Indicator 30 Class Notes by Mrs. Joshi
Area of Composite Figures-(AL 26, 26a, 25b, 25c)

| I can find the area of composite shapes. (real-world and mathematical) |
|---|
| I can calculate the length of a side, perimeter and area of a polygon in the coordinate plane. (Only same x- or same y- coordinate) |

To find the area of a composite figure, split it up into figures with areas you know how to find. Then add the areas of those figures.

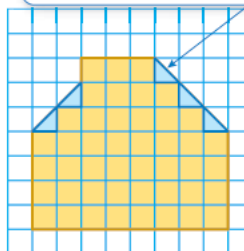**EXAMPLE 1 Finding an Area Using Grid Paper**

Each square on the grid paper is 1 square meter. Find the area of the yellow figure.
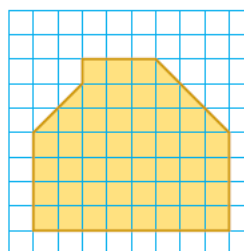
Count the number of squares that lie entirely in the figure. There are 45.
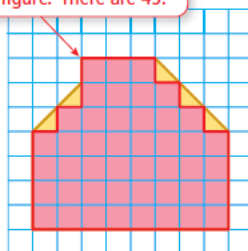
Count the number of half-squares in the figure. There are 5.

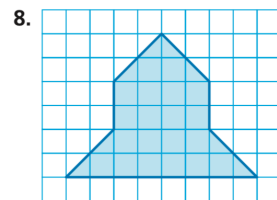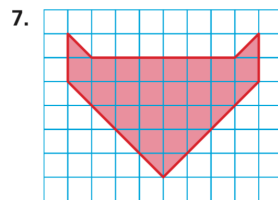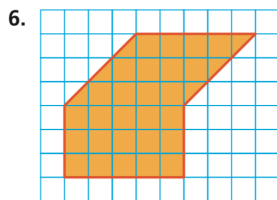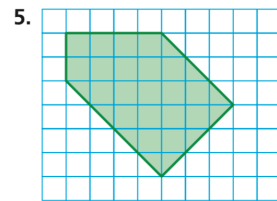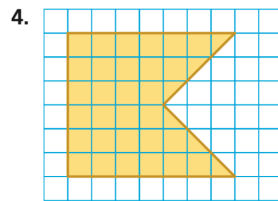The area of a half-square is $1 \div 2 = 0.5$ square meter.

Area of 45 squares: $45 \times 1 = 45$ square meters

Area of 5 half-squares: $5 \times 0.5 = 2.5$ square meters

∴ So, the area is $45 + 2.5 = 47.5$ square meters.

Indicator 30 Class Notes by Mrs. Joshi

Each square on the grid paper is 1 square inch. Find the area of the figure.

3.

4.

5.

6.

7.

8.
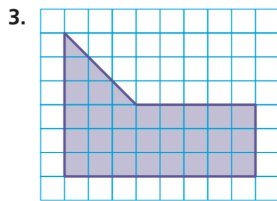
Answer:

3. 28.5 in.^2

4. 33 in.^2

5. 25 in.^2

6. 30 in.^2

7. 25 in.^2

8. 24 in.^2

Indicator 30 Class Notes by Mrs. Joshi

Indicator 12

Areas of Composite Figures

Quadrilaterals

Square

$A = s \times s$
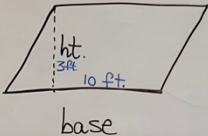$= s^2$
$A = 4 \times 4$
$= 16 \text{ unit}^2$

Mrs. Joshi

Rectangle

$A = length \times width$
$A = lw$
$A = 6 \times 3$
$= 18 \text{ unit}^2$

Indicator 12

Areas of Composite Figures
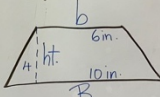
Quadrilaterals

Parallelogram

ht.
3ft   10 ft.
base
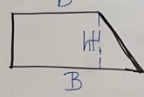
Area = base × height
Area = bh
$A = 10 \times 3$
$= 30 \text{ ft.}^2$

Mrs. Joshi

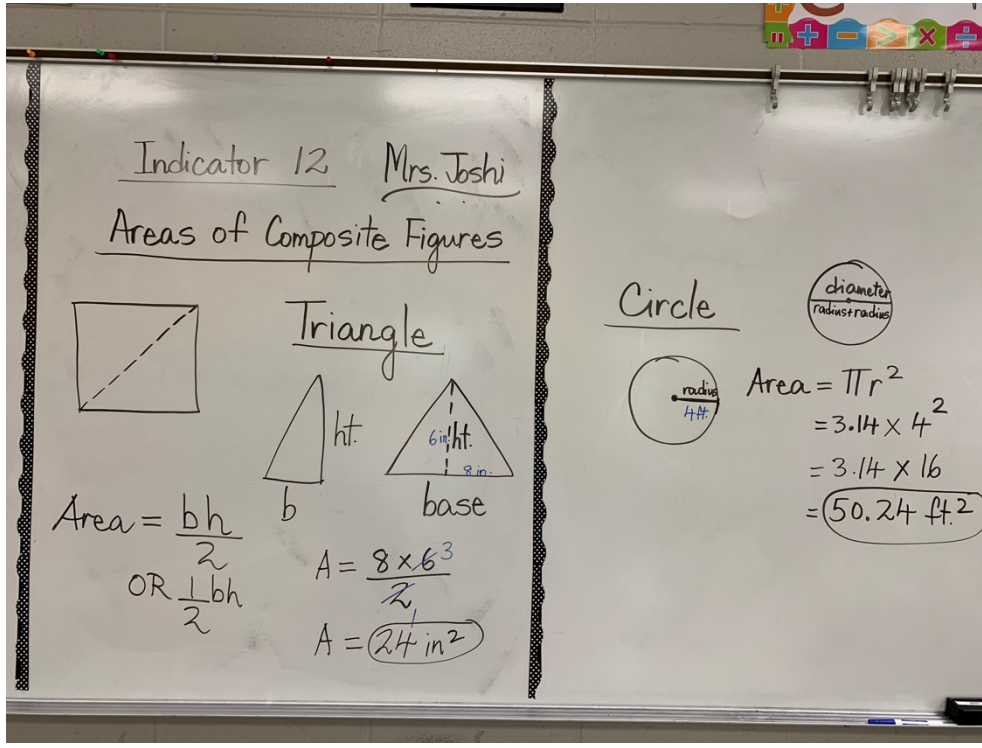Trapezoid

b
6 m.
4 ht.
10 in.
B

OR

b
ht.
B

$A = \dfrac{(B+b) \times h}{2} \rightarrow A = \dfrac{(10+6) \times 4}{2}$

$= \dfrac{16 \times 4}{2}$

$= 8 \times 4 = 32 \text{ in}^2$

Indicator 30 Class Notes by Mrs. Joshi

Indicator 12   Mrs. Joshi

Areas of Composite Figures

Triangle

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

$$OR \frac{1}{2}bh$$

$$A = \frac{8 \times 6^3}{2}$$

$$A = 24 \ in^2$$

ht.

b

6 in. ht.

8 in.

base

Circle

diameter
radius+radius

radius
4 ft.

$$Area = \pi r^2$$

$$= 3.14 \times 4^2$$

$$= 3.14 \times 16$$

$$= 50.24 \ ft.^2$$

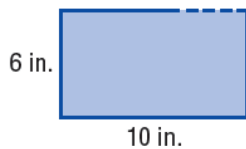**EXAMPLE** **Find the Area of a Composite Figure**

Find the area of the figure at the right.

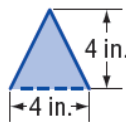The figure can be separated into a rectangle and a triangle. Find the area of each.

Area of Rectangle
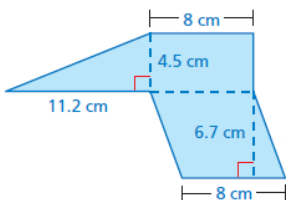
Area of Triangle

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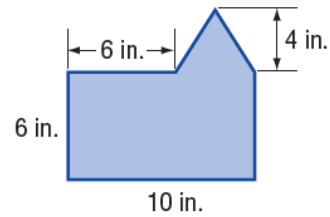
$A = \frac{1}{2}bh$

$A = 10 \cdot 6$ or 60

$A = \frac{1}{2}(4)(4)$ or 8 — The base of the triangle is $10 - 6$ or 4 inches.

The area is $60 + 8$ or 68 square inches.

EXAMPLE ③ **Finding an Area**

Find the area of the figure.

The figure is made up of a triangle, a rectangle, and a parallelogram. Find the area of each figure.

Area of triangle

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

$= \frac{1}{2}(11.2)(4.5)$

$= 25.2$

Area of rectangle

$A = \ell w$

$= (8)(4.5)$

$= 36$

Area of parallelogram

$A = bh$

$= (8)(6.7)$

$= 53.6$

∴ So, the area is $25.2 + 36 + 53.6 = 114.8$ square centimeters.

Find the area of the figure at the right.

The figure can be separated into a square and a rectangle. The shared rectangle, however, will be counted twice if the areas are added, so the area of the small rectangle, 6 × 7 or 42, must be subtracted from the total.

12 cm
6 cm
8 cm
12 cm
12 cm
15 cm
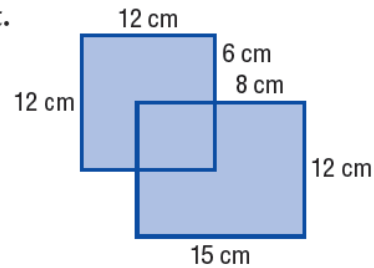
The area of the square is 12 × 12 or 144 square centimeters.

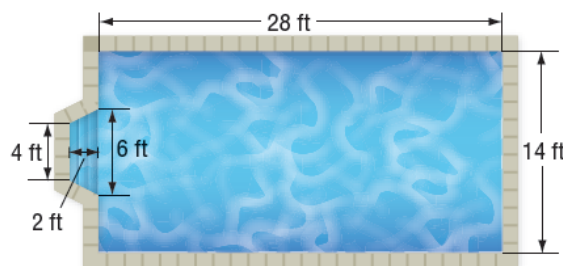The area of the rectangle is 15 × 12 or 180 square centimeters.

The sum of the areas is 144 + 180 or 324 square centimeters.

Since the small rectangle was counted twice, subtract its area from the total. $324 - 42 = 282$

So, the area of the figure is 282 square centimeters.

Real-World EXAMPLES

POOLS The diagram of the pool from the beginning of the lesson is shown below. Find the area of the pool's floor.

28 ft
4 ft
6 ft
14 ft
2 ft

The figure can be separated into a rectangle and a trapezoid.
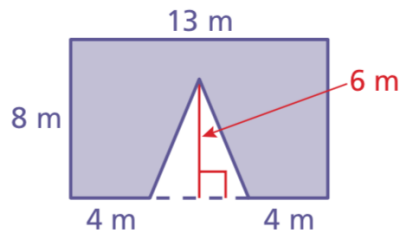
The area of the rectangle is 28 × 14 or 392 square feet.

The area of the trapezoid is $\frac{1}{2}(2)(4 + 6)$ or 10 square feet.

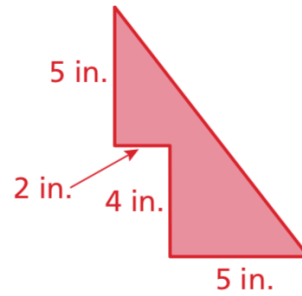So, the area of the pool's floor is 392 + 10 or 402 square feet.

Find the area of the figure.

12.

13 m
8 m
6 m
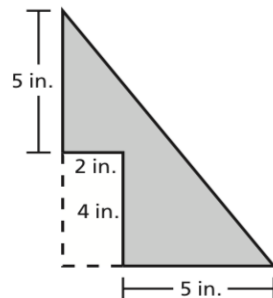4 m   4 m

13.

5 in.
2 in.
4 in.
5 in.

Answer:

12. Area of rectangle: $A = \ell w = 13(8) = 104$

Area of triangle: $A = \dfrac{1}{2}bh = \dfrac{1}{2}(5)(6) = 15$

The area is $104 - 15 = 89$ square meters.

13. To find the area, draw a rectangle on the figure as shown.

5 in.
2 in.
4 in.
5 in.

Find the area of the large triangle, then subtract the area of the rectangle.

Area of large triangle: $A = \dfrac{1}{2}bh = \dfrac{1}{2}(7)(9) = 31.5$

Area of rectangle: $A = \ell w = 4(2) = 8$

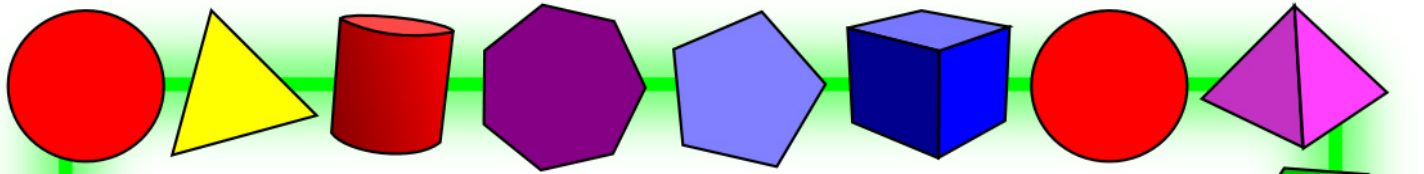The area is $31.5 - 8 = 23.5$ square inches.

Indicator 30 Class Notes by Mrs. Joshi

Use the space below to show a composite figure with an area of 16 square inches made from a rectangle and a triangle.

Answer:

The best way to answer this would be to use the formulas for rectangle and triangle. If I take a rectangle with an area of length x width of 4 x 2 = 8 square units, then I need 8 square units of the triangle. The area of a triangle is base x height divided by 2 or ½ base x height. In order to get 8 square units as the area of the triangle, I can already see based on my drawing below, that the base of the triangle is 4. So, I need to figure out that 4 times what number divided by 2 will give me 8. I know that 4 x 4 = 16 and 16/2=8. Therefore, the height of the triangle needs to be 4 units. See drawing below. This is a sample drawing.

Indicator 30 Class Notes by Mrs. Joshi