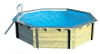
11.7b Surface Area prisms and cylinders with work

Prism: Surface Area

- **Lateral**: $L = Ph$
- **Total**: $T = Ph + 2B$



Cylinder: Surface Area

- **Lateral**: $L = 2\pi rh$
- **Total**: $T = 2\pi rh + 2\pi r^2$

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Right Prism vs Oblique Prism

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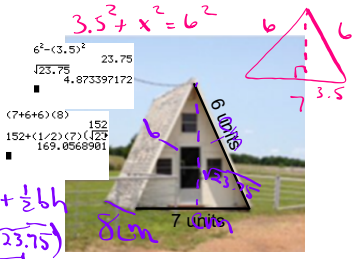
Example 1

- Find the surface area of this prism if the height is 8 cm?

$LA = Ph$
$= (7+6+6)(8)$
$= 152 cm^2$

$3.5^2 + x^2 = 6^2$



$T = LA + B = LA + \frac{1}{2}bh$
$= 152 + \frac{1}{2}(7)(\sqrt{23.75})$
$= 169.057 cm^2$

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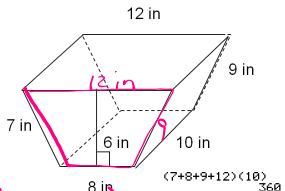
Example 2

- Find the surface area to the nearest tenth of the prism below.

$L = Ph$
$T = Ph + 2B$



$L = (7+8+9+12)(10)$
$= 360 in^2$

$T = LA + 2B = LA + 2(\frac{1}{2}(b_1+b_2)h)$
$= 360 + 2(\frac{1}{2}(8+12)(6)) = 480 in^2$

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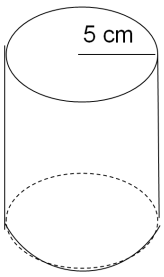
Example 3

- Find the exact surface area of the right cylinder.

$L = 2\pi rh$ or $T = 2\pi rh + 2\pi r^2$

$L = 2\pi(5)(10) = 100\pi cm^2$



$T = 100\pi + 2\pi(5)^2$
$= 100\pi + 50\pi$
$= 150\pi cm^2$

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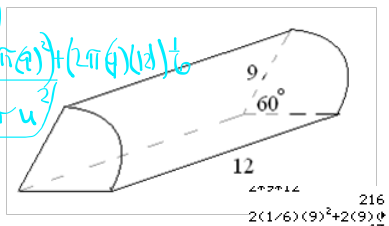
Example 4

- Find the total area of the solid shown.

$SA = 2\square + \frac{1}{6}\square$
$= 2(9)(12) + \frac{1}{6}\pi(9)^2 + (2\pi(9))(12)\frac{1}{6}$
$= 216 + 63\pi u^2$
$\approx 413.920 u^2$



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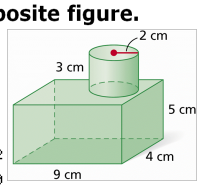
Example 5

Find the surface area of the composite figure.



$T = \square + \square - 2\odot$

$= (Ph + 2B) + (2\pi rh + 2\pi r^2) - 2\pi r^2$

$= (6+4+4+8)(5) + 2(6 \cdot 4) + (2\pi(2)(3) + 2\pi(2)^2) - 2\pi(2)^2$

$= 202 + 20\pi - 8\pi$ $= 202 + 12\pi\ cm^2$ $\approx 239.699\ cm^2$

2*2*3
Ans+8
202+12π
239.6991118

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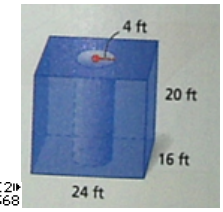
Example 6

- **Find the surface area of the composite figures. Round to the nearest tenth.**



$T = \square - 2\odot + LA_\odot$

$= (Ph + 2B) - (2\pi r^2) + (2\pi rh)$

$= (24+24+16+16)(20) + 2(24 \cdot 16) - 2\pi(4)^2 + 2\pi(4)(20)$

$= 2368 - 32\pi + 160\pi$

$= 2368 + 128\pi\ ft^2$ $\approx 1965.9\ ft^2$

(24+24+16+16)(20
2368
2368−128π
1965.87614

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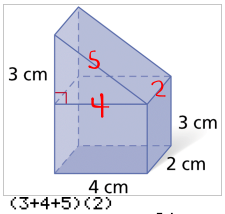
Find the surface area of the composite figures.



$TSA = \square + 2B + \triangle$

$= Ph + Ph + 2(\frac{1}{2}bh)$

$= (4+4+2+2)(3) + (3+4+5)(2) + 2(\frac{1}{2})(3)(4)$

$= 36 + 24 + 12$

$= 72\ cm^2$

(3+4+5)(2)
24
2((1/2)(3)(4))
12
36+24+12
72

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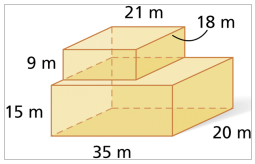
Find the surface area of the composite figures.



$TSA = \square + \square + LA$

$= Ph + 2B + Ph$

$= (35 \cdot 2 + 20 \cdot 2)(15) + 2(35 \cdot 20) + (21 \cdot 2 + 18 \cdot 2)(9)$

$= 1650 + 1400 + 702$

$= 3752\ m^2$

(35*2+20*2)(15)
1650
(21*2+18*2)(9)
702
1650+1400+702
3752

Hint: move prism to check answer!!

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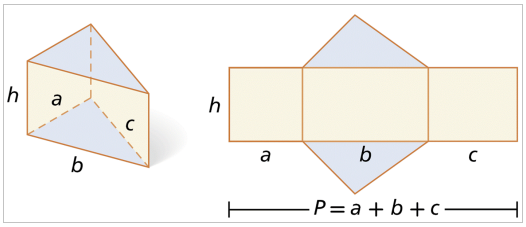
The net of a right prism can be drawn so that the lateral faces form a rectangle with the same height as the prism. The base of the rectangle is equal to the perimeter of the base of the prism.



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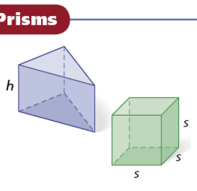
Lateral Area and Surface Area of Right Prisms

The lateral area of a right prism with base perimeter P and height h is $L = Ph$.	
The surface area of a right prism with lateral area L and base area B is $S = L + 2B$, or $S = Ph + 2B$.	
The surface area of a cube with edge length s is $S = 6s^2$.	

The surface area of a right rectangular prism with length ℓ, width w, and height h can be written as $S = 2\ell w + 2wh + 2\ell h$.

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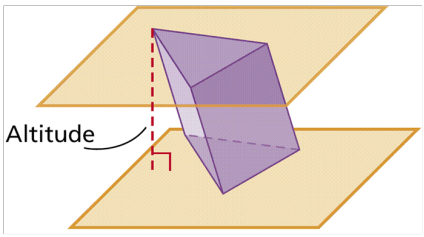
Caution!

The surface area formula is only true for right prisms. To find the surface area of an oblique prism, add the areas of the faces.



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