**EXPERT PROBLEM.**



**Calculate the area enclosed between the above hyperbola and parabola.**

**The curves intersect at (2, 8) and (8, 2).**

**Solution.**

The hyperbola is ***y = 16***

 ***x***

The parabola is of the form ***y = a(x – b)2***

***Sub x = 2, y = 8 8 = a(2 – b)2***

***Sub x = 8, y = 2 2 = a(8 – b)2***

***Dividing : 4 = (2 – b)2***

 ***(8 – b )2***

***4(8 – b )2 = (2 – b)2***

***2(8 – b) = (2 – b) OR - (2 – b)***

***If 16 – 2b = 2 – b***

 ***14 = b***

***This is not the situation:***

So ***16 – 2b = b – 2***

 ***18 = 3b***

 ***b = 6***

The parabola is of the form ***y = b(x – 6)2***

***Sub x = 2, y = 8 8 = b(-4)2 so b = ½***

Parabola is ***y = ½ (x – 6)2***

Area = dx

Area = dx

 8

 = ***16 ln x – (x – 6)3***

 ***6*** 2

***=10.2 units2***

 2 8 14

**EXPERT PROBLEM. (easier version)**



Calculate the area enclosed between the above hyperbola and parabola.

The curves intersect at (2, 8) and (8, 2) and the parabola has a minimum point at (6, 0)

Solution.

The hyperbola is ***y = 16***

 ***x***

The parabola is of the form ***y = b(x – 6)2***

***Sub x = 2, y = 8 8 = b(-4)2 so b = ½***

Parabola is ***y = ½ (x – 6)2***

Area = dx

 8

 = ***16 ln x – (x – 6)3 = 10.2 units2***

 ***6*** 2