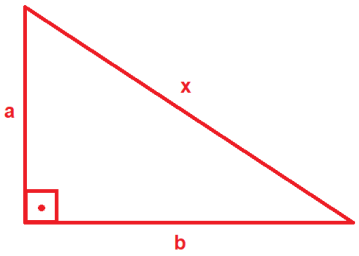
DANIEL GONÇALVES RIBEIRO – CB 301552-1

Geometria Plana – Relações Métricas no Triângulo Retângulo e Teorema de Pitágoras

Tarefa Básica

01. (PUC) Num triângulo retângulo, cujos catetos medem $\sqrt{3}$ e $\sqrt{4}$, a hipotenusa mede

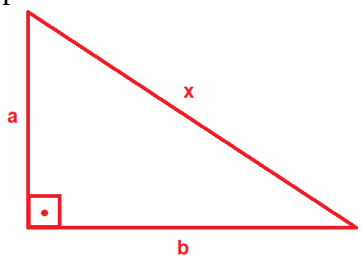
(A) 5
(B) 7
(C) 8
(D) 9
(E) 12



$a = \sqrt{3}$, $b = \sqrt{4}$ e $x = ?$
$x^2 = a^2 + b^2$
$x^2 = (\sqrt{3})^2 + \sqrt{4})^2$
$x^2 = 3 + 4$
$x^2 = 7$
$\sqrt{x^2} = \sqrt{7}$
$x = \sqrt{7}$

Aternativa B

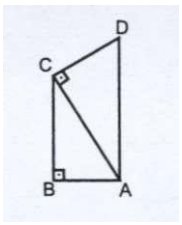
02. (UFSC) Uma escada com 10 m de comprimento foi apoiada em uma parede que é perpendicular ao solo. Sabendo-se que o pé da escada está afastado 6 m da base da parede, determine a altura, em metros, alcançada pela escada.



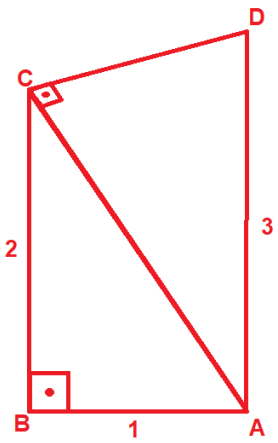
$x = 10$, $b = 6$ e $a = ?$
$x^2 = a^2 + b^2$
$10^2 = x^2 + 6^2$
$100 = x^2 + 36$
$x^2 = 100 - 36$
$x^2 = 64$
$\sqrt{x^2} = \sqrt{64}$
$x = 8$

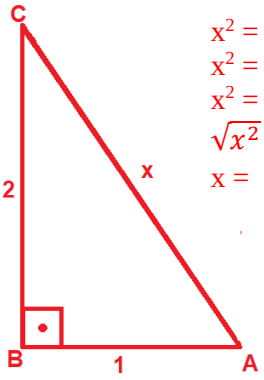
Altura = 8 m

03. (U.F.SERGIPE) Se nos triângulos retângulos, representadosna figura abaixo, têm-se AB= 1, BC=2 e AD=3, então CD é igual a

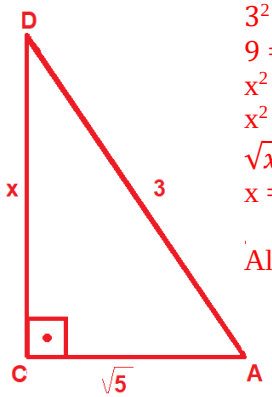


(A) 1
(B) 2
(C) 3
(D) 4
(E) 5





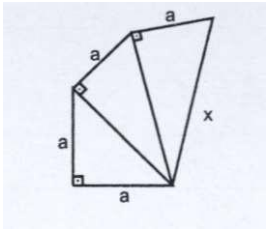
$x^2 = 1^2 + 2^2$
$x^2 = 1 + 4$
$x^2 = 5$
$\sqrt{x^2} = \sqrt{5}$
$x = \sqrt{5}$



$3^2 = x^2 + (\sqrt{5})^2$
$9 = x^2 + 5$
$x^2 = 9 - 5$
$x^2 = 4$
$\sqrt{x^2} = \sqrt{4}$
$x = 2$

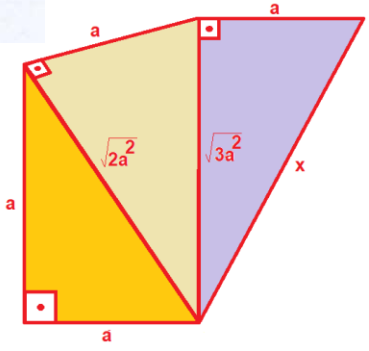
Alternativa B

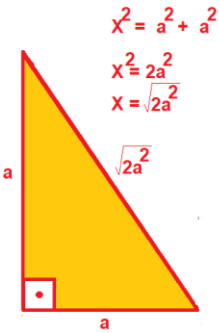
04. (UEL) Na figura abaixo, o valorde x é

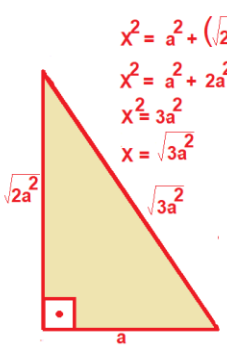


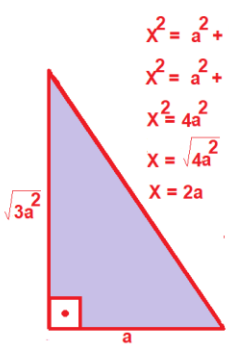
Alternativa B

(A) a
(B) 2a
(C) 3a
(D) $\sqrt{2a}$
(E) $\sqrt{3a}$



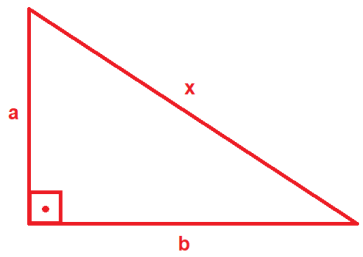






05. (FUVEST) Um dos catetos de um triângulo retângulo mede 2 e a hipotenusa mede 6. A área do triângulo é

(A) $2\sqrt{2}$
(B) 6
(C) $4\sqrt{2}$
(D) 3
(E) $\sqrt{6}$



$x = 6$, $b = 2$ e $a = ?$

$x^2 = a^2 + b^2$

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

$36 = x^2 + 4$

$x^2 = 36 - 4$

$x^2 = 32$

$\sqrt{x^2} = \sqrt{32}$

$x = 4\sqrt{2}$

32 | 2
16 | 2
08 | 2
04 | 2
02 | 2
01

$\sqrt{32} = \sqrt{4^2 . 2} = 4\sqrt{2}$

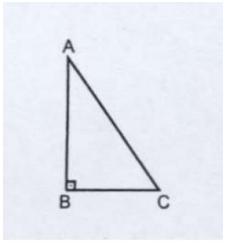
Área = $b \cdot \frac{h}{2}$

Área = $2 \cdot \frac{4\sqrt{2}}{2}$

Área = $\frac{8\sqrt{2}}{2}$

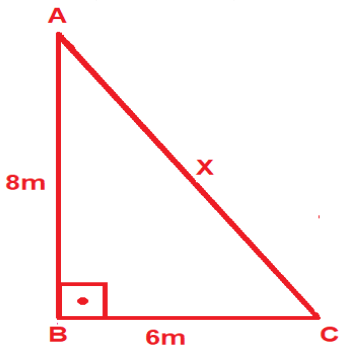
Área = $4\sqrt{2}$

06. (UEL) Na figura abaixo, tem-se o triângulo retângulo ABC cujos catetos medem 6m e 8m. Quer-se construir um outro triângulo retângulo, com hipotenusa $\overline{AC}$ e tal que a medida de um dos catetos seja igual ao dobro da medida do outro.



A medida do menor cateto, em metros, será

(A) $2\sqrt{5}$
(B) $4\sqrt{5}$
(C) 5
(D) 10
(E) 20



$x = ?$, $a = 8$ e $b = 6$

$x^2 = a^2 + b^2$

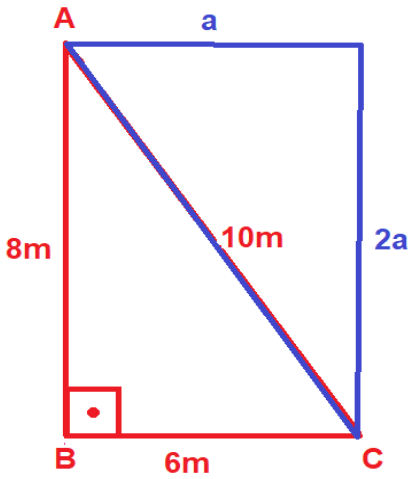
$x^2 = 8^2 + 6^2$

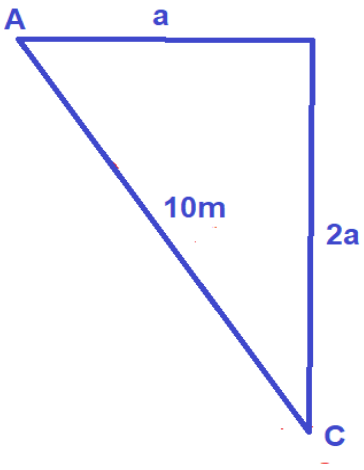
$x^2 = 64 + 36$

$x^2 = 100$

$\sqrt{x^2} = \sqrt{100}$

$x = 10$





$x = 10$, $a = a$ e $b = 2a$

$x^2 = a^2 + b^2$

$10^2 = a^2 + 4a^2$

$100 = 5a^2$

$a^2 = \frac{100}{5}$

$a^2 = 20$

$\sqrt{a^2} = \sqrt{20}$

$a = 2\sqrt{5}$

20 | 2
10 | 2
5 | 5
1

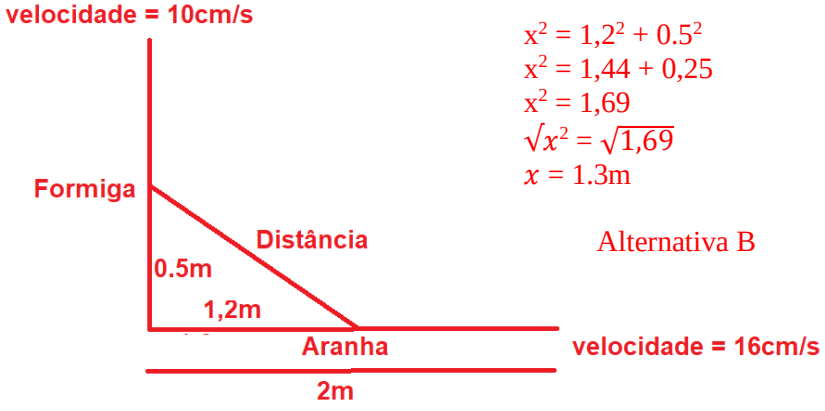
Alternativa A

07. (MACKENZIE) – Considere um poste perpendicular ao plano do chão. Uma aranha está no chão, a 2 m do poste, e começa a se aproximar dele no mesmo instante que uma formiga começa a subir no poste. A velocidade da aranha é de 16 cm por segundo e a da formiga é de 10 cm por segundo. Após 5 segundos do início dos movimentos, a menor distância entre a aranha e a formiga é:

(A) 2,0 m
(B) 1,3 m
(C) 1,5 m
(D) 2,2 m
(E) 1,8 m

Após 5 segundos a aranha terá percorrido:
5 x 16 cm = 80 cm ou 0,80 m
Portanto 2,00m = 0,80m = 1,2m

Após 5 segundos a formiga terá subido:
5 x 10 cm = 50 cm ou 0,5 m



$x^2 = 1{,}2^2 + 0.5^2$

$x^2 = 1{,}44 + 0{,}25$

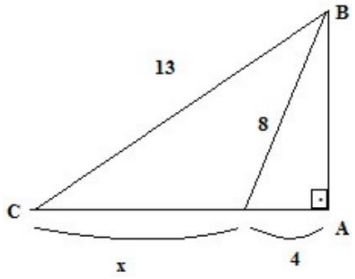
$x^2 = 1{,}69$

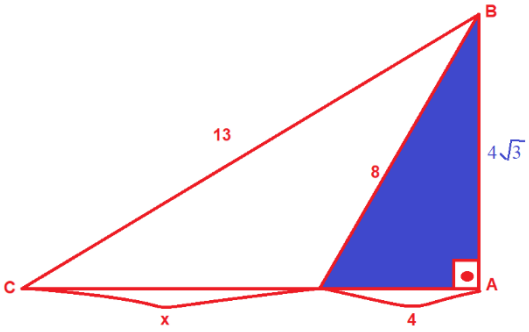
$\sqrt{x^2} = \sqrt{1{,}69}$

$x = 1.3\text{m}$

Alternativa B

08. (PUC) – Na figura seguinte, os segmentos são medidos em metros. O segmento x vale:





x = 8, b = 4 e a = ?

$x^2 = a^2 + b^2$

$8^2 = 4^2 + a^2$

$a^2 = 64 - 16$

$a^2 = 48$

$\sqrt{a^2} = \sqrt{48}$

$a = 4\sqrt{3}$

48 | 2
24 | 2
12 | 2
6 | 2
3 | 2
1

(A) 11 m
(B) 105 m
(C) é impossível saber, pois 43 não tem raiz exata
(D) 7m

$13^2 = (4+x)^2 + (4\sqrt{3})^2$

$169 = x^2 + 8x + 16 + 16.3$

$169 = x^2 + 8x + 16 + 48$

$x^2 + 8x + 64 = 169$

$x^2 + 8x + 64 - 169 = 0$

$x^2 + 8x - 105 = 0$

$$x = \frac{-8 \pm \sqrt{8^2 - 4.1.(-105)}}{2.1}$$

$$x = \frac{-8 \pm \sqrt{64 + 420}}{2}$$

$$x = \frac{-8 \pm \sqrt{484}}{2}$$

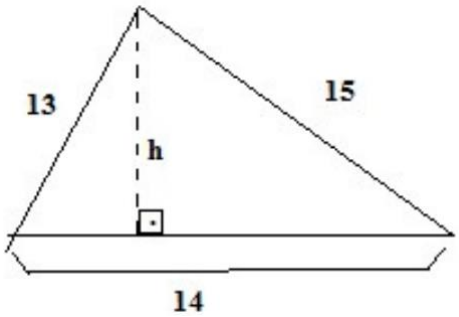
$$x = \frac{-8 \pm 22}{2}$$

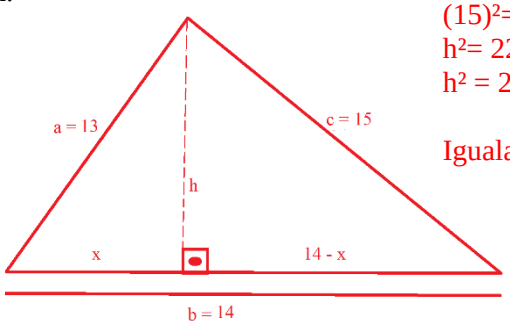
$$x' = \frac{-8 + 22}{2} = \frac{14}{2} = 7$$

$$x'' = \frac{-8 - 22}{2} = \frac{30}{2} = -15$$

Alternativa D

09. Com os dados da figura, calcule h.





$(15)^2 = h^2 + (14-x)^2$

$h^2 = 225 - 196 - 28x - x^2$

$h^2 = 29 - 28x - x^2$

$(13)^2 = h^2 + x^2$

$h^2 = 169 - x^2$

Igualando as equações: $169 - x^2 = 29 - 28x - x^2$

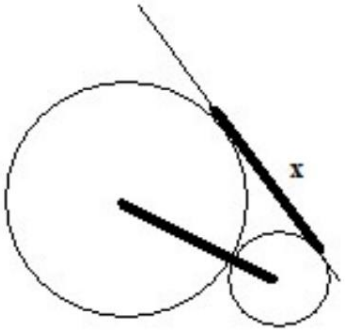
$x = 140/28 = 5$

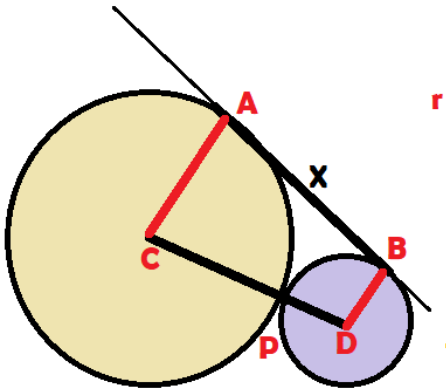
$h^2 = 169 - 5^2$

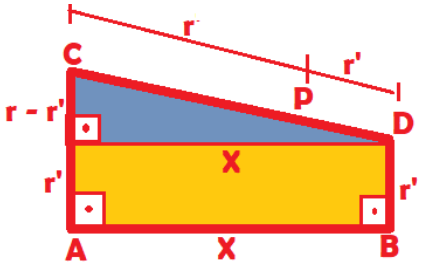
$h^2 = 144$

$h = 12$

10. (FEI) – Calcular o comprimento x na tangente exterior, comum a duas circunferências tangentes externas, de raios r e r'.





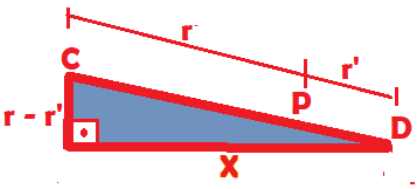


Medida $(\overline{AB}) = X$

Medida $(\overline{CP}) = (\overline{CA}) = r$

Medida $(\overline{DP}) = (\overline{BD}) = r'$

Portanto:



$(r + r')^2 = (r - r')^2 + X^2$

$(r^2 + 2.r.r' + r^2) = (r^2 - 2.r.r' + r^2) + X^2$

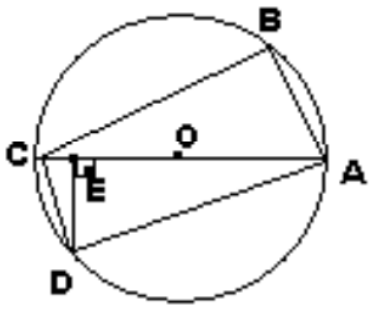
$X^2 = (r^2 + 2.r.r' + r^2) - (r^2 - 2.r.r' + r^2)$

$X^2 = r^2 + 2.r.r' + r^2 + -r^2 + 2.r.r' - r^2$

$X^2 = 4.r.r'$

$X^2 = 2\sqrt{r.r'}$

11. (MACK) – Na figura, AB=30, BC=40, CD=20. O é o centro da circunferência e DEˆ A =90º. O valor de CE é:



Triâgulo ABC
a = hipotenusa = AC
a = AC = ?
b = BC = 40
c = AB = 30

Pitagoras:
$a^2 = b^2 + c^2$
$(AC)^2 = (40)^2 + (30)^2$
$(AC)^2 = (40)^2 + (30)^2$
$(AC)^2 = 1600 + 900$
$(AC)^2 = 2500$
$(AC) = \sqrt{2500}$
(AC) = 50 (hipotenusa do triângulo ABC)

(A)12,5
(B) 10
(C) 8
(D) 5
(E) faltam dados para calcular

de CE é:
CE = n
AC = a = 50
CD = c = 20

$c^2 = a.n$
$(20)^2 = (50)n$
$400 = 50n$
$n = 8$

Alternativa C

Respostas da Tarefa Básica
01. (B)
02. 8m
03. (B)
04. (B)
05. (C)
06. (A)
07. (B)
08. (D)
09. 12
10. $2\sqrt{r.r'}$
11. (C)