

Piston Displacement Lesson 1 Worksheet

Name

Key

Solve the following using the cubic inch displacement formula or volume of a cylinder formula. Show work and use appropriate units.

1. A V-6 engine block has a bore of 4 inches, a stroke of 3 inches. Calculate the cubic inch displacement.

$$CID = .7854 \times \text{Bore}^2 \times \text{Stroke} \times \# \text{Cylinders}$$

$$CID = .7854 \times 4^2 \times 3 \times 6$$

$$CID = .7854 \times 16 \times 3 \times 6$$

$$CID = 226$$

2. A V-4 engine block has a bore of 3 inches, a stroke of 3.25 inches. Calculate the cubic inch displacement.

$$CID = .7854 \times 3^2 \times 3.25 \times 4$$

$$CID = .7854 \times 9 \times 3.25 \times 4$$

$$CID = 92$$

3. A 4-cylinder engine block has a bore of 4.03 inches, a stroke of 3.75 inches. Calculate the cubic inch displacement.

$$CID = .7854 \times 4.03^2 \times 3.75 \times 4$$

$$CID = .7854 \times 16.2409 \times 3.75 \times 4$$

$$CID = 191$$

Caution Students about rounding in middle of problem. It will affect the final outcome

4. A V-6 engine block has a bore of 4.03 inches, a stroke of 3.125 inches. Calculate the cubic inch displacement.

$$CID = .7854 \times 4.03^2 \times 3.125 \times 6$$

$$CID = .7854 \times 16.2409 \times 3.125 \times 6$$

$$CID = 239$$

5. A 6-cylinder engine block has a bore of 3.8 inches, a stroke of 3.25 inches. Calculate the cubic inch displacement.

$$CID = .7854 \times 3.8^2 \times 3.25 \times 6$$

$$CID = .7854 \times 14.44 \times 3.25 \times 6$$

$$CID = 221$$

6. A 4-cylinder engine block has a bore of $4\frac{1}{4}$ inches, a stroke of $3\frac{5}{8}$ inches. Calculate the cubic inch displacement.

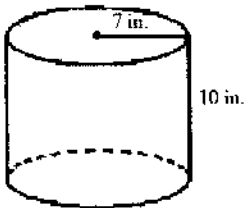
$$\begin{aligned} CID &= .7854 \times (4\frac{1}{4})^2 \times (3\frac{5}{8}) \times 4 \\ CID &= .7854 \times 4.25^2 \times 3.625 \times 4 \\ CID &= .7854 \times 18.0625 \times 3.625 \times 4 \\ \boxed{CID} &= \boxed{206} \end{aligned}$$

Convert fractions to decimals, don't round off

7. A V-6 engine block has a bore of 4.25 inches, a stroke of $3\frac{1}{2}$ inches. Calculate the cubic inch displacement.

$$\begin{aligned} CID &= .7854 \times 4.25^2 \times 3\frac{1}{2} \times 6 \\ CID &= .7854 \times 18.0625 \times 3.5 \times 6 \\ \boxed{CID} &= \boxed{298} \end{aligned}$$

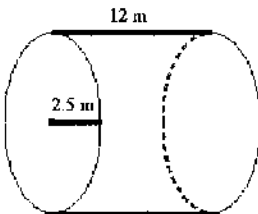
8. Find the volume of the cylinder.



Not drawn to scale

$$\begin{aligned} V &= \pi r^2 h \\ V &= \pi \cdot 7^2 \cdot 10 \\ V &= \pi \cdot 49 \cdot 10 \\ \boxed{V} &= \boxed{490\pi \text{ or } 1539\text{in}^3} \end{aligned}$$

9. Find the volume of the cylinder.



Not drawn to scale

$$\begin{aligned} V &= \pi r^2 h \\ V &= \pi (2.5)^2 \cdot 12 \\ V &= \pi (6.25) 12 \\ \boxed{V} &= \boxed{75\pi \text{ or } 236\text{m}^3} \end{aligned}$$

10. Find the volume of a cylinder with a radius of 13 cm and a height of 21 cm.

$$\begin{aligned} V &= \pi r^2 h \\ V &= \pi \cdot 13^2 \cdot 21 \\ V &= \pi (169) (21) \\ \boxed{V} &= \boxed{3549\pi \text{ or } 11,150\text{cm}^3} \end{aligned}$$