1) $\int_0^4 (2x+1)\,dx = \left(2\cdot\frac{1}{2}x^2+x\right)\Big|_0^4$

$= \left(x^2+x\right)\Big|_0^4$

$= (4^2+4)-(0^2+0)$

$= 16+4 = 20$

2) $\int_{-1}^{3} \left(6x^2-4x+6\right)dx = \left(2x^3-2x^2+6x\right)\Big|_{-1}^{3}$

$= \left(2\cdot 3^3-2\cdot 3^2+6\cdot 3\right)-\left(2\cdot(-1)^3-2\cdot(-1)^2+6(-1)\right)$

$= \left(2\cdot 27-2\cdot 9+18\right)-\left(-2-2-6\right)$

$= (54 \cancel{-18} \cancel{+18}) - (-10) = 54 + 10 = 64$

3) $\int_{-1}^{1} (x^4+1)\,dx = \left(\frac{1}{5}x^5 + x\right)\Big|_{-1}^{1}$

$= \left(\frac{1}{5}\cdot 1^5 + 1\right) - \left(\frac{1}{5}(-1)^5 + (-1)\right)$

$= \frac{1}{5} + 1 + \frac{1}{5} + 1 = \frac{2}{5} + 2$

$= \frac{12}{5}$

4) $\int_{1}^{3} \left(\frac{1}{x^3} + x^2\right) dx = \int_{1}^{3} (x^{-3} + x^2)\,dx$

$= \left(\frac{1}{-3+1} x^{-3+1} + \frac{1}{3}x^3\right)\Big|_{1}^{3} = \left(-\frac{1}{2}x^{-2} + \frac{1}{3}x^3\right)\Big|_{1}^{3}$

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

$$= -\frac{1}{2}\cdot\frac{1}{9} + \frac{27}{3} + \frac{1}{2} - \frac{1}{3}$$

$$= -\frac{1}{18} + \frac{9}{18} - \frac{6}{18} + 9$$

$$= \frac{1}{9} + 9 = \frac{82}{9}$$

5) $$\int_{-\sqrt{3}}^{\sqrt{3}} 2u^2\,du = \frac{2}{3}u^3\Big|_{-\sqrt{3}}^{\sqrt{3}} = \frac{2}{3}\sqrt{3}^3 - \frac{2}{3}\left(-\sqrt{3}\right)^3$$

$$= \frac{2}{3}\sqrt{3^3} + \frac{2}{3}\sqrt{3^3} = \frac{4\sqrt{3^3}}{3} = \frac{4\sqrt{3^2\cdot 3}}{3}$$

$$= \frac{4\cdot 3\cdot\sqrt{3}}{3} = 4\sqrt{3}$$

б) $-4\int_1^4 t^{-4}dt = -4\frac{1}{-4+1}\cdot t^{-4+1}\Big|_1^4$

$= \frac{-4}{-3}t^{-3}\Big|_1^4 = \frac{4}{3}\left(4^{-3}-1\right)$

$= \frac{4}{3}\left(\frac{1}{64}-1\right) = \frac{4}{3}\cdot\frac{-63}{64} = -\frac{21}{16}$

13) $$\int_1^2 \left(\frac{1}{\sqrt{x}} - \frac{1}{x^2}\right) dx =$$

$$\int_1^2 \left(x^{-\frac{1}{2}} - x^{-2}\right) dx =$$

$$\left(\frac{1}{-\frac{1}{2}+1} x^{-\frac{1}{2}+1} - (-1) \cdot x^{-1}\right)\Big|_1^2 =$$

$$\left(\frac{1}{\left(\frac{1}{2}\right)} \cdot x^{\frac{1}{2}} + x^{-1}\right)\Big|_1^2 =$$

$$\left(2 \cdot x^{\frac{1}{2}} + x^{-1}\right)\Big|_1^2 = 2\sqrt{2} + \frac{1}{2} - (2+1)$$

$$= 2\sqrt{2} + \frac{1}{2} - 3 = 2\sqrt{2} + \frac{1}{2} - \frac{6}{2}$$

$$= 2\sqrt{2} - \frac{5}{2}$$

14) $$\int_{1/2}^{2} \frac{x^2+1}{x^2}\,dx = \int_{1/2}^{2} \left(1 + \frac{1}{x^2}\right) dx$$

$$= \int_{1/2}^{2} \left(1 + x^{-2}\right) dx = \left(x + (-1)\,x^{-1}\right)\Big|_{1/2}^{2}$$

$$= \left(x - \frac{1}{x}\right)\Big|_{1/2}^{2} = \left(2 - \frac{1}{2}\right) - \left(\frac{1}{2} - \frac{1}{\left(\frac{1}{2}\right)}\right)$$

$$= \frac{3}{2} - \overbrace{\left(\frac{1}{2} - 2\right)}^{-\frac{3}{2}} = \frac{3}{2} + \frac{3}{2} = 3$$

16) $$\int_{\pi}^{2\pi} \sin(x)\,dx =$$

$\sin$

$-\cos$ $\qquad \cos$

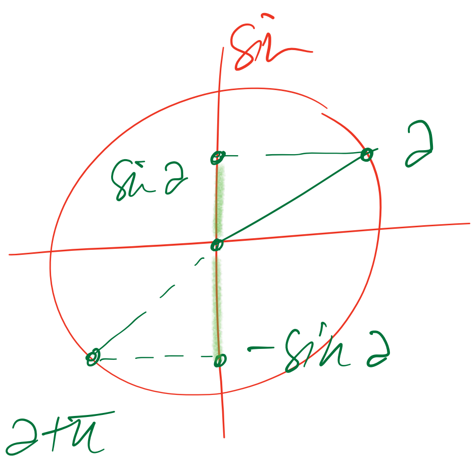
$-\sin$

$$-\cos(x)\Big|_{\pi}^{2\pi} = -\left(\cos 2\pi - \cos \pi\right)$$

$$= -\left(1-(-1)\right)$$

$$= -2$$

17) $$\int_{a}^{a+\pi} \cos t\,dt = \sin t\Big|_{a}^{a+\pi}$$



$$= \sin(a+\pi) - \sin(a)$$

$$= -\sin(a) - \sin(a) = -2\sin(a)$$

18) $$\int_0^{\pi/2} (a \sin t + b \cos t)\, dt =$$

$$\left(a(-\cos t) + b \sin t\right)\Big|_0^{\pi/2} =$$

$$\left(-a \cos \frac{\pi}{2} + b \sin \frac{\pi}{2}\right) - \left(-a \cos 0 + b \sin 0\right) =$$

$$\left(-a \cdot 0 + b \cdot 1\right) - \left(-a \cdot 1 + b \cdot 0\right) =$$

$$a + b$$