10-1:

Areas of Quadrilaterals and Triangles

OBJECTIVE

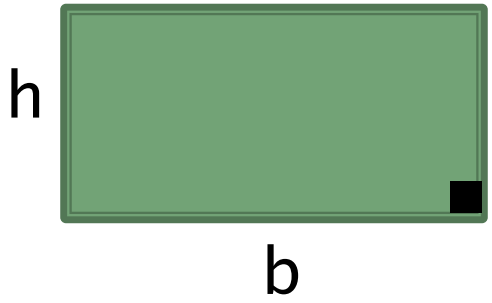
- To find the area of quadrilaterals and triangles

FORMULAS

- Square: $A = s^2$

A = Area
s = side

- Rectangle: $A = bh$



b = base
h = height (altitude)

1. Find the perimeter and area of the square.

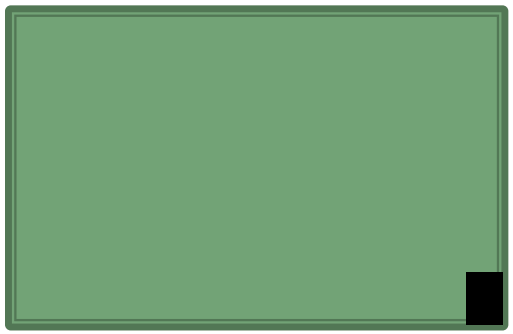
(3x+2) m

$$P = 4s$$
$$P = 4(3x + 2)$$
$$P = (12x + 8)m.$$

$$A = s^2$$
$$A = (3x + 2)^2$$
$$A = (3x + 2)(3x + 2)$$
$$A = 9x^2 + 6x + 6x + 4$$
$$A = (9x^2 + 12x + 4)\ m^2$$

2. Find the base of the rectangle if the area is $A = (6x^2 + 24x - 6)in.$

b

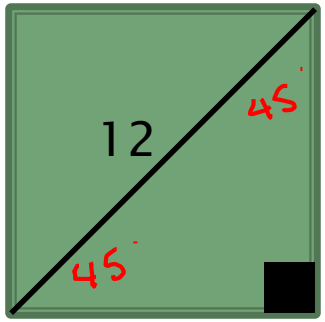


3 in.

$$A = bh$$
$$6x^2 + 24x - 6 = 3b$$
$$b = (2x^2 + 8x - 2)in.$$

CLASS WORK

1. Find the area of the square.



$A = s^2$

$A = (6\sqrt{2})^2$

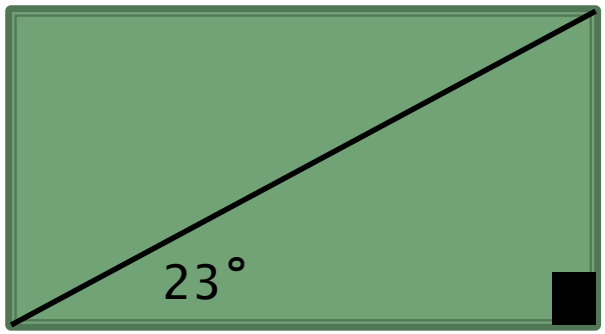
$A = (36)(2)$

$A = 72un^2$

$s = \frac{12}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{2}}{2}$

$s = (6\sqrt{2})$

2. Find the area of the rectangle.



15

b

$A = bh$

$A = (35.3357)(15)$

$A = 530un^2$

$\tan 23° = \frac{15}{b}$

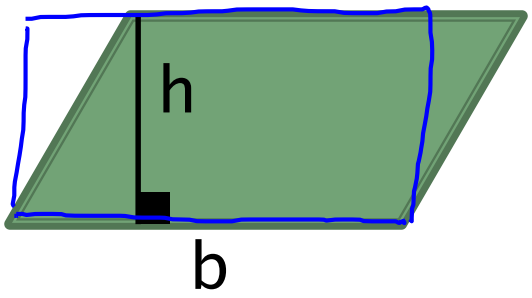
$b = \frac{15}{0.4245}$

$b = 35.3357$

CLASS WORK

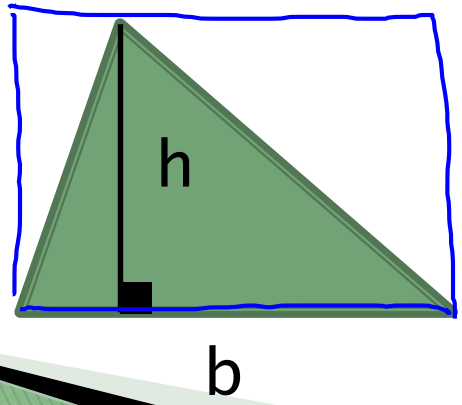
FORMULAS

- Parallellogram: $A = bh$



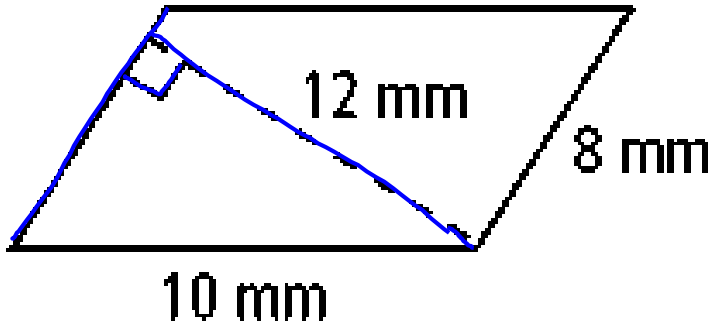
b = base
h = height (altitude)

- Triangle: $A = \frac{1}{2}bh$



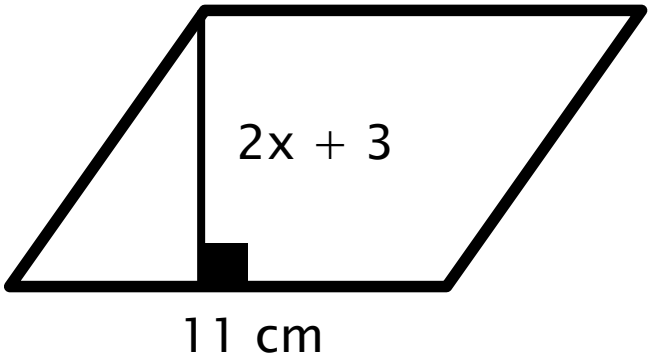
b = base
h = height (altitude)

3. Find the area of the parallelogram.



$$A = bh$$
$$A = 12(8)$$
$$A = 96mm^2$$

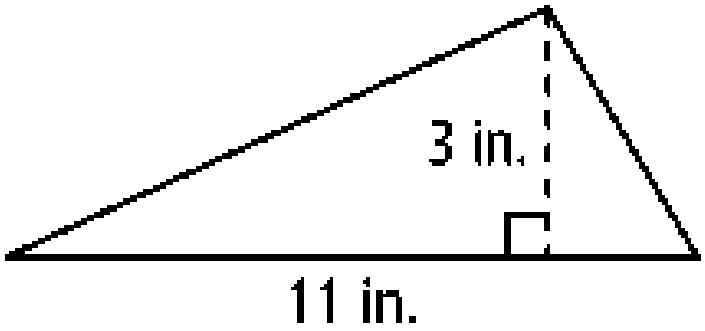
4. Find the area of the parallelogram.



$$A = bh$$
$$A = 11(2x + 3)$$
$$A = (22x + 33)cm^2$$

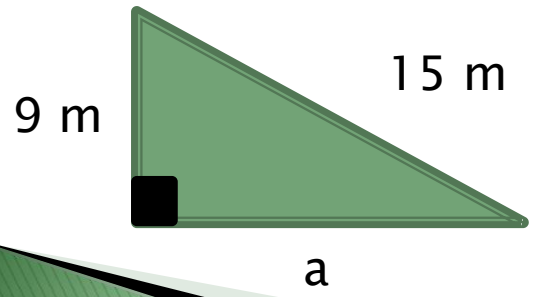
CLASS WORK

5. Find the area of the triangle.



$A = \frac{1}{2}bh$
$A = \frac{1}{2}(11)(3)$
$A = 16.5in^2$

6. A right triangle has a perimeter of 36 meters, a hypotenuse of 15 meters, and a leg of 9 meters. Find the area of the triangle.



$P = a + b + c$
$36 = a + 9 + 15$
$36 = a + 24$
$a = 12$ m

$A = \frac{1}{2}bh$
$A = \frac{1}{2}(9)(12)$
$A = 54m^2$

CLASS WORK

KEY CONCEPT

Area of a Triangle Given SAS Theorem:

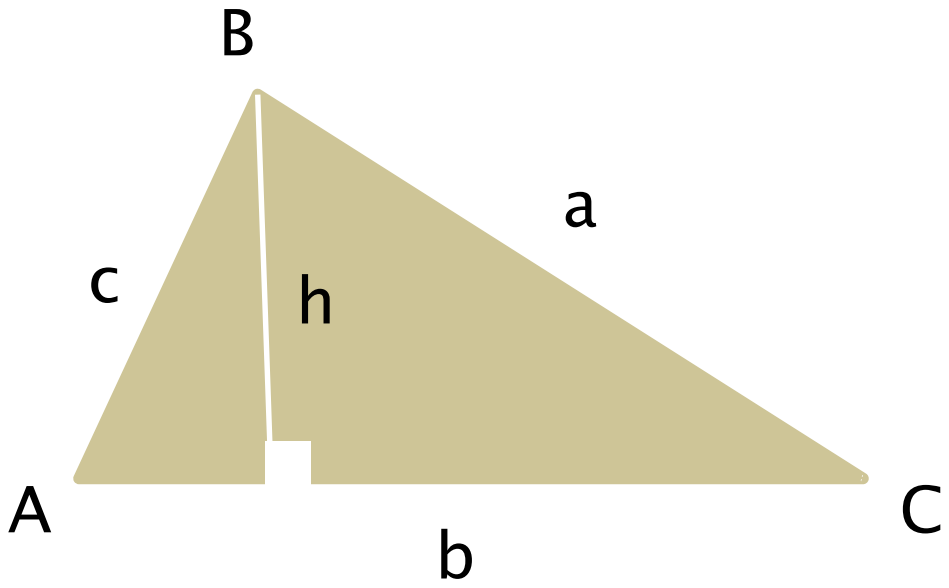
Area of $\Delta ABC = \frac{1}{2}bc(\sin A)$

$$Area = \frac{1}{2}bh$$

$$\sin A = \frac{h}{c}$$

$$h = c(\sin A)$$

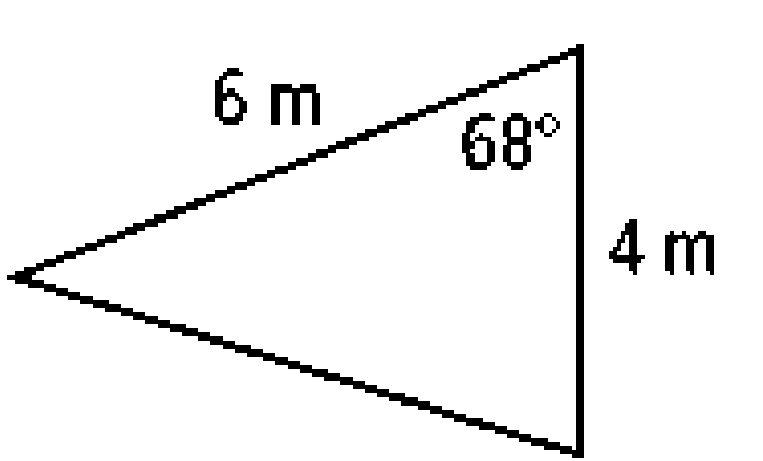
$$Area = \frac{1}{2}bc(\sin A)$$



CLASS WORK

Find the area of the triangle. Round your answers to the nearest tenth.

5.



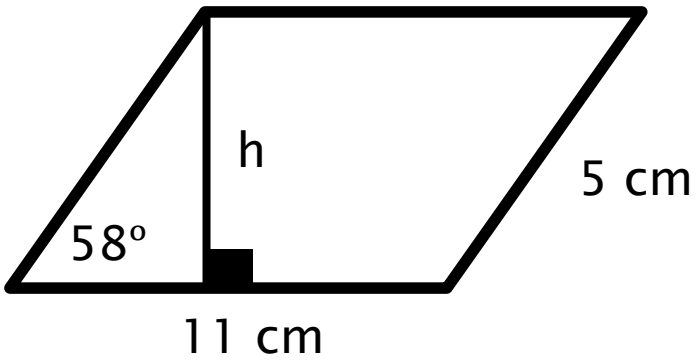
$Area = \frac{1}{2}bc(\sin A)$

$A = \frac{1}{2}(6)(4)(\sin 68^\circ)$

$A = 12(0.9272)$

$A = 11.1\ m^2$

3. Find the area of the parallelogram.



$$\sin 58^\circ = \frac{h}{5}$$
$$h = 5(\sin 58^\circ)$$
$$h = 4.2402$$

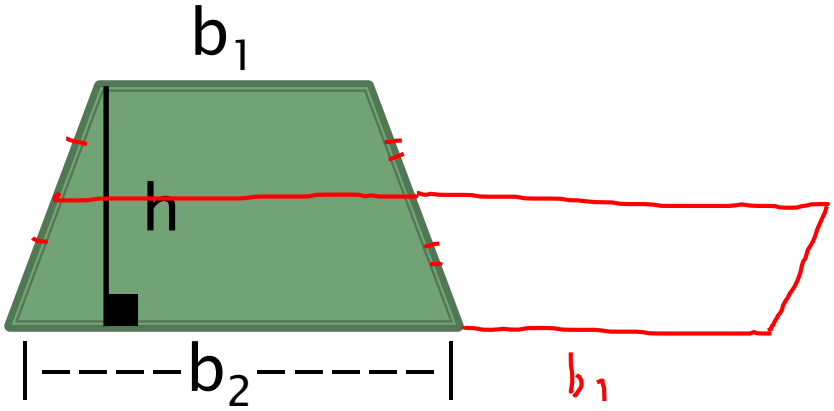
$$A = bcSin\ A$$
$$A = 5(11)(\sin 58)$$
$$A = 46.6\ cm^2$$

$$A = bh$$
$$A = 11(4.2402)$$
$$A = 46.6\ cm^2$$

- CLASS WORK

FORMULAS

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

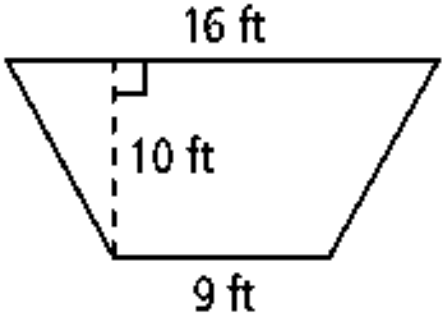


h = height

b_1 and b_2 are bases

Draw the midsegment, then rotate the top portion of the trapezoid to form a long parallelogram with the bottom portion. The height of the parallelogram is half the height (h) of the trapezoid, and the base of the parallelogram is the sum of the two bases.

Find the area of each trapezoid.

8. 

$A = \frac{1}{2}h(b_1 + b_2)$
$A = \frac{1}{2}(10)(9 + 16)$
$A = 5(25)$
$A = 125 ft^2$

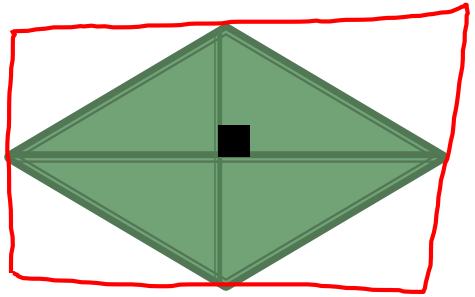
9. Find b_2 in a trapezoid with an area of 231 mm^2, a height of 11 mm, and a b_1 of 23 mm.

$A = \frac{1}{2}h(b_1 + b_2)$
$231 = \frac{1}{2}(11)(23 + b_2)$
$231 = 5.5(23 + b_2)$
$231 = 126.5 + 5.5b_2$
$5.5b_2 = 104.5$
$b_2 = 19\ mm$

- CLASS WORK

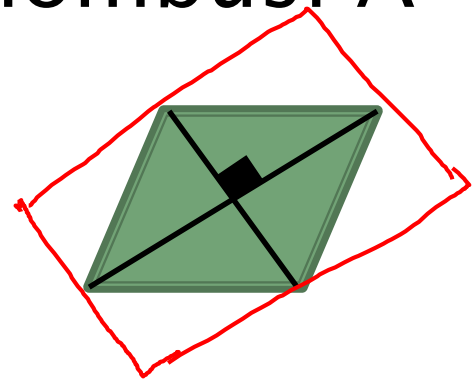
FORMULAS

- Kite: $A = \frac{1}{2}d_1d_2$



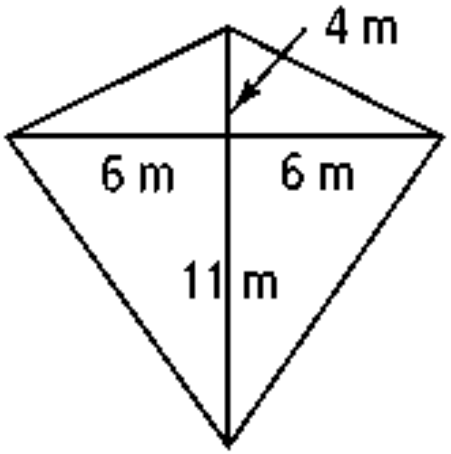
d_1 and d_2 are the diagonals

- Rhombus: $A = \frac{1}{2}\ d_1d_2$



d_1 and d_2 are the diagonals

10. Find the area of the kite.

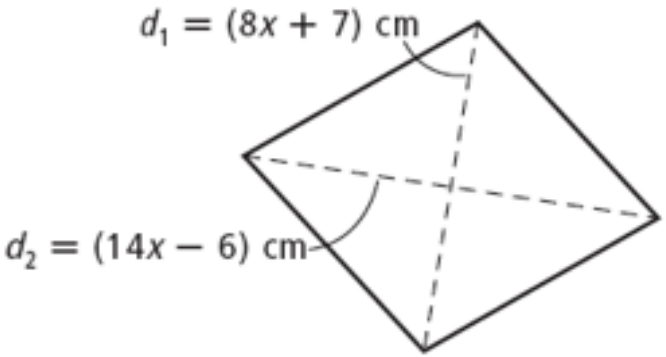


$A = \frac{1}{2}d_1d_2$

$A = \frac{1}{2}(12)(15)$

$A = 90m^2$

11. Find the area of the rhombus.



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

$A = \frac{1}{2}(8x + 7)(14x - 6)$

$A = \frac{1}{2}(112x^2 - 48x + 98x - 42)$

$A = \frac{1}{2}(112x^2 + 50x - 42)$

$A = (56x^2 + 25x - 21)\ cm^2$

CLASS WORK

Pages 682 – 685
12 – 22 even; 23 – 28 all; 34 – 40 even; 52, 54, 56

HOMEWORK