Douglas College

**Douglas College Learning Centre**

# PERIMETER, CIRCUMFERENCE and AREA

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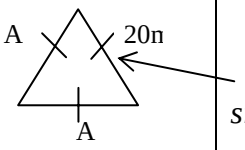
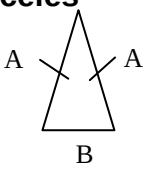
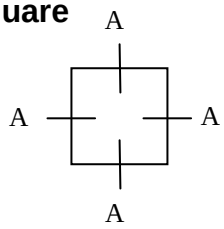
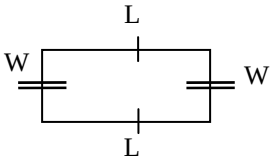
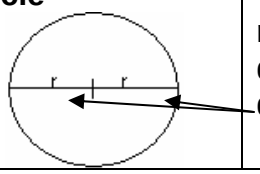
**Perimeter**: the distance around an object or sum of it's sides

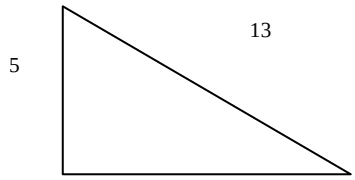
**Circumference**: the distance around a circle

| Shape | Sides | Formula | Example |
|---|---|---|---|
| **triangles: equilateral**   | 3 equal<br>*slashes indicate sides of equal length* | P = 3A | *if* A = 4<br>*then* P = 3(4) =12 |
| **isosceles**   | 2 equal<br>1 other | P = 2A + B | *if* A = 5 *and* B = 2<br>*then* P = 2(5) + 2 = 12 |
| **square**   | 4 equal | P = 4A | *if* A = 3<br>*then* P = 4(3) = 12 |
| **rectangle**   | 2 pairs of sides of different length & width | P = 2W + 2L<br>or<br>P = 2(W+L) | *if* W = 2 *and* L = 5<br>*then* P = 2(2) + 2(5) = 14 |
| **circle**   | r = radius<br>d = diameter<br>d = 2r | C = 2 π r<br>= πd<br>π ≈ 3.14 | *if* r = 3<br>*then* C = 2(3.14)(3) = 18.84 |

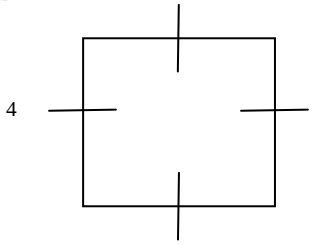
## Perimeter and Circumference Worksheet

1. Calculate the perimeter of the shapes:

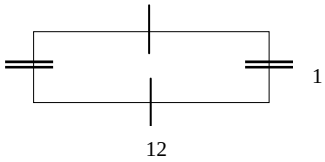
**A**



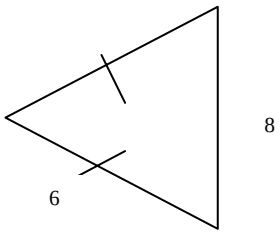

**B**



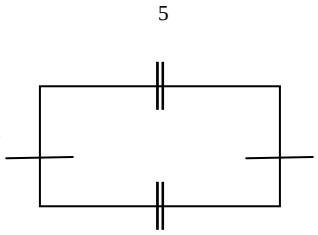

**C**



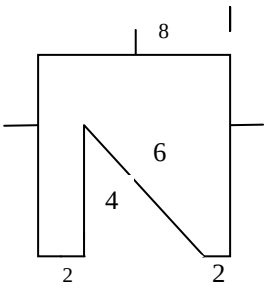

**D**



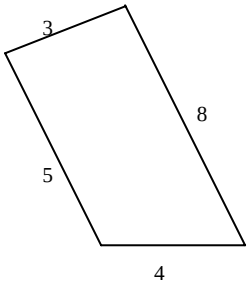

**E**



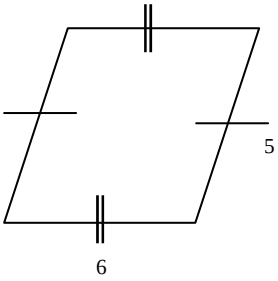

**F**



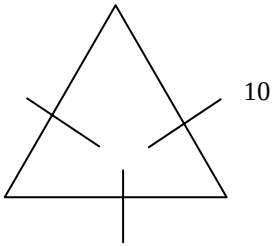

**G**



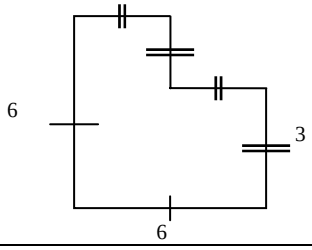

**H**



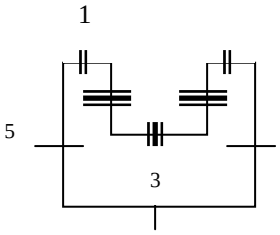

**I**



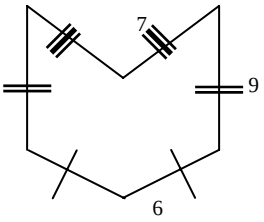

**J**



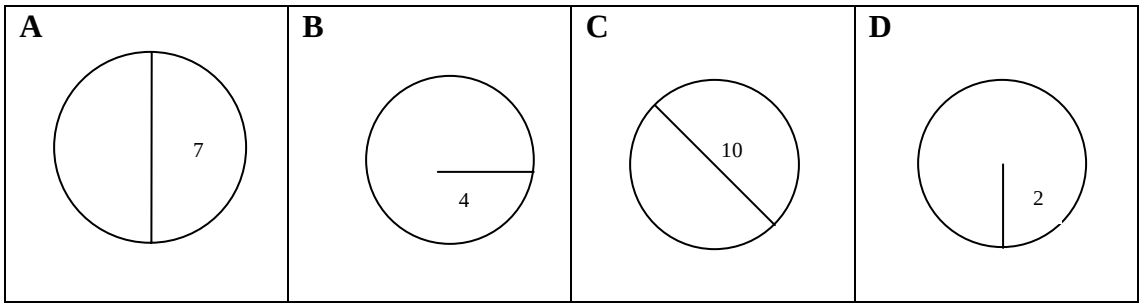

**K**



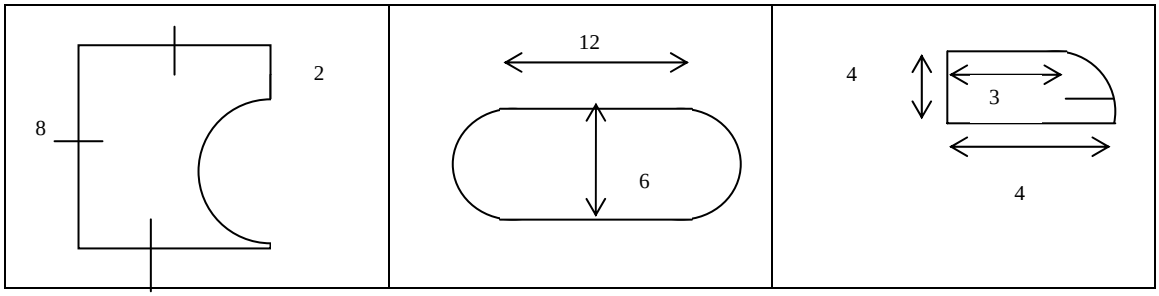

**L**



2. Calculate the circumference to one tenth accuracy. Use $\pi = 3.14$




3. Find these shapes' perimeters:



# Perimeter and Circumference Worksheet Answers

1. A $P = 5 + 12 + 13$
$= 30$

B $P = 4(4)$
$= 16$

C $P = 2(12) + 2(1)$
$= 26$

D $P = 2(6) + 8$
$= 20$

E $P = 2(3) + 2(5)$
$= 16$

F $P = 3(8) + 2 + 4 + 6 + 2$
$= 38$

G $P = 3 + 8 + 5 + 4$
$= 20$

H $P = 2(5) + 2(6)$
$= 22$

I $P = 3(10)$
$= 30$

J $P = 2(6) + 4(3)$
$= 24$

K $P = 3(5) + 3(3) + 2(1)$
$= 26$

L $P = 2(6) + 2(7) + 2(9)$
$= 44$

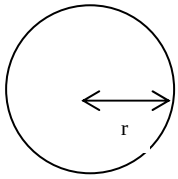
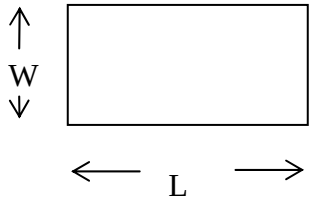
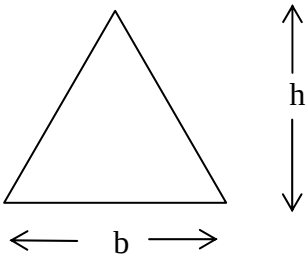
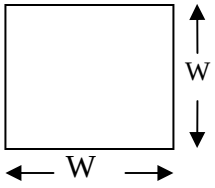
3A $P = 3(8) + 2 + ½ (6 \pi)$
$= 35.42$

B $P = 2(12) + 6 \pi$
$= 42.84$

C $P = 5 + 4 + 3 + ¼ [2\pi (2)] + 2$
$= 17.14$

# AREA

**What is area?** the size of a space
usually enclosed by a perimeter
Note: measurements are in units squared

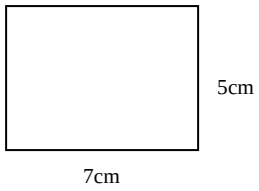
| Shape | Formula | Example |
|---|---|---|
| Circle   | $A = \pi r^2$ | r = 1 m<br><br>$A = 3.14\ (1m)^2$<br>$=3.14\ m^2$ |
| Rectangle   | A = LW | L = 5 cm<br>W=3 cm<br><br>A = 5 cm × 3 cm<br>$=15\ cm^2$ |
| Triangle   | A = ½ bh<br><br>any side of a triangle can be the base | b = 1 ½ft.<br>h = 2 ft.<br><br>A = ½ (1 ½ft.) (2 ft.)<br>$= 1½\ ft^2$ |
| Square   | $A = W^2$ | W = 5 cm<br><br>$A = 25\ cm^2$ |

Others
- divide any large area into smaller areas of these shapes
- sum the shapes of the small areas to find the size of the original area
- subtracting areas from a larger area can also work for some problems

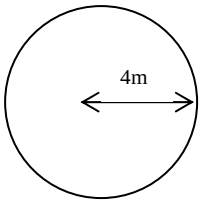
# Area Worksheet

1. Calculate the area of these shapes:

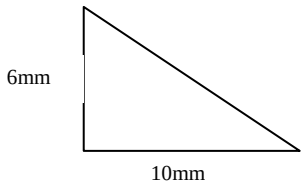
A



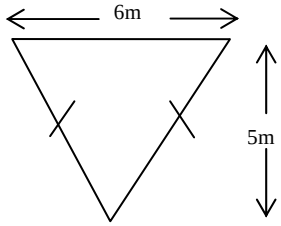

B



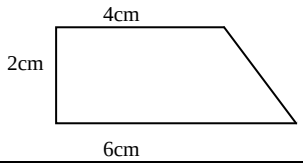

C



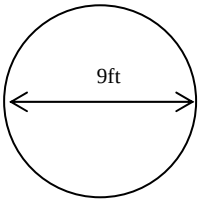

D



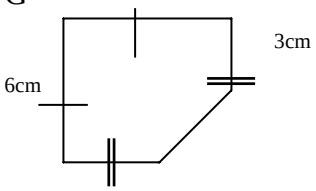

E



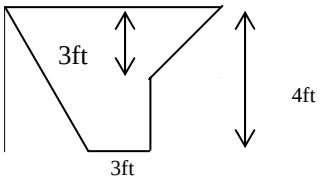

F



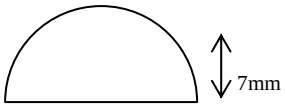

G



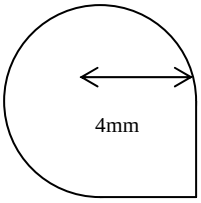

H



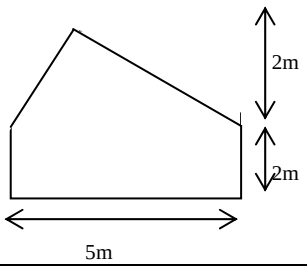

I



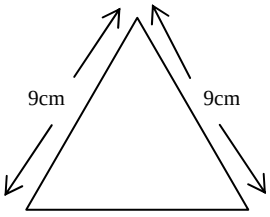

J



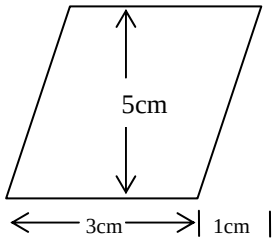

K



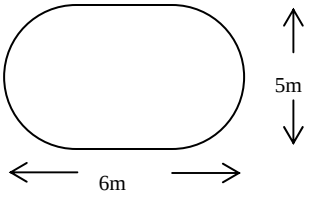

L



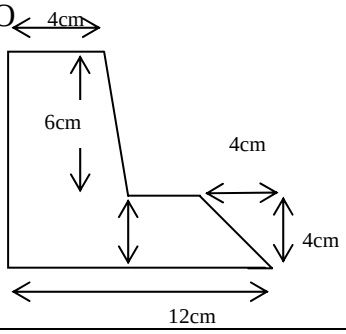

M



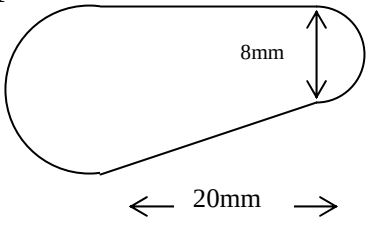

N



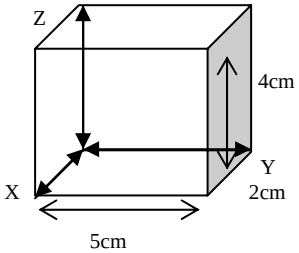

O




P




Q



# Area Worksheet Answers:

| | | |
|---|---|---|
| **A**<br>$A = L \times W$<br>$= 7\text{ cm} \times 5\text{ cm}$<br>$= 35\text{ cm}^2$ | **G**<br>$A = A - A_{\Delta}$<br>$= 6\text{ cm} \times 6\text{ cm} - \frac{1}{2} \times 3\text{cm} \times 3\text{cm}$<br>$= 36\text{ cm}^2 - 4.5\text{ cm}^2$<br>$= 31.5\text{ cm}^2$ | **M**<br>$A = 2A_{\Delta} + A$<br>$= 2 \times \frac{1}{2} \times 1\text{cm} \times 5\text{cm} + 2\text{cm} \times 5\text{cm}$<br>$= 5\text{ cm}^2 + 10\text{ cm}^2$<br>$= 15\text{ cm}^2$ |
| **B**<br>$A = \pi r^2$<br>$= 3.14 \times 16\text{ m}^2$<br>$= 50.24\text{ m}^2$ | **H**<br>$A = A_{\Delta} + A + A_{\Delta}$<br>$= \frac{1}{2} \times 3\text{ ft} \times 4\text{ ft} + 3\text{ ft} \times 4\text{ ft} + \frac{1}{2} \times 3\text{ft} \times 3\text{ ft}$<br>$= 6\text{ ft}^2 + 12\text{ ft}^2 + 4.5\text{ ft}$<br>$= 22.5\text{ ft}^2$ | **N**<br>$A = A_O + A$<br>$= \pi r^2 + 1\text{ m} \times 5\text{m}$<br>$= 3.14 \times (2.5\text{m})^2 + 5\text{m}^2$<br>$= 19.63\text{ m}^2 + 5\text{m}^2$<br>$= 24.63\text{ m}^2$ |
| **C**<br>$A = \frac{1}{2}\ b\ h$<br>$= \frac{1}{2} \times 10\text{ mm} \times 6\text{ mm}$<br>$= 30\text{ mm}^2$ | **I**<br>$A = \frac{1}{2}\ A_O$<br>$= \frac{1}{2}\ \pi\ r^2$<br>$= \frac{1}{2} \times 3.14 \times (7\text{mm})^2$<br>$= 76.93\text{ mm}^2$ | **O**<br>$A = A + A_{\Delta} + A_{\Delta}$<br>$= 4\text{ cm} \times 10\text{ cm} +$<br>$\frac{1}{2} \times 6\text{ cm} \times 2\text{ cm} +$<br>$2\text{ cm} \times 4\text{ cm} +$<br>$\frac{1}{2} \times 4\text{ cm} \times 4\text{ cm}$<br>$= 40\text{ cm}^2 + 6\text{ cm}^2 +$<br>$8\text{ cm}^2 + 8\text{ cm}^2$<br>$= 61\text{ cm}^2$ |
| **D**<br>$A = \frac{1}{2}\ b\ h$<br>$= \frac{1}{2} \times 6\text{ m} \times 5\text{ m}$<br>$= 30\text{ m}^2$ | **J**<br>$A = \frac{3}{4}\ A_O + A$<br>$= \frac{3}{4}\pi r^2 + 4\text{mm} \times 4\text{mm}$<br>$= \frac{3}{4} \times 3.14 \times (4\text{mm})^2 + 16\text{mm}^2$<br>$= 37.68\text{ mm}^2 + 16\text{ mm}^2$<br>$= 53.68\text{ mm}^2$ | **P**<br>$A = \frac{1}{2}A_O + A + A_{\Delta} + \frac{1}{2}AO$<br>$= \frac{1}{2} \times 3.14 \times (8\text{mm})^2 +$<br>$8\text{ mm} \times 20\text{ mm} +$<br>$\frac{1}{2} \times 3.14 \times (4\text{mm})^2 +$<br>$\frac{1}{2} \times 20\text{ mm} \times 8\text{ mm}$<br>$= 100.48\text{ mm}^2 + 160\text{ mm}^2$<br>$+ 25.12\text{ mm}^2 + 80\text{ mm}^2$<br>$= 365.6\text{ mm}^2$ |
| **E**<br>$A = A + A_{\Delta}$<br>$= 2\text{ cm} \times 4\text{xm} + \frac{1}{2} \times 2\text{ cm}$<br>$= 8\text{ cm} + 2\text{ cm}^2$<br>$= 10\text{ cm}^2$ | **K**<br>$A = A_{\Delta} + A$<br>$= \frac{1}{2} \times 2\text{cm} \times 5\text{ m} + 2\text{ m} \times 5\text{m}$<br>$= 5\text{ m}^2 + 10\text{ m}^2$<br>$= 15\text{ m}^2$ | **Q**<br>$A = 2A_{xy} + 2Axz + 2A_{yz}$<br>$= 2 \times 2\text{cm} \times 5\text{cm} + 2x2\text{cm} \times 4\text{cm} + 2 \times 5\text{cm} \times 4\text{cm}$<br>$= 20\text{ cm}^2 + 16\text{ cm}^2 + 40\text{ cm}^2$<br>$= 76\text{ cm}^2$ |
| **F**<br>$A = \pi\ r^2$<br>$= \pi\ (9/2\text{ ft})^2$<br>$= 3.14 \times 20.25\text{ ft}^2$<br>$= 63.59\text{ ft}^2$ | **L**<br>$A = \frac{1}{2}\ b\ h$<br>$= \frac{1}{2} \times 9\text{ mm} \times 9\text{ mm}$<br>$= 40.5\text{ mm}^2$ | |