Pre-Calculus Final Exam Extra Practice Missing last question rescan Key

Given the table below:

x	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$
y	0.5	0	-0.5	0	0.5

Period $= \pi$

Amp $= 0.5$

Phase Shift $\frac{\pi}{2}$

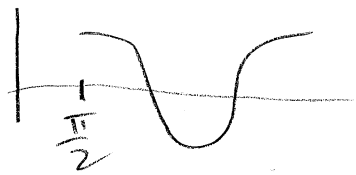
Which function fits the data?

A $y = 0.5\cos(2x - \pi)$

B $y = 0.5\cos(x - \pi)$

C $y = 0.5\cos\left(2x + \frac{\pi}{2}\right)$

D $y = \cos\left(2x + \frac{\pi}{2}\right)$



or plug in angles!

In a geometric sequence, $a_1 = 12$ and $r = \sqrt{2}$. What is the ***approximate*** sum of the first 20 terms of the sequence?

A 339.4

B 8,688.9

C 29,624.9

D 29,636.9

$12, 12\sqrt{2}, 24$

$S = \frac{12(1-(\sqrt{2})^{20})}{(1-(\sqrt{2}))}$

A bathroom floor has tiles arranged in 9 circles. The innermost circle contains 9 tiles. Each successive circle contains 9 more tiles than the previous circle. How many total tiles are on the bathroom floor?

A 81

B 396

C 405

D 729

Arithmetic

$9, 18, 27$

$a_9 = 9 + 9(9-1) = 81$

$S_9 = \frac{9}{2}(9+81)$

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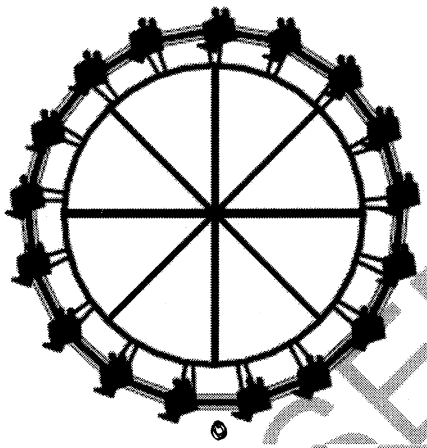
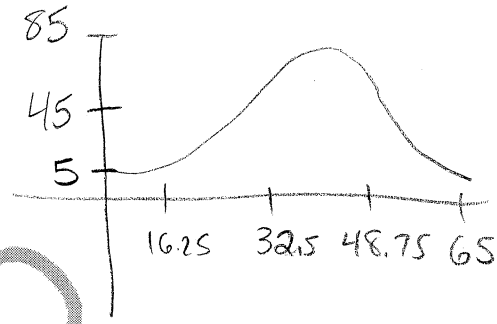
A Ferris wheel has a diameter of 80 feet. Riders enter the Ferris wheel at its lowest point, 5 feet above the ground, at time $t = 0$ seconds. One complete rotation takes 65 seconds.

$\frac{65}{4} = 16.25$





Which function models a rider's vertical height, $h(t)$, at t seconds?

A $h(t) = -80\cos\left(\frac{2\pi}{65}t\right) + 5$

B $h(t) = -40\cos\left(\frac{2\pi}{65}t\right) + 45$

C $h(t) = -45\cos\left(\frac{65}{2\pi}t\right) + 40$

D $h(t) = -5\cos\left(\frac{65}{2\pi}t\right) + 80$

$\frac{2\pi}{B} = 65 \quad B = \frac{2\pi}{65}$

midline $y = 45$

Amp $= 40$

How does the graph of $g(x) = 0.5\cos(2x)$ differ from the graph of its parent function, $f(x) = \cos(x)$, over the interval $-\pi \le x \le \pi$?

A The amplitude is smaller, and the period is shorter.

B The amplitude is smaller, and the period is longer.

C The amplitude is larger, and the period is shorter.

D The amplitude is larger, and the period is longer.

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Two sides of a triangle measure 14 ft and 17 ft, respectively. The included angle is 72°. ***Approximately*** how long is the third side of the triangle?

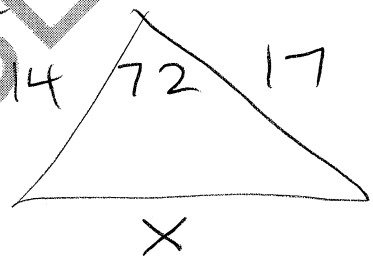
A 18.4 ft

B 20.3 ft

C 25.1 ft

D 30.7 ft

Degree mode



$x^2 = 14^2 + 17^2 - 2(14)(17)\cos 72$

What is the solution to the equation below?

$$\frac{\frac{3}{x}+2}{\frac{x}{5}+1} = \frac{15}{x}$$

A -12

B -2

C 2

D 12

$$\frac{\frac{3+2x}{x}}{\frac{x+5}{5}} \qquad \frac{3+2x}{x}\cdot\frac{5}{x+5} = \frac{15}{x}$$

$$\frac{15+10x}{x(x+5)} = \frac{15}{x}$$

$$x(15+10x) = 15x(x+5)$$

$$15+10x = 15x+75 \qquad -60 = 5x \qquad x = -12$$

Which is the solution set for x if $2e^{2x} + 5e^{x} - 12 = 0$?

A $\left\{\ln\frac{3}{2}, \ln 4\right\}$

B $\left\{\ln\frac{3}{2}, \ln^{-}4\right\}$

C $\{\ln 4\}$

D $\left\{\ln\frac{3}{2}\right\}$

$$(2e^x - 3)(e^x + 4)$$

$e^x = \frac{3}{2}$ $\qquad$ $e^x = -4$

$x = \ln\frac{3}{2}$ $\qquad$ $x = \ln(-4)$

↑ Not ok

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What value of h is needed to complete the square for the equation $x^2 + 10x - 8 = (x - h)^2 - 33$?

A $^-25$

B $^-5$

C 5

D 25

$x^2+10x = 8$

$x^2+10x+25 = 8+25$

$(x+5)^2 - 33$

Which expression is equivalent to $\frac{\cos(\theta)}{1 - \sin(\theta)} - \tan(\theta)$?

A $\sec(\theta)$

B $\sin(\theta)$

C $\cos(\theta)$

D $\csc(\theta)$

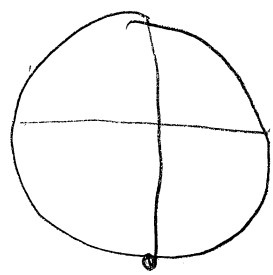
$\frac{\cos\theta(1+\sin\theta)}{(1-\sin\theta)(1+\sin\theta)}$

$\frac{\cos\theta(1+\sin\theta)}{\cos^2\theta}$

$\frac{1+\sin\theta}{\cos\theta} - \frac{\sin\theta}{\cos\theta}$

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

William put the tip of his pencil on the outer edge of a graph of the unit circle at the point $(0, ^-1)$. He moved his pencil tip through an angle of $\frac{4\pi}{3}$ radians in the counterclockwise direction along the edge of the circle. At what angle of the unit circle did William's pencil tip stop?



A $\frac{\pi}{3}$

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

C $\frac{7\pi}{6}$

D $\frac{5\pi}{3}$

Which is the inverse of $f(x) = 1.5^x + 4$?

A $f^{-1}(x) = \frac{x - 4}{1.5}$

B $f^{-1}(x) = \frac{\log(x) - 4}{1.5}$

C $f^{-1}(x) = \frac{\log(x - 4)}{\log(1.5)}$

D $f^{-1}(x) = \frac{4 - \log(x)}{\log(1.5)}$

$X = 1.5^Y + 4$

$X - 4 = 1.5^Y$

$\log(x-4) = y \cdot \log 1.5$

The recursive formula for a sequence is $U_n = U_{n-1} + 12$, where U_n is the nth term of the sequence and $U_0 = 7$. Which explicit formula can be used to determine the nth term of the sequence?

A $7n + 19$

B $7n + 12$

C $7 + 19n$

D $7 + 12n$

7 19 31

a_0 a_1 a_2

$d = 12$

So 12 is slope!

The volume of a rectangular prism is represented by the expression $(x^3 - 2x^2 - 20x - 24)$. If the length is $(x - 6)$ and the height and width are equal, what is the width of the prism?

A $x + 2$

B $x - 2$

C $x + 4$

D $x - 4$

$$\begin{array}{r|rrrr} 6 & 1 & -2 & -20 & -24 \\ & \downarrow & 6 & 24 & 24 \\ \hline & 1 & 4 & 4 & 0 \end{array}$$

$x^2 + 4x + 4$

$(x+2)(x+2)$

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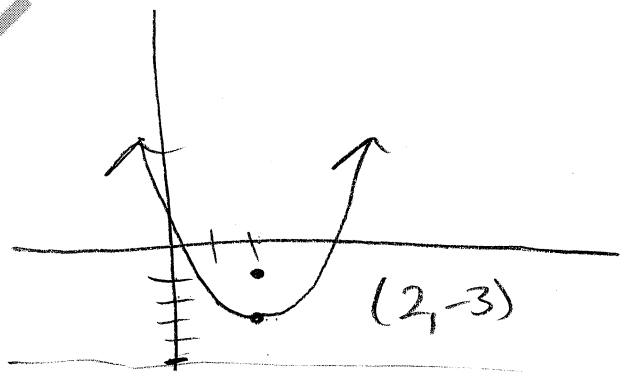
Which is an equation of a parabola that has a directrix of $y = -5$ and a focus at $(2, -1)$?

~~A~~ $y = \frac{1}{2}(x + 2)^2 + 2$

B $y = \frac{1}{8}(x + 2)^2 + 3$

C $y = \frac{1}{8}(x - 2)^2 - 3$

~~D~~ $y = \frac{1}{2}(x - 2)^2 - 2$



$c = 2 \quad a = \frac{1}{4(2)} = \frac{1}{8}$

Given the function:

$$g(x) = \frac{(x-2)(3x+2)}{(x+4)(x-2)(x-6)} = \frac{3x+2}{(x+4)(x-6)}$$

- What are the equations of the asymptotes of the function?
- Determine if there are any points of discontinuity. Explain why or why not.
- Describe the end behavior as x approaches $-\infty$ and as x approaches $+\infty$.

$X = -4$ VA

$X = 6$ VA

$Y = 0$ HA (Denom > Numer)

$(2, \frac{8}{-24})$

$\hookrightarrow (2, -\frac{1}{3})$ Hole (Point of Discontinuity)

End Behavior → Since the HA is 0,

then as $x \to -\infty \quad y \to 0$

$x \to \infty \quad y \to 0$

$y = x^2$ 5 up, 2 right

$y = (x-2)^2 + 5 = x^2 - 4x + 4 + 5 = \boxed{x^2 - 4x + 9}$