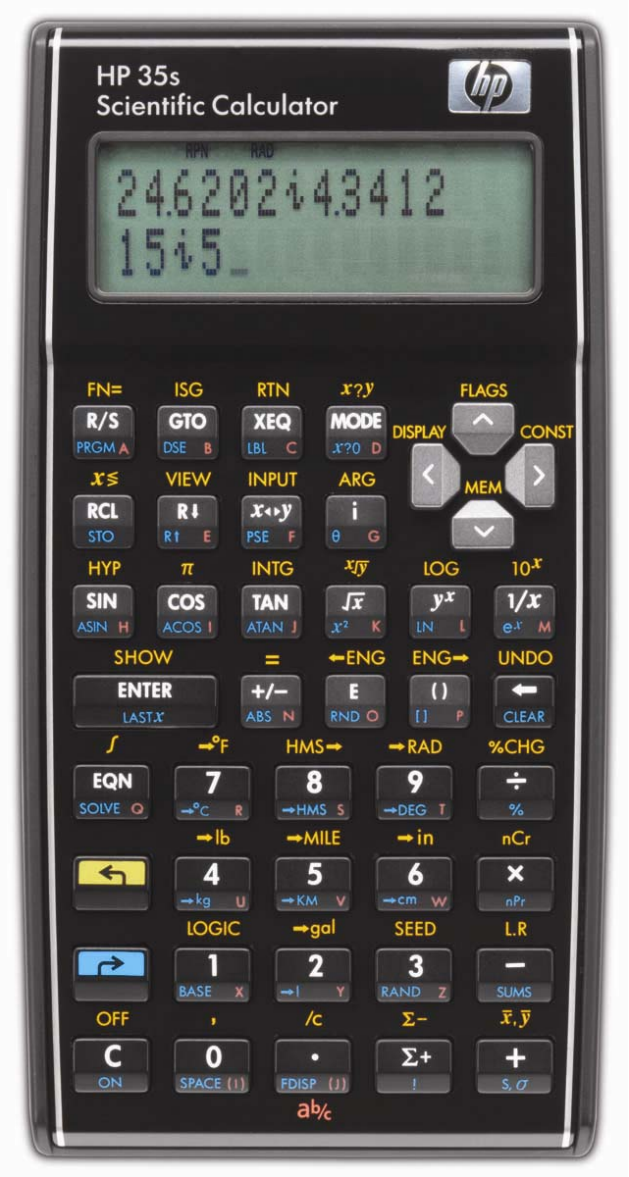
hp calculators



HP 35s General applications – Part 1

General applications

Practice solving problems

- Application 1: Shape Factor
- Application 2: Fluid Flow

General applications

This training aid will illustrate the application of the HP 35s calculator to several problems in other areas. These examples are far from exhaustive, but do indicate the incredible flexibility of the HP 35s calculator.

Practice solving problems

Application 1: Shape Factor

Example 1: What is the shape factor for heat transfer by radiation between two parallel disks 2 feet apart? The radii of the disks are 1.5 feet and 3.5 feet.

Solution: While the formula to solve this problem is not particularly complicated, it does involve a good amount of repetitive calculation, making it a very good candidate for the Equation Mode on the HP 35s. In the formula below, a is the radius of the first disk, b is the radius of the second disk, and L is the distance between the disks.

$$F = \frac{1}{2a^2}[L^2 + a^2 + b^2 - \sqrt{(L^2 + a^2 + b^2)^2 - 4a^2 * b^2}]$$

EQN 1 ÷ ( ) 2 × ↗ x^2 RCL A › › ×
( ) ↗ x^2 RCL L › + ↗ x^2 RCL A › + ↗ x^2 RCL B › −
$\sqrt{x}$ ↗ x^2 ↗ x^2 RCL L › + ↗ x^2 RCL A › + ↗ x^2 RCL B › ›
− 4 × ↗ x^2 RCL A › × ↗ x^2 RCL B ENTER

Figure 1

Figure 2

With the equation showing on the bottom line of the screen, press ENTER

Figure 3

1 . 5 R/S

Figure 4

2 R/S

Figure 5

3 · 5 R/S

Figure 6

Answer: The shape factor is 0.7263.

Application 2: Fluid Flow

Example 1: What is the amount of flow of fluid across a weir with a V shaped notch? The angle of the notch is 30 degrees and the height of the liquid from the bottom edge of the weir is 6 feet.

Fluid flow = 2.505 x TAN (½ angle) x H $^{2.47}$

Solution: First, set the angle mode to degrees: MODE 1

In RPN mode: 2 · 5 0 5 ENTER 3 0 ENTER 2 ÷ TAN ×
6 ENTER 2 · 4 7 y^x ×

In algebraic mode: 2 · 5 0 5 × TAN 3 0 ÷ 2) ×
6 y^x 2 · 4 7 ENTER

Figure 7

Answer: The amount of fluid flow is 56.09 cubic feet per second.