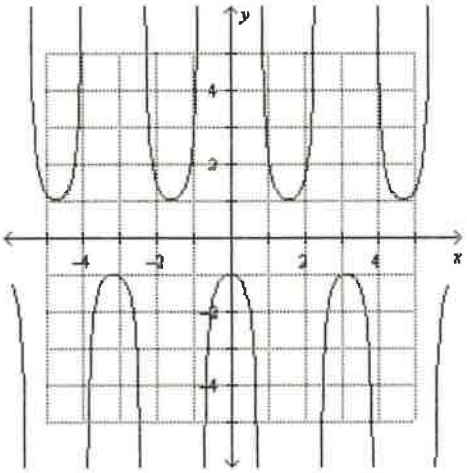
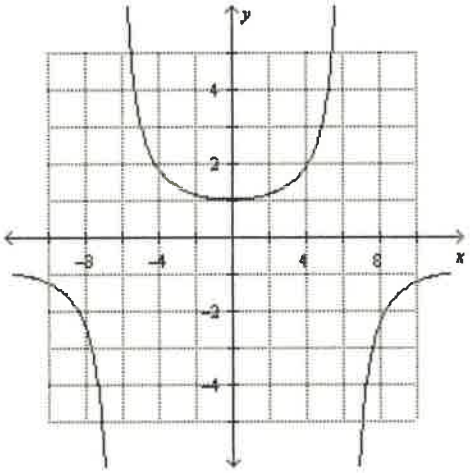
7. Graph $y = \sec\left(\frac{1}{4}\theta + \pi\right)$

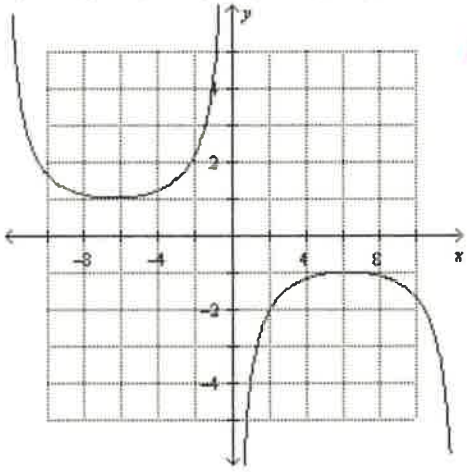
a.



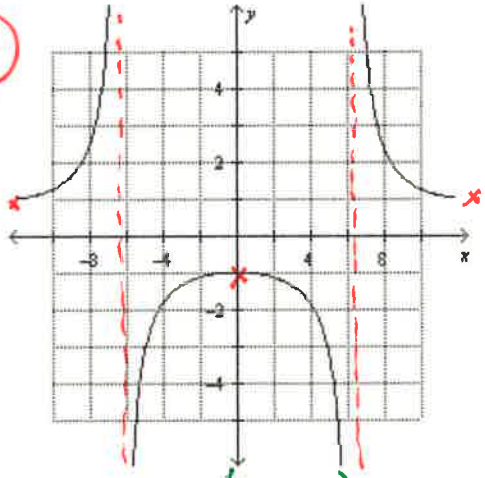
b.



c.



d.



$\sec\theta = \frac{1}{\cos\theta}$

$= \frac{1}{\cos\left(\frac{1}{4}\theta + \pi\right)}$

Graph of $\cos\left(\frac{1}{4}\theta + \pi\right)$

period $= \frac{2\pi}{\frac{1}{4}} = 8\pi$

Start

$\frac{\theta}{4} + \pi = 0$

$\frac{\theta}{4} = -\pi$

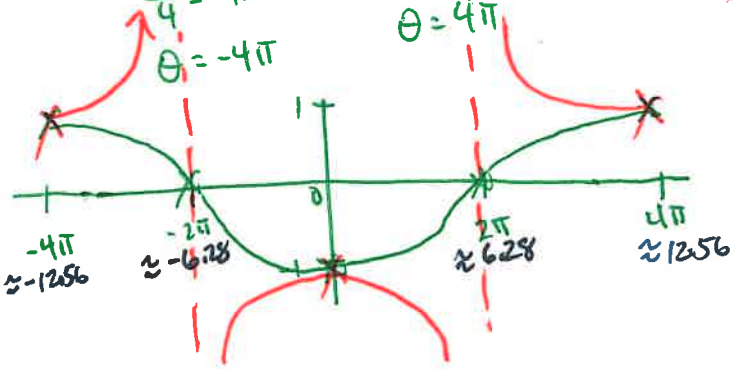
$\theta = -4\pi$

End

$\frac{\theta}{4} + \pi = 2\pi$

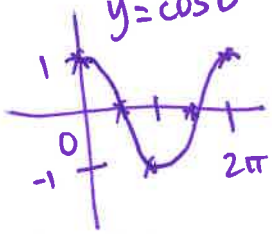
$\frac{\theta}{4} = \pi$

$\theta = 4\pi$



Graph of $\cos\theta$

$y = \cos\theta$



$y = \sec\left(\frac{1}{4}\theta + \pi\right)$

- has asymptotes when "green" ← graph is zero
- equals 1 or -1 when "green" graph is 1 or -1

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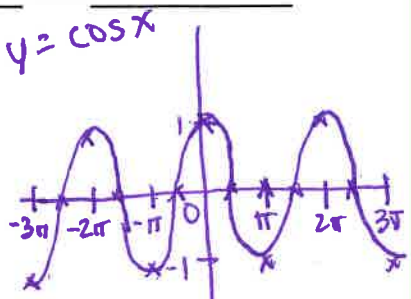
$f(x) = 4x^2$

$-f(x) = -4x^2$

$y = -4x^2 \cos x$

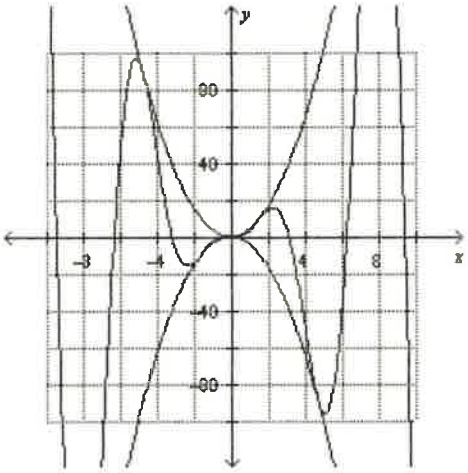
$y = \cos x$



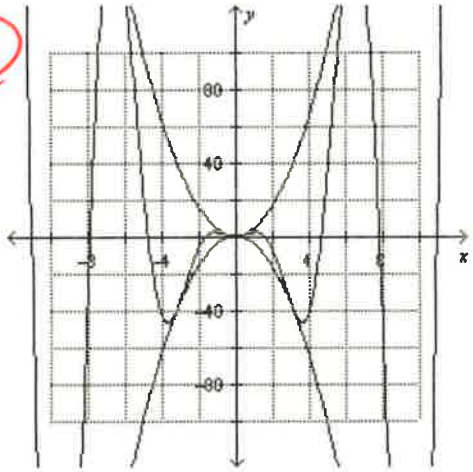
Graph $f(x)$, $-f(x)$, and the given function.

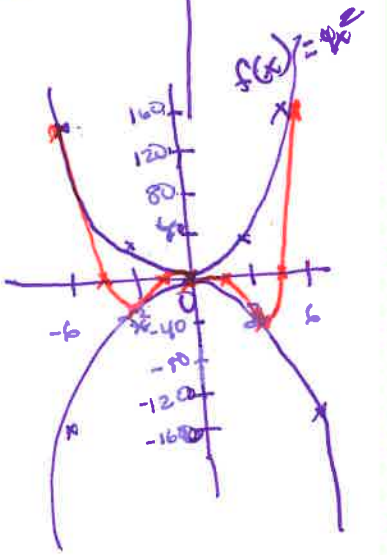
8. $y = 4x^2 \cos x$

a.

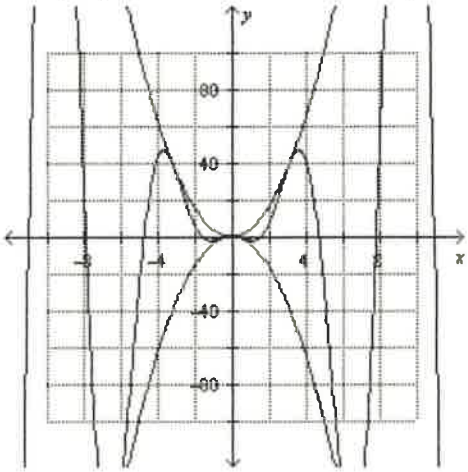


b.

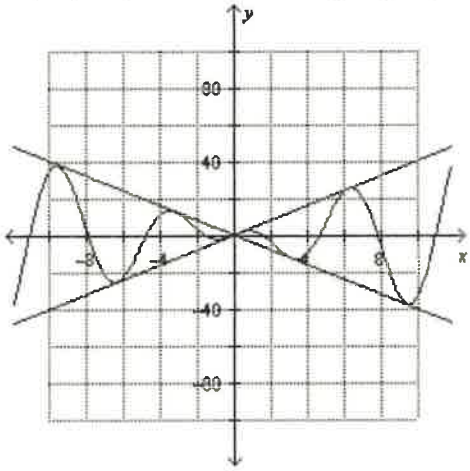




c.



d.



9. Find the value of $\tan\left(\sin^{-1}\left(-\frac{1}{2}\right)\right)$.

$\tan\left(\sin^{-1}\left(-\frac{1}{2}\right)\right)$

$\sin^{-1}\left(-\frac{1}{2}\right)$

ref $\angle \frac{\pi}{6}$

$\angle = -\frac{\pi}{6}$

$\tan\left(-\frac{\pi}{6}\right) = -\tan\frac{\pi}{6}$

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

a. $\sqrt{3}$ b. $\frac{\sqrt{3}}{3}$

c. $-\frac{\sqrt{3}}{3}$ d. $-\sqrt{3}$

S | A

T | C

tan is neg ref $\frac{\pi}{6}$

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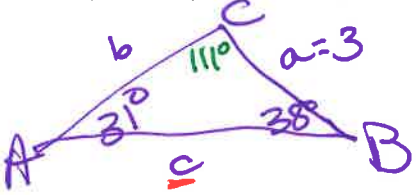
10. Given a triangle with $a = 3$, $A = 31°$, and $B = 38°$, what is the length of c? Round to the nearest tenth.

a. 6.4 b. 5.4
c. 4.4 d. 7.4



I didn't draw Δs to scale

$C = 180-(31+38)$
$180-69$
$C = 111°$

$\frac{\sin 31°}{3} = \frac{\sin 111°}{c}$

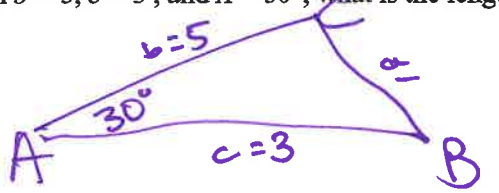
$c = \frac{3\sin 111°}{\sin 31°}$

$c \approx 5.4379\ldots$

$c \approx 5.4$

11. Given a triangle with $b = 5$, $c = 3$, and $A = 30°$, what is the length of a? Round to the nearest tenth.

a. 2.2 b. 3.8
c. 2.8 d. 3.4

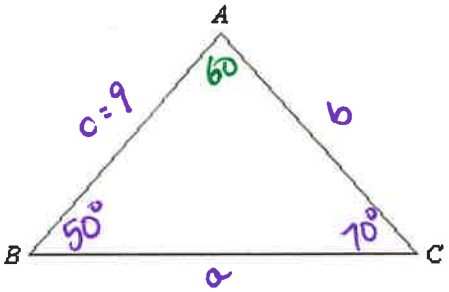


$a = \sqrt{5^2+3^2-2(5)(3)\cos 30°}$

$a \approx 2.8318\ldots$

$a \approx 2.8$

12. Solve ΔABC.



$A = 180-(70+50)$
$A = 180-120$
$A = 60$

$\frac{\sin 70°}{9} = \frac{\sin 50°}{b}$

$b = \frac{9\sin 50°}{\sin 70°}$

$b \approx 7.336867\ldots$

$b \approx 7.3$

$\frac{\sin 70°}{9} = \frac{\sin 60°}{a}$

$a = \frac{9\sin 60°}{\sin 70°}$

$a \approx 8.29444\ldots$

$a \approx 8.3$

$c = 9, B = 50°, C = 70°$

a. $A = 60°, a = 9, b = 7.3$ b. $A = 60°, a = 7.3, b = 8.3$
c. $A = 60°, a = 8.3, b = 7.3$ d. $A = 60°, a = 65.1, b = 7.3$

13. Find the area of the triangle with $a = 9$ feet, $b = 3$ feet, and $c = 10$ feet. Round to the nearest tenth.

a. 10.3 ft^2 b. 13.3 ft^2
c. 15.3 ft^2 d. 14.3 ft^2

Heron's Formula

$s = \frac{1}{2}(a+b+c)$

$\text{Area} = \sqrt{s(s-a)(s-b)(s-c)}$

$s = \frac{9+3+10}{2} = \frac{22}{2} = 11$

$\text{Area} = \sqrt{11(11-9)(11-3)(11-10)}$

$\approx 13.266499 16\ldots$

$\text{Area} \approx 13.3\ \text{ft}^2$

14. Find the value of $\text{Cos}^{-1}\left(-\frac{\sqrt{3}}{2}\right)$.

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

ref $\angle = \frac{\pi}{6}$

angle is $\pi - \frac{\pi}{6}$

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