

Q1

Saturday, May 30, 2020

8:28 AM

prove or disprove $\sin a \sin b = \frac{1}{2} [\cos(a - b) - \cos(a + b)]$

↓
Product-to-Sum identity

B) Identity

Q2

Saturday, May 30, 2020

8:34 AM

$$9 \cos(-300^\circ) + i \cdot 9 \sin(-300^\circ)$$

$$e^{i\theta} = \cos \theta + i \sin \theta$$

$$\begin{aligned} 9 \cos(-300^\circ) + i \cdot 9 \sin(-300^\circ) &= \underline{\underline{9 e^{(-300^\circ) i}}} \\ &= \underline{\underline{9 (\cos(-300^\circ) + i \sin(-300^\circ))}} \end{aligned}$$

$$\text{E) } (\cos(-300^\circ) + i \sin(-300^\circ))$$

$$\text{F) } 9 e^{(-300^\circ) i}$$

Q3

Saturday, May 30, 2020

8:45 AM

prove or disprove

$$4 \cos^2(2x) \cos(3x) - 2 \cos 3x - \cos(7x) = \cos x$$

$$4 \cos^2(2x) \cos(3x) - 2 \cos(3x) - \cos(7x) = \cos(x)$$

x) NOT identity

Q4

Saturday, May 30, 2020

8:46 AM

Prove the following identity

$$\frac{\cos(x) + 1}{\sin(x)} = \cot(x) + \csc(x)$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\frac{\cos(x) + 1}{\sin(x)} = \cot(x) + \csc(x)$$

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

$$\frac{\cos(x) + 1}{\sin(x)} = \frac{\cos(x) + 1}{\sin(x)}$$

b) Identity

Q5

Saturday, May 30, 2020

8:47 AM

$$15e^{(180^\circ)i}$$

$$e^{i\theta} = \cos \theta + i \sin \theta$$

$$i = i$$

$$i^2 = -1$$

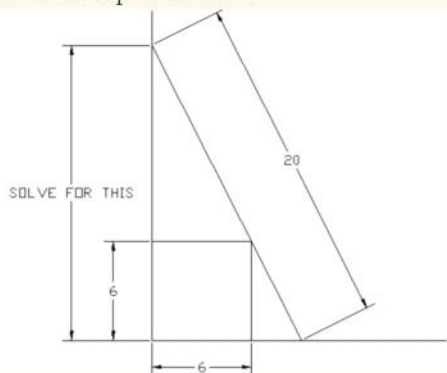
$$i^3 = -i$$

$$i^4 = 1$$

$$\begin{aligned} 15e^{(180^\circ)i} &= 15(\cos(180^\circ) + i \sin(180^\circ)) \\ &= 15(-1 + i(0)) \\ &= \underline{\underline{-15 + i(0)}} \end{aligned}$$

$$x) \approx -15 + i(0)$$

A twenty foot ladder leans up against a perpendicular wall and just touches the outer top edge of a 6x6x6 cube packing case pushed up close to the wall. How far up the wall is the top of the ladder?



hint: if needed use a calculator to solve the equation you derive

Solution from Quiz 8 #12

12

Proportional Δ 's

$$\frac{y-6}{20-x} = \frac{6}{x}$$

$$(y-6)x = 6(20-x)$$

$$(y-6)x = 120 - 6x$$

$$yx - 6x = 120 - 6x$$

$$yx = 120$$

$$y = \frac{120}{x}$$

Also... Pythagoras

$$6^2 + (y-6)^2 = (20-x)^2$$

$$(y-6)^2 = (20-x)^2 - 6^2$$

combine equations

$$x^2 \left(\frac{36}{x^2} (20-x)^2 \right) = (20-x)^2 - 6^2$$

$$36(20-x)^2 = x^2(20-x)^2 - 36x^2$$

$$36(400 - 40x + x^2) = x^2(400 - 40x + x^2) - 36x^2$$

$$14400 - 1440x + 36x^2 = 400x^2 - 40x^3 + x^4 - 36x^2$$

$$0 = x^4 - 40x^3 + 328x^2 + 1440x - 14400$$

Solutions from www.symbolab.com

$$x = -6.72642, -6.16427, 13.27357, 26.16427$$

Find solution by trial and error

h = y + 6

h = 9.04 + 6

h \approx 15.04

12

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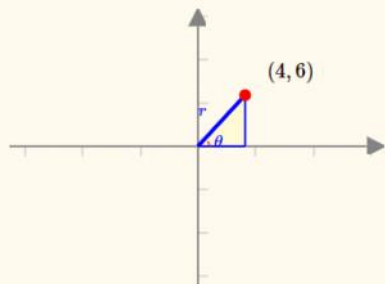
h = 9.04 + 6

h \approx 15.04

None of these

None of these

Convert the cartesian coordinates, $(4, 6)$, to Polar Coordinates



$$c^2 = a^2 + b^2$$

$$r^2 = 4^2 + 6^2$$

$$r^2 = 16 + 36$$

$$\sqrt{r^2} = \sqrt{52}$$

$$r = \sqrt{52}$$

$$= \sqrt{4 \cdot 13}$$

$$\underline{\underline{r = 2\sqrt{13}}}$$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$

$$= \tan^{-1}\left(\frac{6}{4}\right)$$

$$\underline{\underline{\theta \approx 56.31^\circ}}$$

$$\text{or } r = -2\sqrt{13}, \theta = (56.31 + 180^\circ)$$

$$\theta = 236.31^\circ$$

$$\underline{\underline{r = -2\sqrt{13}}}, \underline{\underline{\theta = 236.31^\circ}}$$

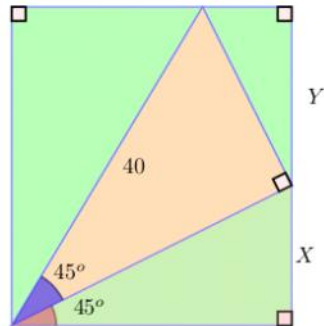
$$\text{B) } r = 2\sqrt{13}, \theta = 56.31^\circ$$

$$\text{C) } r = -2\sqrt{13}, \theta = 236.31^\circ$$

Q8

Saturday, May 30, 2020 9:42 AM

Determine the value of X and Y .



TYP0 IN THE QUESTION

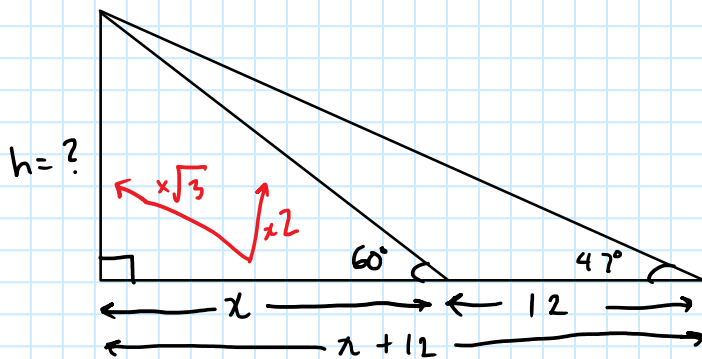
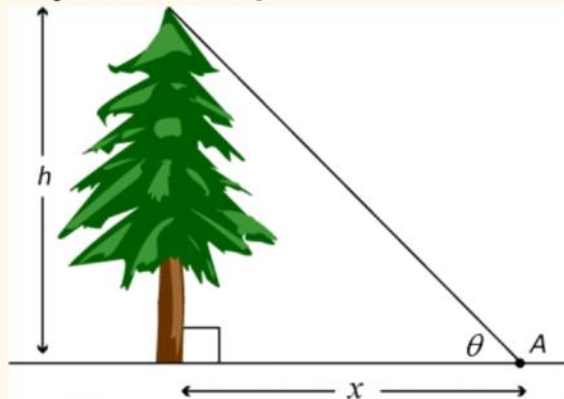
G) None of the above

Q9

Saturday, May 30, 2020

9:43 AM

Suppose you look at a tree from afar and note the angle of elevation is 60° . From that point, after walking 12 feet away from the tree, you note the angle of elevation decreased to 47° . Estimate the height of the tree h [do not use ideas from future part of the course].



$$\tan 60^\circ = \frac{h}{x}$$

$$h = x \tan 60^\circ$$

$$\tan 47^\circ = \frac{h}{x+12}$$

$$h = \tan 47^\circ (x+12)$$

$$x \tan 60^\circ = \tan 47^\circ (x+12)$$

$$x(1.7321) = (1.0724)(x+12)$$

$$1.7321x = 1.0724x + 12.8684$$

$$1.7321x - 1.0724x = 12.8684$$

$$\frac{0.6597x}{0.6597} = \frac{12.8684}{0.6597}$$

$$x = 19.5070$$

$$\begin{aligned} h &= x \sqrt{3} \\ &= 19.5070 \sqrt{3} \\ h &\approx 33.7871 \end{aligned}$$

$$\text{D) } h = 33.787 \text{ ft}$$

Q10

Saturday, May 30, 2020

10:38 AM

Prove the following identity

$$\frac{\tan(x)^2}{\sec(x) + 1} + 1 = \frac{1}{\cos(x)}$$

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

$$\tan \theta = \pm \sqrt{\sec^2 \theta - 1}$$

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$\frac{\tan^2(x)}{\sec(x) + 1} + 1 = \frac{1}{\cos(x)}$$

$$(\cancel{\sec(x) + 1}) \frac{\tan^2(x)}{\cancel{\sec(x) + 1}} + 1 = \sec(x) (\sec(x) + 1)$$

$$\tan^2(x) + 1 = \sec^2(x) + \sec(x)$$

$$\sec^2(\theta) - 1 + 1 =$$

$$\sec^2(\theta) = \sec^2(x) + \sec(x)$$

A) not identity