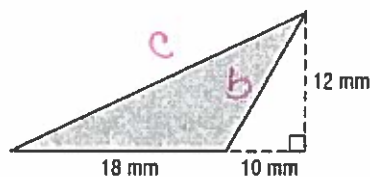Area of a Parallelogram   A = bh   Area of a Trapezoid $A = \frac{1}{2}h(b_1 + b_2)$ Area of Rhombus/Kite A = ½ d_1d_2

Area of a Triangle   A = ½ bh   Area of a Circle $A = \pi r^2$ $\dfrac{area\ of\ sector}{area\ of\ circle} = \dfrac{central\ angle}{360}$

Find the perimeter and area of each parallelogram or triangle. Round to the nearest tenth if necessary.

1.

c   b   12 mm
18 mm   10 mm

$A = \frac{1}{2}(18)(12)$
$A = 108\ mm^2$

$10^2 + 12^2 = b^2$
$100 + 144 = b^2$
$\sqrt{244} = \sqrt{b^2}$
$15.6 = b$

$28^2 + 12^2 = c^2$
$784 + 144 = c^2$
$928 = c^2$
$30.5 = c$
$P = 18 + 15.6 + 30.5 = 64.1\ mm$

2.

17 in.
13 in.   17 in.

$17^2 = 289 = 24$

$A = \frac{1}{2}bh$
$A = \frac{1}{2}(17)(17)$
$A = 144.5\ in^2$

$P = 17 + 17 + 24$
$P = 58\ in$

3. The height of a parallelogram is 10 feet more than its base. If the area of the parallelogram is 1200 square feet, find its base and height.

let b = base
10 + b = height

$1200 = \frac{10+b}{1}(b)$
$1200 = 10b + b^2$
$0 = b^2 + 10b - 1200$
$0 = (b + 40)(b - 30)$

$b + 40 = 0$
$b = -40$

$b - 30 = 0$
$b = 30$

base = 30 ft
height = 40 ft

4. The base of a triangle is one half of its height. If the area of the triangle is 196 square millimeters, find its base and height.

h = height
$\frac{1}{2}h$ = base

$196 = \frac{1}{2}(\frac{1}{2}h)(h)$
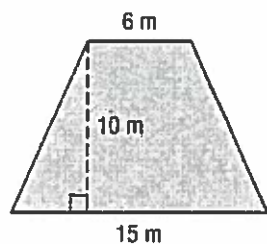$196 = \frac{1}{4}h^2$
$\sqrt{784} = \sqrt{h^2}$
$28 = h$

height = 28 mm
base = $\frac{1}{2}(28) = 14\ mm$

Find the area of each trapezoid, rhombus, or kite.

5.

6 m
10 m
15 m

$A = \frac{1}{2}(10)(6 + 15)$
$A = 105\ m^2$

6.

12 mm
14 mm
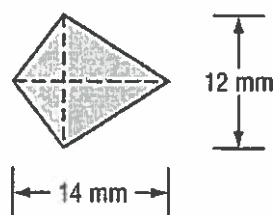
$A = \frac{1}{2}(14)(12)$
$A = 84\ mm^2$

7. One diagonal of a kite is four times as long as the other diagonal. If the area of the kite is 72 square meters, what are the lengths of the diagonals?

d = diagonal 1
4d = diagonal 2

$72 = \frac{1}{2}(d)(4d)$
$72 = 2d^2$
$36 = d^2$
$6 = d$

The diagonals are 6m and 24m.

8. A trapezoid has a height of 24 meters, a base of 4 meters, and an area of 264 square meters. What is the length of the other base?

base is 18 meters

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

$264 = \frac{1}{2}(24)(4+b)$

$264 = 12(4+b)$

$264 = 48 + 12b$

$216 = 12b$

$18 = b$

9. Find the diameter of a circle with an area of 1134.1 square millimeters.

diameter ≈ 38 mm

$A = \pi r^2$

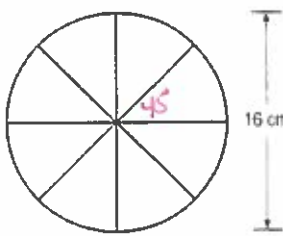$1134.1 = \pi r^2$

$\sqrt{\frac{1134.1}{\pi}} = \sqrt{r^2}$

$19 = r$

$d = 2r$

$d = 2(19)$

$d = 38$

10. GAMES Jason wants to make a spinner for a new board game he invented. The spinner is a circle divided into 8 congruent pieces, what is the area of each piece to the nearest tenth?

$\frac{360}{8} = 45$

16 cm $= d$

$r = \frac{1}{2}d$

$r = \frac{1}{2}(16)$
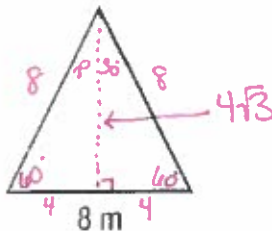
$r = 8$ cm

$\frac{45}{360} = \frac{x}{\pi(8)^2}$

$\frac{45}{360} = \frac{x}{64\pi}$

$25.1 \approx x$

The area of each piece is about 25.1 cm².

Find the area of each regular polygon. Round to the nearest tenth.
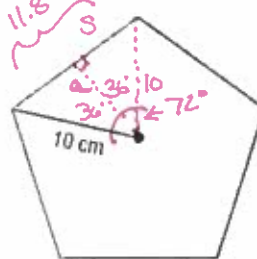
11.

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

$A = \frac{1}{2}(8)(4\sqrt{3})$

$A = 16\sqrt{3}$ m² ≈ 27.7 m²

12.

$\frac{360}{5} = 72$

$\sin 36 = \frac{S}{10}$

$10\sin 36 = S$

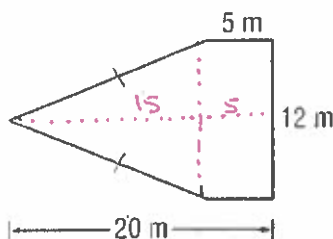$5.9 \approx S$

$\cos 36 = \frac{a}{10}$

$10\cos 36 = a$

$8.1 = a$

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

$A = \frac{1}{2}(8.1)(5 \cdot 11.8)$

$A = 238.95 \approx 239$ cm²

Find the area of each figure. Round to the nearest tenth if necessary.

13.

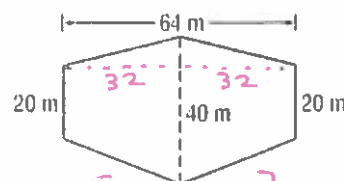
$A_\triangle + A_\square = A$

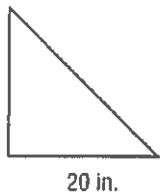$\frac{1}{2}(12)(15) + 5(12) = A$

$90 + 60 = A$

$150 \, m^2 = A$

14.

$A = 2\left[\frac{1}{2}h(b_1+b_2)\right]$

$A = 2\left[\frac{1}{2}(32)(20+40)\right]$

$A = 1920 \, m^2$

15. Find the area of the shaded figure.

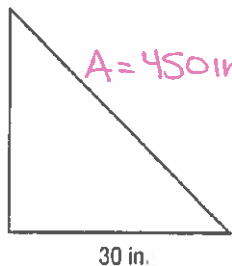$A = 450 \text{ in}^2$

20 in.

30 in.

$A = 200 \text{ in}^2$

Scale factor for sides $= \frac{30}{20} = \frac{3}{2}$

for area $\left(\frac{3}{2}\right)^2 = \frac{9}{4}$

$\frac{9}{4} = \frac{x}{200}$

$1800 = 4x$

$450 = x$

16. Find x

21 m

$A = 4590 \text{ m}^2$

7m
x
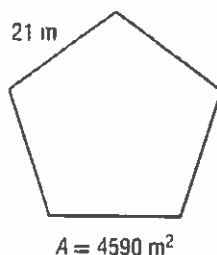
$A = 510 \text{ m}^2$

Scale factor for area $= \frac{510}{4590} = \frac{1}{9}$

for length $= \sqrt{\frac{1}{9}} = \frac{1}{3}$
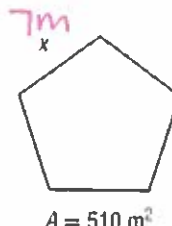
$\frac{1}{3} = \frac{x}{21}$

$3x = 21$

$x = 7m$

17. SCIENCE PROJECT Matt has two posters for his science project. Each poster is a rectangle. The length of the larger poster is 11 inches. The length of the smaller poster is 6 inches. What is the area of the smaller poster if the larger poster is 93.5 square inches?

11in

6in

$A = 93.5 \text{ in}^2$

$\frac{6}{11} =$ scale factor for lengths

$\left(\frac{6}{11}\right)^2 = \frac{36}{121} =$ scale factor for area

$\frac{36}{121} = \frac{x}{93.5}$

$121x = 3364$

$x \approx 27.8 \text{ in}^2$

18. If the length of a side of a rectangle is doubled, what happens to its area?

area is multiplied by 2^2 or 4

19. If the scale factor between the area of two similar figures is 9, what is the scale factor of their bases?

scale factor of the bases is $\sqrt{9}$ or 3