Areas of Trapezoids, Rhombuses, and Kites

These are the formulas that will be used in this section. The trapezoid formula is provided to you on your MCAS Reference Sheet, so you do not have to memorize that. You do need to MEMORIZE the rhombus and kite formulas.

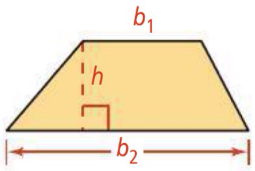
The **height of a trapezoid** is the perpendicular distance between the bases.

take note

Theorem 10-4 Area of a Trapezoid

The area of a trapezoid is half the product of the height and the sum of the bases.

$$A = \frac{1}{2}h(b_1 + b_2)$$

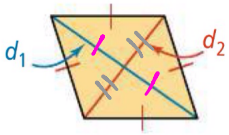


take note

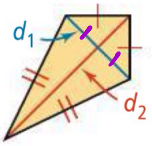
Theorem 10-5 Area of a Rhombus or a Kite

The area of a rhombus or a kite is half the product of the lengths of its diagonals.

$$A = \frac{1}{2}d_1d_2$$



Rhombus



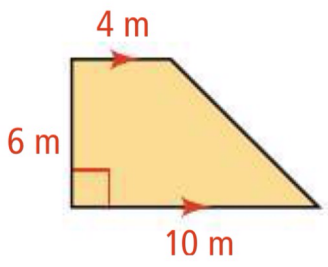
Kite

Note: For trapezoids, the BASES are always the PARALLEL sides. The HEIGHT is always the PERPENDICULAR distance between the bases.

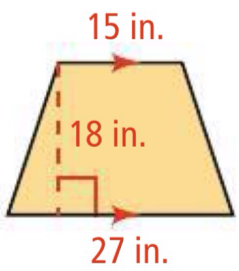
Note: Remember that a RHOMBUS is a parallelogram, so in addition to the formula given above to find the area by multiplying the diagonals, you can also use the formula from Lesson 10-1 where the area of a parallelogram can be calculated by multiplying the base times the height (if you know those dimensions).

Area Examples:

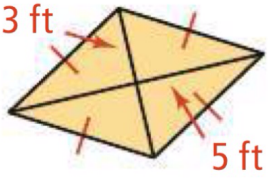
1.



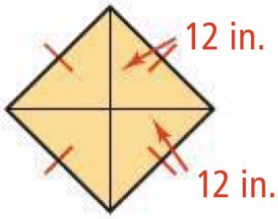
2.



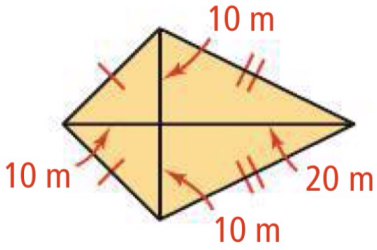
3.



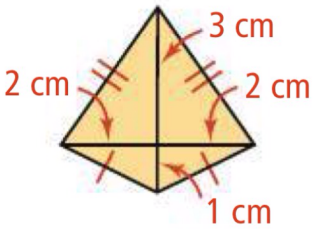
4.



5.

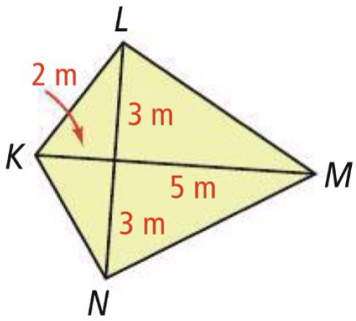


6.



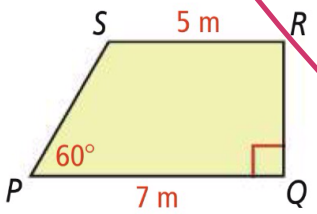
7.

8.

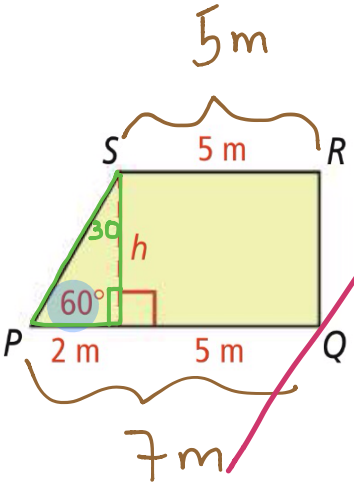


Other Area Examples:

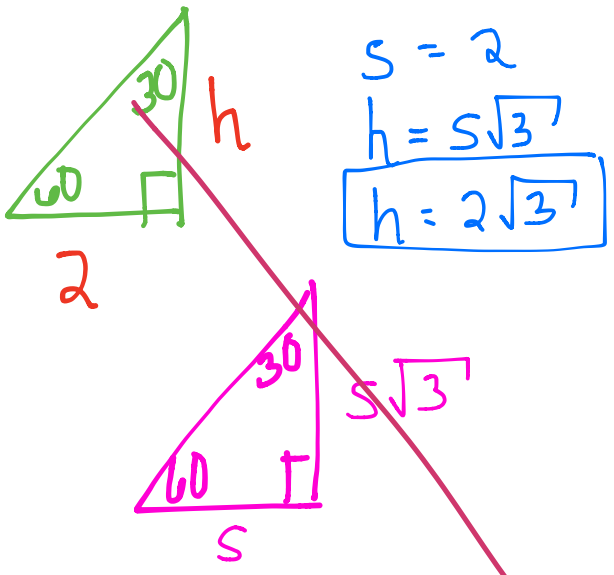
9) What is the area of trapezoid PQRS?



Notice that you know both bases, but you need to find the height of the trapezoid to calculate the area.



Here is the same diagram with the missing height dimension drawn in. How can we find the height?



$s = 2$

$h = s\sqrt{3}$

$\boxed{h = 2\sqrt{3}}$

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}(2\sqrt{3})(5+7)$

$A = \frac{1}{2}(2\sqrt{3})(12)$

$A = (1\sqrt{3})(12)$

$\boxed{A = 12\sqrt{3}\ m^2}$

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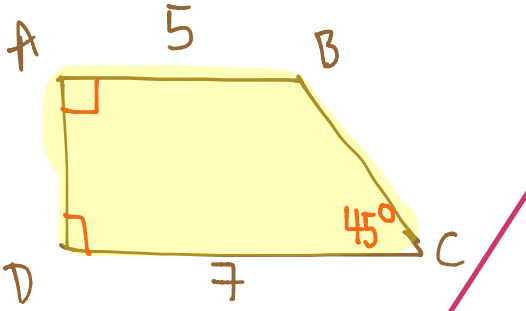
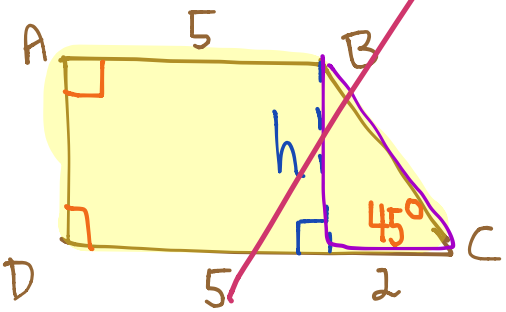
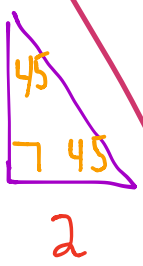
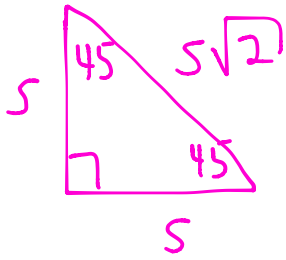
(10) Find the area of trapezoid ABCD.









$s = 2$

$h = s$

$\boxed{h = 2}$

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}(2)(5+7)$

$A = 1/2\,(2)(12) = \boxed{12\ m^2}$

Homework:

Textbook p. 626-627 #17-25, 29