1) $\int_{0}^{\frac{\sqrt{\pi}}{2}} 2\pi x \cos(x^2)\,dx$

$U = x^2$
$du = 2x\,dx$

$\pi \int_{0}^{\frac{\sqrt{\pi}}{2}} \cos(x^2)\, 2x\,dx$

$\pi \left. \sin(x^2) \right|_{0}^{\frac{\sqrt{\pi}}{2}} = \pi\left(\sin\frac{\pi}{4} - \sin 0\right) = \frac{\pi}{\sqrt{2}}$

2) $y = 2x - 3$

$y' = 2 \quad (y')^2 = 4$

$$\int_1^4 \sqrt{1 + 4} \, dx$$

$$\int_1^4 \sqrt{5} \, dx = \sqrt{5} \, x \Big|_1^4 = 4\sqrt{5} - \sqrt{5} = 3\sqrt{5}$$
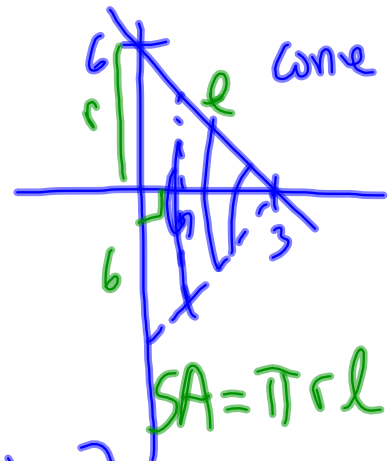
3) $y = -2x + 6$

$y' = -2$   $(y')^2 = 4$

$SA = \int_0^3 2\pi(-2x+6)\sqrt{1+4}\, dx$

$SA = 2\pi\sqrt{5} \int_0^3 (-2x+6)\, dx$

$2\pi\sqrt{5} \left. (-x^2 + 6x) \right|_0^3 = 2\pi\sqrt{5}\left[(-9+18) - 0\right]$

$= 18\pi\sqrt{5}$

cone

$SA = \pi r \ell$

$\ell = \sqrt{36 + 9}$

$\ell = 3\sqrt{5}$

$SA = \pi(6)3\sqrt{5}$

$= 18\pi\sqrt{5}$