5.4

(27) $\int_{1/2}^{3} \left(2 - \frac{1}{x}\right) dx$

$\Big|_{1/2}^{3} \; 2x - \ln|x|$

$\boxed{\left[2(3) - \ln 3\right] - \left[2\left(\tfrac{1}{2}\right) - \ln \tfrac{1}{2}\right]}$

$6 - \ln 3 - 1 + \ln \frac{1}{2}$

$5 + \ln 3 + \ln \frac{1}{2}$

$5 + \ln \frac{1}{3} + \ln \frac{1}{2}$

$5 + \ln \frac{1}{3} \cdot \frac{1}{2}$

$5 + \ln \frac{1}{6} = 5 - \ln 6$

$-\ln 3$

$\ln 3^{-1}$

$\ln \frac{1}{3}$

(31) $\int_{1}^{32} x^{-6/5} \, dx$

$\Big|_{1}^{32} -5x^{-1/5}$

$-5(32)^{-1/5} - -5(1)^{-1/5}$

$-5\left(\frac{1}{2}\right) + 5 = \frac{5}{2}$

(19) $\frac{d}{dx} \int_{x^2}^{x^3} \cos(2t) \, dt$

$\frac{d}{dx}\left[\int_{c}^{x^3} \cos(2t) \, dt + \int_{x^2}^{c} \cos(2t) \, dt\right]$

$\cos(2x^3)[3x^2] - \cos(2x^2)[2x]$

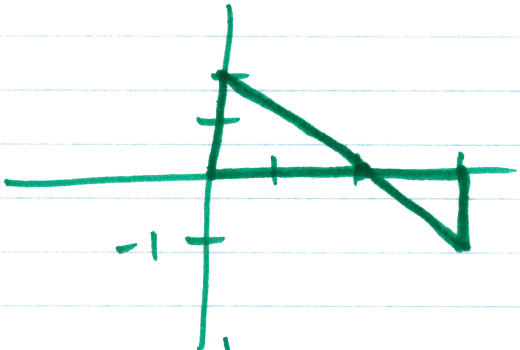
$3x^2\cos(2x^3) - 2x\cos(2x^2)$

5.4

(41) $y = 2 - x$, $0 \le x \le 3$

$$\int_0^3 (2-x)\,dx = 1\tfrac{1}{2}$$

$$\underbrace{\int_0^2 (2-x)\,dx + \int_2^3 (2-x)\,dx}$$



$$2 + \tfrac{1}{2} = \boxed{2\tfrac{1}{2}}$$

$$\tfrac{1}{2}(2)(2) = 2$$

$$\tfrac{1}{2}(1)(1) = \tfrac{1}{2}$$

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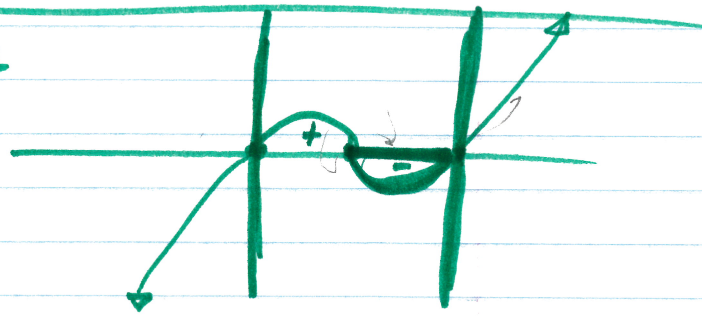
(43) $y = x^3 - 3x^2 + 2x$, $0 \le x \le 2$

$x(x^2 - 3x + 2)$

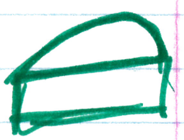
$x(x-2)(x-1)$



$\rightarrow \int_0^1 (x^3 - 3x^2 + 2x)\,dx$

$\Big|_0^1 \tfrac{1}{4}x^4 - x^3 + x^2$

$\left[\tfrac{1}{4}(1)^4 - 1^3 + 1^2\right] - \left[\tfrac{1}{4}(0)^4 - 0^3 + 0^2\right]$



$\tfrac{1}{4}$

$\int_1^2 (x^3 - 3x^2 + 2x)\,dx$

$\Big|_1^2 \tfrac{1}{4}x^4 - x^3 + x^2$

$\left[\tfrac{1}{4}(2)^4 - 2^3 + 2^2\right] - \tfrac{1}{4}$

$[4 - 8 + 4] - \tfrac{1}{4}$

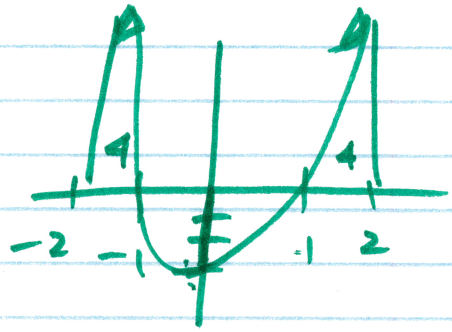
$0 - \tfrac{1}{4} = -\tfrac{1}{4}$

$\left|-\tfrac{1}{4}\right| = \tfrac{1}{4}$

$$\tfrac{1}{4} + \tfrac{1}{4} = \boxed{\tfrac{1}{2}}$$

5.4

(42) $y = 3x^2 - 3, \quad -2 \le x \le 2$



$$2\int_1^2 (3x^2 - 3)\,dx$$

$$2\Big|_1^2 \; x^3 - 3x$$

$$2\Big[[2^3 - 3(2)] - [1^3 - 3(1)]\Big]$$

$$2[4] = 8$$

$$8 + 4 = \boxed{12}$$

$$\int_{-1}^{1} (3x^2 - 3)\,dx$$

$$\Big|_{-1}^{1} \; x^3 - 3x$$

$$[1^3 - 3(1)] - [(-1)^3 - 3(-1)]$$

$$-2 \quad - \quad +2$$

$$-4$$

$$|-4| = 4$$

---

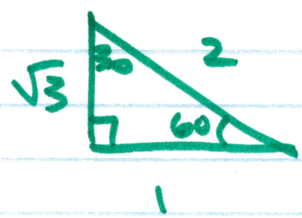
(35) $\displaystyle\int_0^{\pi/3} 2\sec^2\theta \, d\theta$

$$\Big|_0^{\pi/3} \; 2\tan\theta$$

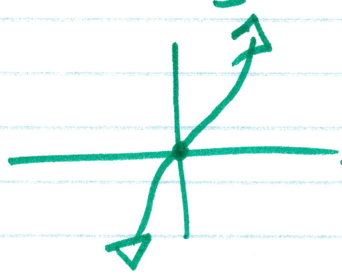
$$2\tan\frac{\pi}{3} - 2\tan 0$$

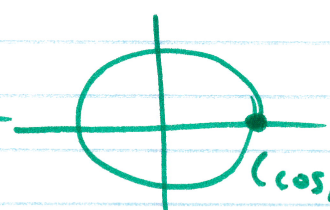
$$2\sqrt{3} - 0$$

$$\boxed{2\sqrt{3}}$$



$$\frac{\pi}{3} = \frac{180}{3} = 60$$





(cos, sin)

1, 0

$$\tan \quad \frac{\sin}{\cos} \quad \frac{0}{1}$$

5.4

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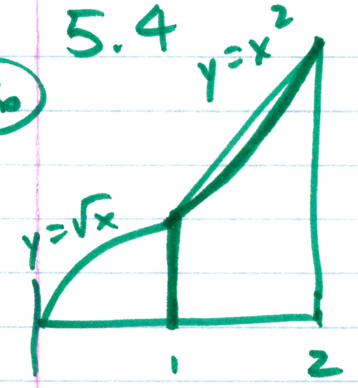

$$\int_0^2$$

$$\int_0^1 \sqrt{x}\,dx + \int_1^2 x^2\,dx$$

$$\left.\frac{2}{3}x^{3/2}\right|_0^1 + \left.\frac{1}{3}x^3\right|_1^2$$

$$\left(\left[\frac{2}{3}(1)^{3/2} - \cancel{\frac{2}{3}(0)^{3/2}}\right] + \left[\frac{1}{3}(2)^3 - \frac{1}{3}(1)^3\right]\right)$$

$$\frac{2}{3} + \frac{8}{3} - \frac{1}{3}$$

$$\boxed{3}$$

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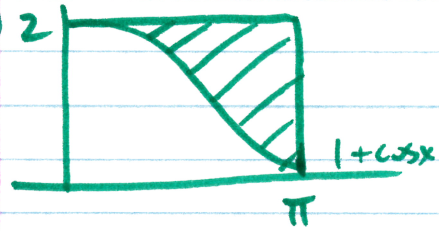

$$A_{blank} = \int_0^\pi (1+\cos x)\,dx$$

$$= \left. x+\sin x \right|_0^\pi$$

$$= [\pi+\sin\pi] - \cancel{[0+\sin 0]}$$

$$= \pi$$

$$A_{\square} = 2\pi$$

$$2\pi - \pi = \boxed{\pi}$$

19

$$\int_{x^2}^{x^3}\cos(2t)\,dt = \int_c^{x^3} + \int_{x^2}^{c} \qquad \int_c^{x^3} - \int_c^{x^2}$$

$$\cos(2x^3)[3x^2] - \cos(2x^2)[2x]$$

(19) $\int_{x^2}^{x^3} \cos(2t)\,dt$

$\int_{c}^{x^3} \cos(2t)\,dt + \int_{x^2}^{c} \cos(2t)\,dt$ ✓

$\int_{c}^{x^3} \cos(2t)\,dt - \int_{c}^{x^2} \cos(2t)\,dt$ ✓

$\cos(2x^3)\,[3x^2] - \cos(2x^2)\,[2x]$

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(27) $\int_{1/2}^{3} \left(2 - \frac{1}{x}\right) dx$

$\left. 2x - \ln|x| \right|_{1/2}^{3}$

$[2(3) - \ln 3] - [2(\tfrac{1}{2}) - \ln \tfrac{1}{2}]$

$6 - \ln 3 - 1 + \ln \tfrac{1}{2}$

$5 - \ln 3 + \ln \tfrac{1}{2}$ $\leftarrow$ $5 + \ln \tfrac{1}{2} + \ln 3^{-1}$

$5 + \ln \frac{\frac{1}{2}}{3}$ $\quad$ $5 + \ln \frac{\frac{1}{2}}{3}$

$\boxed{\begin{array}{l} 5 + \ln \frac{1}{6} \\ 5 - \ln 6 \end{array}}$