



**Areas of Triangles**

Area of  $\triangle ABF = \frac{1}{2} (h_1)(x)$       Area of  $\triangle BEF = \frac{1}{2} (h_2)(x/2) = \frac{1}{4} (h_2)(x)$       Area of  $\triangle ABE = \frac{1}{2} (x/2)(x) = \frac{1}{4} (x^2)$

Given ABDE is a square, then BD bisects angle ABC  
 Therefore, any point on BD is equidistant from the sides of the angle.  
 F is on BD, therefore,  $h_1 = h_2$   
 To simplify calculations,  $h_1$  and  $h_2$  will be referred to as  $h$ .

Area of  $\triangle ABE = \text{Area of } \triangle ABF + \text{Area of } \triangle BEF$   
 $= \frac{1}{2} (h)(x) + \frac{1}{4} (h)(x)$   
 $= (\frac{1}{2} + \frac{1}{4})(hx)$   
 $= \frac{3}{4} (hx)$

Area of  $\triangle ABE = \frac{1}{4} \text{ Area of Square ABCD}$   
 $= .25 = 1/4$   
 Area of  $\triangle ABE = \frac{1}{4} (x^2) = .25$   
 $(x^2) = 1.0$   
 $x = .10 = 1/10$

Area of  $\triangle ABE = \frac{3}{4} (hx)$   
 $\frac{1}{4} = (\frac{3}{4}) * (h) (1/10)$   
 $\frac{1}{4} = (\frac{3}{40}) (h)$   
 $10/3 = h$

Area of  $\triangle BEF = \frac{1}{4} (h)(x)$   
 $= \frac{1}{4} * (10/3) * (1/10)$   
 $= 1/12$   
 $= .083333 \text{ or } 8.33 \%$

Area of  $\triangle ABE = \text{Area of } \triangle ABF + \text{Area of } \triangle BEF$   
 $\frac{1}{4} = \text{Area of } \triangle ABF + (1/12)$   
 $\frac{1}{4} - 1/12 = \text{Area of } \triangle ABF$   
 $2/12 \text{ or } 16.66 \% = \text{Area of } \triangle ABF$

Area of  $\triangle ABF + \text{Area of } \triangle AFD = \text{Area of } \triangle ABD = 50\%$   
 $16.66\% + \text{Area of } \triangle AFD = 50\%$   
 Area of  $\triangle AFD = 33.33\%$

$DCEF = 100\% - (8.33\% + 16.66\% + 33.33\%)$   
 $= 41.66\%$