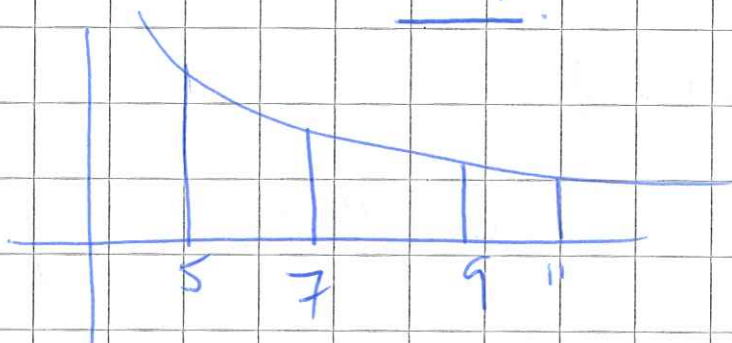


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(2)

$$\textcircled{1} \quad A \approx \frac{1}{2} (2) \times \left(\frac{8}{5} + \frac{8}{11} + 2 \left(\frac{8}{7} + \frac{8}{9} \right) \right)$$
$$= \underline{6.39}$$



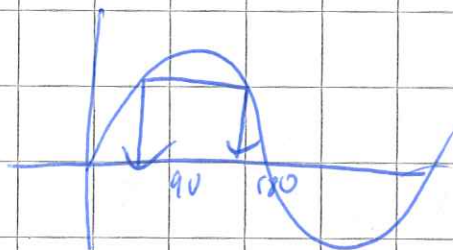
$$\textcircled{2} \quad \text{i) } \sin \frac{1}{2} x = 0.8$$

$$0 \leq x \leq 360$$

$$0 \leq \frac{1}{2} x \leq 180$$

$$\frac{1}{2} x = \sin^{-1}(0.8)$$
$$= 53.1, 126.9$$

$$x = 106^\circ, 254^\circ$$



$$\text{ii) } \sin x = 3 \cos x$$

$$\frac{\sin x}{\cos x} = 3$$

$$\tan x = 3$$

$$x = 71.6^\circ, 252^\circ$$



$$\text{D i) } (2+5x)^6 = {}^6C_0 2^6 + {}^6C_1 2^5 (5x) + {}^6C_2 2^4 (5x)^2$$

$$= 64 + 960x + 6000x^2$$

$$\text{ii) } (3+cx)^2 (2+5x)^6$$

$$= (9 + 6cx + (cx)^2) (64 + 960x + \dots)$$

$$\Rightarrow (9 \times 960) + (6c \times 64) = 4416$$

$$8640 + 384c = 4416$$

$$384c = -4224$$

$$c = -11$$

$$\text{④ a) find } \int 5x^3 - 6x + 1 \, dx$$

$$= \frac{5}{4}x^4 - 3x^2 + x + c$$

$$\text{b) i) } \int 24x - 24x^{-3} \, dx = 12x - 12x^{-2} + c$$

$$\text{ii) } \int_a^\infty 24x^{-3} \, dx = \left[-12x^{-2} \right]_a^\infty$$

$$= (-12(\infty)^{-2}) - (-12a^{-2})$$

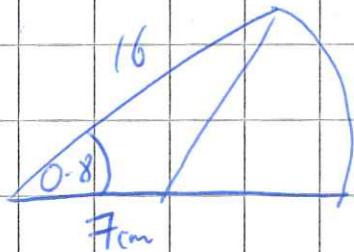
$$-12(\infty)^{-2} = 0 \quad 3 = 0 - (-12a^{-2})$$

$$3 = 12a^{-2}$$

$$\frac{3}{12} = a^{-2}$$

~~the end~~

5) i)



$$\begin{aligned} \text{A of sector} &= \frac{1}{2} r^2 \theta \\ &= 102.4 \end{aligned}$$

$$\begin{aligned} \text{A of triangle} &= \frac{1}{2} ab \sin C \\ &= \frac{1}{2} \times 16 \times 7 \times \sin 0.8 \\ &= 40.2 \end{aligned}$$

$$\begin{aligned} \text{A BDC} &= 102.4 - 40.2 \\ &= \underline{62.2 \text{ cm}^2} \end{aligned}$$

$$\begin{aligned} \text{ii) } BD^2 &= 16^2 + 7^2 - 2(16)(7)\cos 0.8 \\ &= 12.2 \end{aligned}$$

$$\begin{aligned} \text{Arc} &= r \theta \\ &= 16 \times 0.8 \\ &= 12.8 \end{aligned}$$

$$\begin{aligned} DC &= 16 - 7 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 12.2 + 12.8 + 9 \\ &= \underline{34.0 \text{ cm}} \end{aligned}$$

$$\textcircled{6} \quad \text{i) } S_{30} = \frac{30}{2} (2 \times 6 + (29 \times 1.8))$$
$$= 963$$

$$\text{ii) } r = \frac{7.8}{6} = 1.3$$

$$\frac{6(1-1.3^N)}{1-1.3} \leq 1800$$

$$\frac{6(1-1.3^N)}{-0.3} \leq 1800$$

$$1-1.3^N \geq -90$$

$$-1.3^N \geq -91$$

$$\underline{1.3^N \leq 91}$$

$$N \log 1.3 \leq \log 91$$

$$N \leq 17.19$$

$$\text{Hence } \underline{\underline{N=17}}$$

$$\textcircled{7} \text{ i) } \int_1^4 x^{3/2} - 1 \, dx = \left[\frac{2}{5} x^{5/2} - x \right]_1^4$$

$$= \left(\frac{2}{5} (4)^{5/2} - 4 \right) - \left(\frac{2}{5} (1)^{5/2} - 1 \right)$$

$$= (12 - 8 - 4) - (0.4 - 1)$$

$$= 9^{2/5}$$

$$\text{ii) } \frac{dy}{dx} \text{ @ } x=4 \Rightarrow \frac{2}{5} (4)^{3/2} = 4$$

$$\frac{dy}{dx} = \frac{3}{2} x^{1/2} \quad \text{@ } x=4$$

$$\frac{3}{2} \times \sqrt{4} = 3$$

$$y = 3x + C$$

$$7 = 12 + C$$

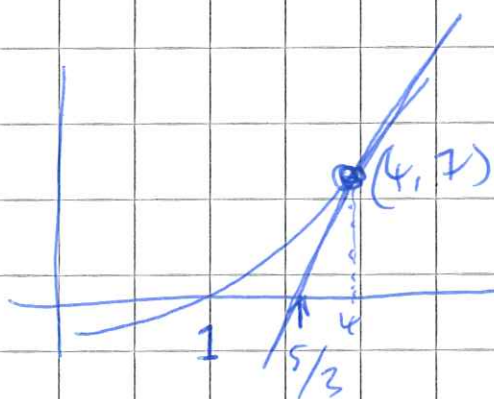
$$C = -5$$

$$y = 3x - 5$$

$$x \text{ } y=0$$

$$3x = 5$$

$$x = 5/3$$



$$\text{Area of } \triangle = \frac{1}{2} (4 - 5/3) \times 7$$

$$= 8 \frac{1}{6}$$

$$\text{Area of } \triangle = \triangle - \triangle$$

$$= 9^{2/5} - 8 \frac{1}{6}$$

$$= 1 \frac{7}{30}$$

✓

$$\textcircled{8} \quad a) (0, 1)$$

$$b) (0, 4)$$

$$c) a = 2 \quad b = \frac{1}{2}$$

$$ii) \quad ab = 2 \quad a^x = 4b^x$$

$$b = \frac{2}{a}$$

$$x \log_2 a = \log_2 4 + x \log_2 b$$

$$x \log_2 a = \log_2 4 + x \log_2 \left(\frac{2}{a}\right)$$

$$x \log_2 a = 2 + x \log_2 2 - x \log_2 a$$

$$\cancel{x} x (2 \log_2 a - 1) = 2$$

$$x = \frac{2}{2 \log_2 a - 1}$$

$\textcircled{9}$

Next 19

$$\textcircled{a} \text{ i) } f(2) = 4(2)^3 - 7(2) - 3 \\ = 15$$

$$\text{ii) } 4x^3 - 7x - 3$$

if $2x+1$ is a factor $f(-1/2) = 0$

$$f(-1/2) = 4(-1/2)^3 - 7(-1/2) - 3 \\ = 0$$

$$(2x+1)(\frac{2}{4}x^2 + bx - 3)$$

$$\begin{array}{r} 2bx^2 \\ 2x^2 \\ \hline 2b+2 = 0 \\ b = -1 \end{array}$$

$$\therefore (2x+1)(2x^2 - x - 3)$$

$$= (2x+1)(2x-3)(x+1)$$

$$\text{iii) } 2\cos\theta + 1 = 0 \\ \cos\theta = -1/2$$

$$2\cos\theta - 3 = 0 \\ \cos\theta = 3/2$$

$$\cos\theta + 1 = 0 \\ \cos\theta = -1$$

or

$$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$$

$$\theta = \pi$$

