1

Convierte 30° a radianes.

A) $\frac{\pi}{2}$ rad B) $\frac{\pi}{3}$ rad C) $\frac{\pi}{6}$ rad

D) $\frac{\pi}{4}$ rad E) $\frac{\pi}{5}$ rad

$30°\left(\frac{\pi}{180°}\right) = \frac{\pi}{6}$ rad

2

Convierta $\frac{\pi}{5}$ rad a grados sexagesimales.

A) 32° B) 36° C) 30°

D) 40° E) 60°

$\frac{\pi \text{ rad}}{5}\left(\frac{180°}{\pi \text{ rad}}\right) = 36°$

3

Simplifica la expresión

$$E = \frac{144°}{\frac{2\pi}{15} \text{ rad}}$$

A) 4 B) 2 C) 6

D) 3 E) 5

$\frac{2\pi \text{ rad}}{15}\left(\frac{180°}{\pi \text{ rad}}\right) = 24°$

$\Rightarrow F = \frac{144°}{24°} = 6$

4

Simplifica la expresión

$$M = \frac{\frac{7\pi}{20} \text{ rad}}{90°}$$

A) 0,3 B) 0,2 C) 0,5

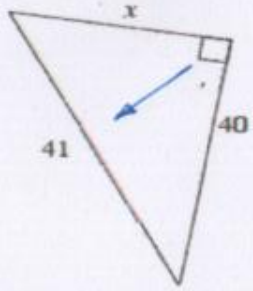
D) 0,7 E) 0,6

$\frac{7\pi}{20} \text{ rad}\left(\frac{180°}{\pi \text{ rad}}\right) = 63°$

$\Rightarrow M = \frac{63°}{90} = \frac{7}{10} = 0,7$

5

Del gráfico, halla el valor de x.



A) 11 B) 10 C) 9

D) 8 E) 12

$41^2 = 40^2 + x^2$

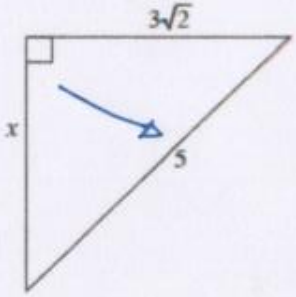
$1681 = 1600 + x^2$

$81 = x^2$

$9 = x$

6

De la figura, halla el valor de x.



A) 7 B) 3 C) $\sqrt{3}$

D) 2 E) $\sqrt{7}$

$5^2 = x^2 + (3\sqrt{2})^2$

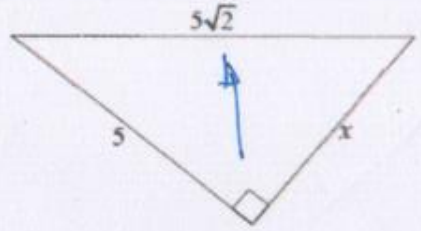
$25 = x^2 + 9 \times 2 \rightarrow 25 - 18 = x^2$

$7 = x^2$

$\sqrt{7} = x$

7

Del triángulo mostrado, halla el valor x.



A) 5 B) $\sqrt{2}$ C) $\sqrt{3}$

D) $\sqrt{5}$ E) 2

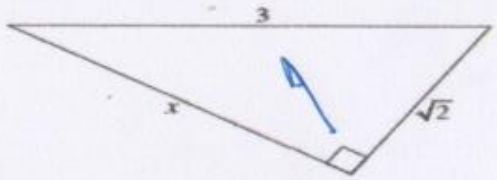
$(5\sqrt{2})^2 = 5^2 + x^2$

$25 \times 2 = 25 + x^2 \rightarrow 25 = x^2$

$5 = x$

8

Del triángulo mostrado, halla el valor de x.



A) $\sqrt{3}$ B) $\sqrt{5}$

C) $\sqrt{7}$ D) $\sqrt{2}$

E) 2

$3^2 = x^2 + \sqrt{2}^2$

$9 = x^2 + 2$

$7 = x^2$

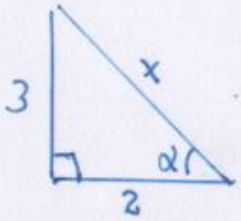
$\sqrt{7} = x$

9

Dado $\tan\alpha = \frac{3}{2}$ siendo α un ángulo agudo, calcula $\text{sen}^2\alpha$.

A) $\frac{3}{13}$ B) $\frac{9}{13}$ C) $\frac{13}{9}$

D) $\frac{9}{169}$ E) $\frac{3}{169}$



$x^2 = 3^2 + 2^2$

$x^2 = 13 \rightarrow x = \sqrt{13}$

$\text{Sen}^2\alpha = \left(\frac{3}{\sqrt{13}}\right)^2$

$= \frac{9}{13}$

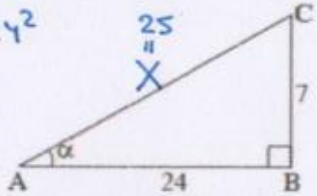
10

Calcula $F = \text{sen}\alpha + \cos\alpha$.

$x^2 = 7^2 + 24^2$

$x^2 = 625$

$x = 25$



A) $\frac{27}{31}$ B) $\frac{31}{25}$ C) $\frac{33}{25}$

D) $\frac{37}{25}$ E) $\frac{41}{25}$

$F = \frac{7}{25} + \frac{24}{25} = \frac{31}{25}$

11

Dado $\text{sen}\theta = \frac{1}{3}$ siendo θ un ángulo agudo, calcula $\tan^2\theta$.

A) 8 B) 1/8 C) 1/2

D) 1/4 E) 1/5

$3^2 = 1^2 + x^2$

$9 = 1 + x^2$

$8 = x^2$

$\sqrt{8} = x$

$\tan^2\theta = \left(\frac{1}{\sqrt{8}}\right)^2 = \frac{1}{8}$

12

En el triángulo rectángulo, calcula

$K = 3\tan\alpha + \sqrt{10}\cdot\cos\alpha$

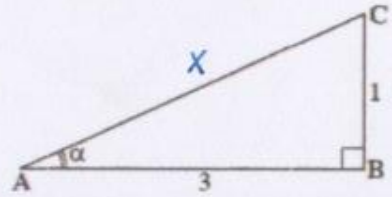
A) 2

B) 4

C) 6

D) 8

E) 10



$x^2 = 1^2 + 3^2$

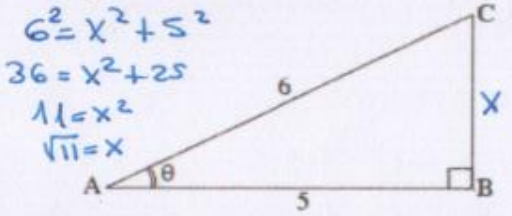
$x^2 = 10 \rightarrow x = \sqrt{10}$

$K = 3\left(\frac{1}{3}\right) + \sqrt{10}\left(\frac{3}{\sqrt{10}}\right)$

$K = 1 + 3 = 4$

13

Del gráfico, calcula $M = \cot^2\theta$.



$6^2 = x^2 + 5^2$

$36 = x^2 + 25$

$11 = x^2$

$\sqrt{11} = x$

A) $\frac{11}{5}$ B) $\frac{11}{25}$ C) $\frac{5}{11}$

D) $\frac{25}{11}$ E) $\frac{2}{11}$

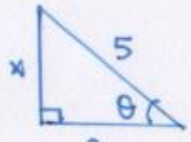
$M = \cot^2\theta = \left(\frac{5}{\sqrt{11}}\right)^2 = \frac{25}{11}$

14

Dado $\sec\theta = \frac{5}{2}$ siendo θ un ángulo agudo, calcula $K = \csc^2\theta - 1$.

A) $\frac{2}{21}$ B) $\frac{25}{21}$ C) $\frac{5}{21}$

D) $\frac{21}{4}$ E) $\frac{4}{21}$



$5^2 = x^2 + 2^2$

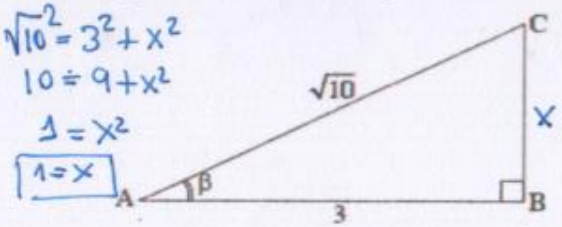
$25 = x^2 + 4$

$21 = x^2 \rightarrow x = \sqrt{21}$

$K = \left(\frac{5}{\sqrt{21}}\right)^2 - 1 = \frac{25}{21} - 1 = \frac{4}{21}$

15

Del gráfico, calcula $R = \cot^2\beta - 5$.



$\sqrt{10}^2 = 3^2 + x^2$

$10 = 9 + x^2$

$1 = x^2$

$1 = x$

A) 3 B) 5 C) 6

D) 4 E) 8

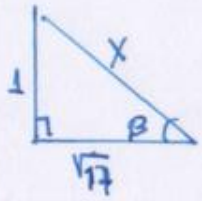
$R = \left(\frac{3}{1}\right)^2 - 5 = 9 - 5 = 4$

16

Si $\cot\beta = \sqrt{17}$, calcula $M = \sec^2\beta$.

A) $\frac{18}{7}$ B) $\frac{18}{17}$ C) $\frac{17}{8}$

D) 1 E) $\frac{17}{8}$



$x^2 = 1^2 + \sqrt{17}^2$

$x^2 = 1 + 17$

$x^2 = 18 \rightarrow x = \sqrt{18}$

$M = \left(\frac{\sqrt{18}}{\sqrt{17}}\right)^2 = \frac{18}{17}$

17

Halla el valor numérico de

$$K = \frac{\text{sen}53^\circ + \cos 53^\circ}{\cos 37^\circ - \text{sen}37^\circ}$$

A) 7/5 B) $\frac{5}{7}$ C) 1/7

D) 1/5 E) 7

$$K = \frac{\frac{4}{5} + \frac{3}{5}}{\frac{4}{5} - \frac{3}{5}}$$

$$K = \frac{\frac{7}{5}}{\frac{1}{5}} = \frac{35}{5} = 7$$

18

Halla el valor de x si

$$x \cdot \csc 37^\circ + \tan 53^\circ = \sec 53^\circ$$

A) 5 B) 1/5 C) 9/5

D) 1/3 E) 25

$x\left(\frac{5}{3}\right) + \frac{4}{3} = \frac{5}{3}$

$x\left(\frac{5}{3}\right) = \frac{5}{3} - \frac{4}{3} \rightarrow x\left(\frac{5}{3}\right) = \frac{1}{3}$

$x = \frac{1}{5}$

19

Reduzca la expresión

$$M = (16\sec 37^\circ - 9\tan 53^\circ)^2$$

A) 25 B) 60 C) 28

D) 64 E) 81

$M = \left(16 \times \frac{5}{4} - 9\left(\frac{4}{3}\right)\right)^2 = (20 - 12)^2$

$= 8^2 = 64$

20

Halla el valor de a en

$$\csc 53^\circ = \frac{a+5}{a}$$

A) 22 B) 21 C) 19

D) 20 E) 15

$\frac{5}{4} = \frac{a+5}{a}$

$5a = 4(a+5)$

$5a = 4a + 20$

$a = 20$