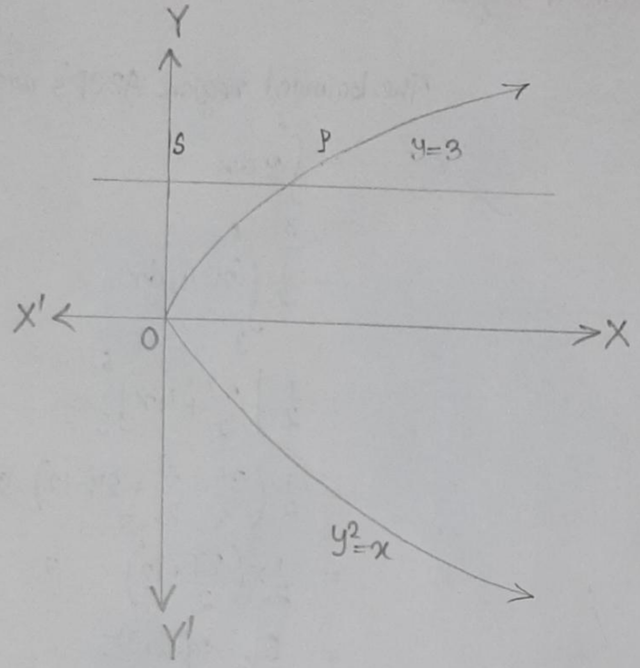
Draw graphs of $y^2 = x$, the y-axis and the straight line $y = 3$ and shade region bounded by them. Find the area of the shaded region.



The area OSP is bounded by

$$y^2 = x \quad \text{---(i)}$$

$$y = 3 \quad \text{---(ii)}$$

and, y axis

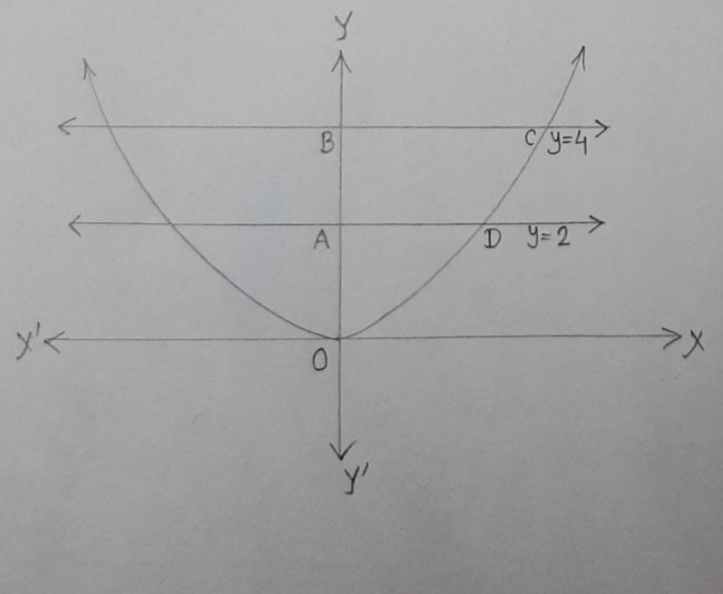
required area,

$$\int_0^3 x\,dy = \int_0^3 y^2\,dy = \left.\frac{y^3}{3}\right|_0^3$$

$$= \frac{1}{3}(3^3 - 0)$$

$$= 9 \text{ sq.units}$$

Sketch the region lying in the first quadrant and bounded by $y = 4x^2$, $x = 0$, $y = 2$ and $y = 4$. Find the area of the region.



Required region ABCD's area

$$= \int_2^4 x\,dy$$

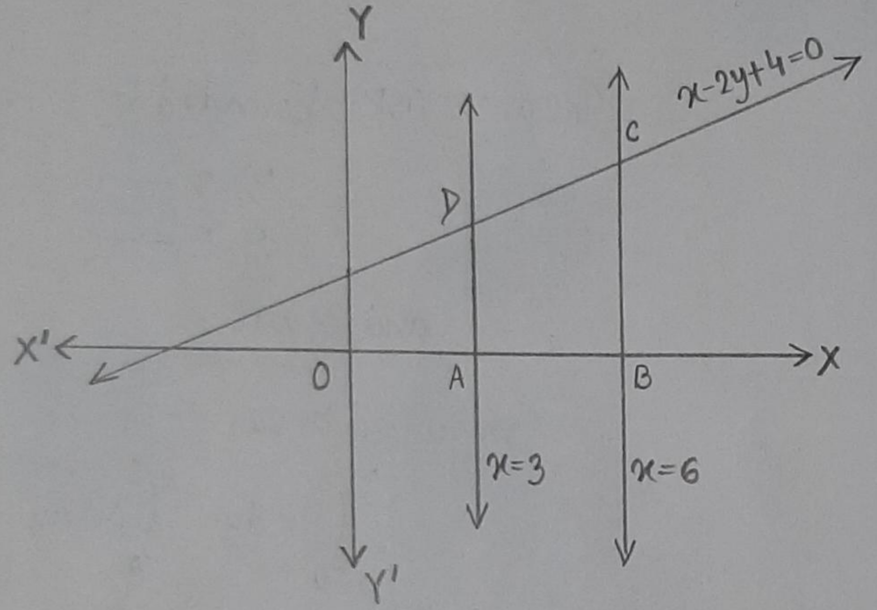
$$= \int_2^4 \frac{1}{2} y^{\frac{1}{2}}\,dy$$

$$= \left[\frac{1}{2} y^{\frac{3}{2}} \times \frac{2}{3}\right]_2^4$$

$$= \frac{1}{3}\left(4^{3/2} - 2^{3/2}\right)$$

$$= \frac{1}{3}\left(8 - 2\sqrt{2}\right) \text{ sq units}$$

Shade the area above x-axis bounded by $x-2y+4=0$, $x=3$ and $x=6$ and use integration to find the area of the bounded region.



The bounded region ABCD's area,

$$= \int_3^6 y\,dx$$

$$= \frac{1}{2}\int_3^6 (x+4)\,dx$$

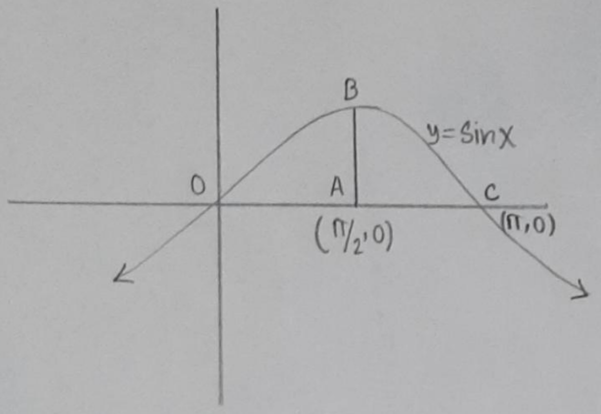
$$= \frac{1}{2}\left[\frac{x^2}{2}+4x\right]_3^6$$

$$= \frac{1}{2}\left(\frac{36}{2}-\frac{9}{2}+24-12\right) \text{ sq units}$$

$$= \frac{1}{2}\times\left(\frac{27}{2}+12\right) \quad \text{"}$$

$$= 51/4 \text{ sq.units}$$

Find the area bounded by the x-axis and one arc of the sine curve $y = \sin x$ between $(0,0)$ and $(\pi, 0)$.



Area of region OACBO

$= 2 \times$ Area of OABO.

$= 2\int_0^{\pi/2} y\,dx$

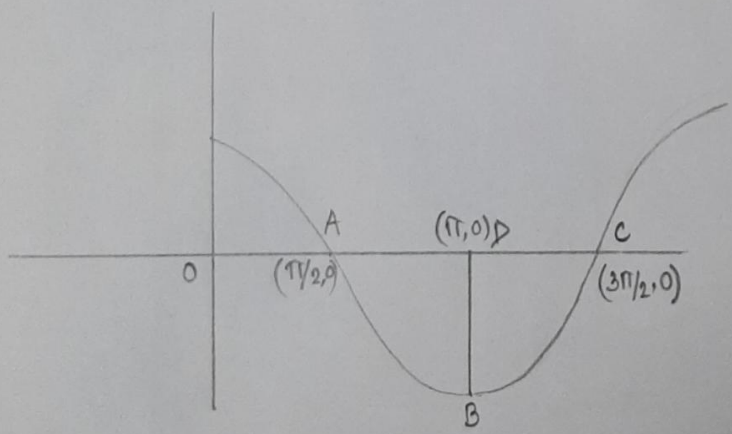
$= 2\int_0^{\pi/2} \sin x\,dx$

$= -2\cos x \Big|_0^{\pi/2}$

$= \left(-2\cos\pi/2 + 2\cos 0\right)$ sq.units

$= 2$ squnits.

Draw the curve $y = \cos x$ between $x = \pi/2$ and $x = 3\pi/2$. Find the area between this curve.



Area of required region ABCDA

$= 2 \times$ area of ABDA

$= 2 \times \int_{\pi/2}^{\pi} y\,dx$

$= 2 \times \int_{\pi/2}^{\pi} \cos x\,dx$

$= 2 \sin x \Big|_{\pi/2}^{\pi}$

$= 2\left|\sin\pi - \sin\pi/2\right|$

$= 2|0-1|$ sq.units.

$= 2$ sq.units.