Sign

+

$\cos\theta$, Q I

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

II (-,+) S | (+,+) I A

T III (-,-) | C (+,-) IV

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\frac{y}{x}$

$\sin^2\theta + \cos^2\theta = 1$

$\left(\frac{3\sqrt{34}}{34}\right)^2 + \cos^2\theta = 1$

$\frac{9\cdot\cancel{34}}{34\cdot\cancel{34}}$

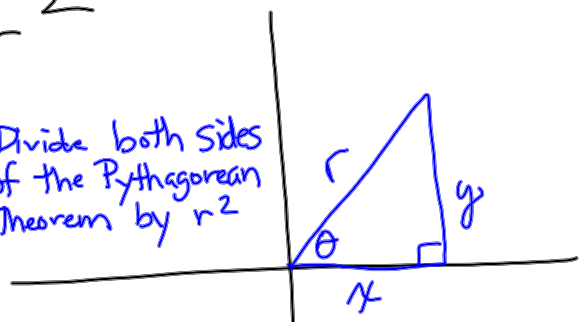
$\frac{9}{34} + \cos^2\theta = \frac{34}{34}$

$-\frac{9}{34} \qquad -\frac{9}{34}$

$\cos^2\theta = \frac{25}{34}$

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

$$x^2 + y^2 = r^2$$




① $\dfrac{x^2}{r^2} + \dfrac{y^2}{r^2} = \dfrac{r^2}{r^2}$ Divide both sides of the Pythagorean Theorem by $r^2$

② $\left(\dfrac{x}{r}\right)^2 + \left(\dfrac{y}{r}\right)^2 = 1$ Power of a Quotient Property

$\sin\theta = \dfrac{y}{r}$

$\cos\theta = \dfrac{x}{r}$

③ $\cos^2\theta + \sin^2\theta = 1$ Substitute $\cos\theta$ for $\frac{x}{r}$ and $\sin\theta$ for $\frac{y}{r}$

④ $\sin^2\theta + \cos^2\theta = 1$ Commutative Property of addition

$\dfrac{y}{r} \cdot \dfrac{y}{r} = \left(\dfrac{y}{r}\right)^2$

$$\sin^2\theta + \cos^2\theta = 1 \quad \square$$

Find $\tan\theta$ if $\theta$ is in QI, given

$(+)$ $\sin\theta = \frac{11}{13}$

| | |
|---|---|
| S | A |
| T | C |

$$\sin^2\theta + \cos^2\theta = 1$$

$$\left(\frac{11}{13}\right)^2 + \cos^2\theta = 1$$

$$\frac{121}{169} + \cos^2\theta = \frac{169}{169}$$

$$-\frac{121}{169} \qquad -\frac{121}{169}$$

$$\cos^2\theta = \frac{48}{169}$$

$$\cos\theta = \frac{4\sqrt{3}}{13}$$

$\sqrt{48} = 4\sqrt{3}$

2, 24

2, 12

2, 6

2, 3

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

$$\tan\theta = \frac{\frac{11}{\cancel{13}}}{\frac{4\sqrt{3}}{\cancel{13}}} \quad \frac{11}{4\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \boxed{\frac{11\sqrt{3}}{12}}$$

$4 \cdot 3$

$$4\sqrt{3} \cdot \sqrt{3} = 4\sqrt{\cancel{3 \cdot 3}}$$

$4 \cdot 3$

**Explanation**

The proof is shown below.

| Statement | Reason |
|---|---|
| $x^2 + y^2 = r^2$ | Pythagorean theorem |
| $\frac{x^2}{r^2} + \frac{y^2}{r^2} = \frac{r^2}{r^2}$ | divide both sides of the Pythagorean theorem by $r^2$ |
| $\left(\frac{x}{r}\right)^2 + \left(\frac{y}{r}\right)^2 = 1$ | power of a quotient property |
| $\cos^2(\theta) + \sin^2(\theta) = 1$ | substitute $\cos(\theta)$ for $\frac{x}{r}$ and $\sin(\theta)$ for $\frac{y}{r}$ |

Feb 27-10:37 AM