

$$1) y = 5x^4 + 5x^2 + 3x + 19$$

$$\frac{dy}{dx} = 20x^3 + 10x + 3$$

$$b) y = (2x + 5)(x - 1)$$

$$y = 2x^2 - 2x + 5x - 5$$

$$\frac{dy}{dx} = 4x + 3$$

$$c) y = \frac{1}{x^6} - \cos 5x$$

$$y = x^{-6} - \cos 5x$$

$$\frac{dy}{dx} = -6x^{-7} + 5\sin 5x$$

$$d) y = \underset{u}{e^{2x}} \underset{v}{\sin 3x} \quad \frac{du}{dx} = 2e^{2x} \quad \frac{dv}{dx} = 3\cos 3x$$

$$\frac{dy}{dx} = (\sin 3x)(2e^{2x}) + (e^{2x})(3\cos 3x)$$

$$e) y = \frac{\tan 7x}{\sin x} \quad \underset{u}{\tan 7x} \quad \underset{v}{\sin x} \quad \frac{du}{dx} = 7\sec^2 7x \quad \frac{dv}{dx} = \cos x$$

$$\frac{dy}{dx} = \frac{(\sin x)(7\sec^2 7x) - (\tan 7x)(\cos x)}{(\sin x)^2}$$

$$f) y = \sqrt{6x^2 - 3x + 5}$$

$$y = (6x^2 - 3x + 5)^{0.5} \rightarrow 0.5(6x^2 - 3x + 5)^{-0.5}$$

$$y = \underset{0.5}{(6x^2 - 3x + 5)^{0.5}} (12x - 3)$$

$$\frac{dy}{dx} = (6x - 0.5)(6x^2 - 3x + 5)^{-0.5}$$

ACHA4006

Tim James

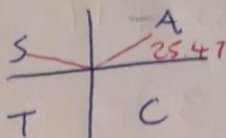
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2)

a) $\sin x = 0.43$

$x = \sin^{-1}(0.43)$

$x = 25.47^\circ, 154.53^\circ$



$180 - 25.47$

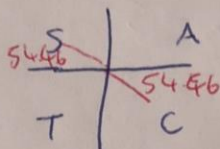
b) $5 \tan x = -7$

$\tan x = \frac{-7}{5}$

$x = \tan^{-1}(\frac{-7}{5})$

$x = \cancel{A 54.46^\circ}$

$x = 125.54^\circ, 305.54^\circ$



$a^2 = b^2 + c^2 - 2bc \cos A$

$$23^2 = b^2 + 18^2 - 2(b)(18) \cos(105)$$

$$529 = b^2 + 324 - 36b \cos(105)$$

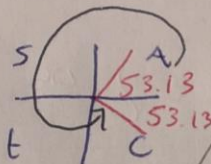
$$529 = b^2 + 324 - 2(36)$$

c) $5 \cos x = 3$

$\cos x = \frac{3}{5}$

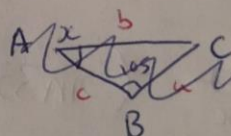
$x = \cos^{-1}(\frac{3}{5})$

$x = 53.13^\circ, 306.87^\circ$

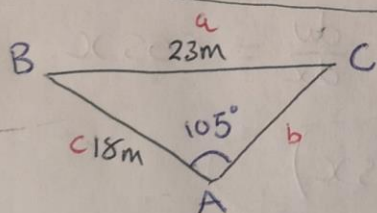


$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{a}{\sin A} = \frac{23}{\sin(105)} = \frac{18}{\sin C}$



3)



$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\frac{23}{\sin 105} = \frac{b}{\sin B} = \frac{18}{\sin C}$

find

Angle C = $\frac{23}{\sin 105} = \frac{18}{\sin C} > \frac{23}{0.97} = \frac{18}{\sin C}$

Angle B =

Length AC = $\cancel{23529} = AC^2 + 324 - AC$

$\sin C(23) = 0.97(18)$

$\frac{\sin C(23)}{23} = \frac{17.46}{23}$

$\sin C = 0.76$

$\sin^{-1}(0.76) = C$

Angle C = 49.46°

$\frac{23}{\sin 105} = \frac{b}{\sin 25.54}$

Angle B = 25.54°

$\frac{0.966(b)}{0.966} = \frac{9.92}{0.966}$

$b = 10.27m$

Length AC = $10.27m$

$$4) y = \frac{t(x^2 + R)}{t} \quad \text{xc subject}$$

$$\frac{y\theta}{t} = \frac{t(x^2 + R)}{t} \Rightarrow \frac{y\theta}{t} = x^2 + R$$

$$\frac{y\theta}{t} - R = x^2 \quad x = \sqrt{\frac{y\theta}{t} - R}$$

$$5) a) 3^{x+4} = 7^x$$

$$\log 3^{(x+4)} = \log 7^x$$

$$(x+4)\log 3 = x\log 7$$

$$(x+4)(0.477) = 0.845x$$

$$0.477x + 1.908 = 0.845x$$

$$\frac{1.908}{0.368} = \frac{0.368x}{0.368}$$

$$x = 5.185$$

$$b) \log(x+5) + \log(x+2) = \log(x+7) + \log(x+6)$$

$$\log(x+5) + \log(x+2) = \log(x+7) + \log(x+6)$$

$$(x+5)(x+2) = (x+7)(x+6)$$

$$x^2 + 2x + 5x + 10 = x^2 + 6x + 7x + 42$$

$$x^2 + 7x + 10 = x^2 + 13x + 42$$

$$x^2 + 10 - 42 = x^2 + 13x - 7x$$

$$\frac{-32}{6} = \frac{6x}{6}$$

$$x = -5.33...$$

6)

$$a) \int x^8 + 4x^3 + 5x - 1 \, dx$$

$$= \frac{x^9}{9} + \frac{4x^4}{4} + \frac{5x^2}{2} - x + C$$

$$b) \int 5x^2(x^3 + 2x + 1) \, dx$$

$$5 \int x^2(x^3 + 2x + 1) \, dx$$

$$= \left(\frac{5x^3}{3} + \frac{5x^4}{4} + 10x^2 + 5 \right) dx$$

$$= \left(\frac{5x^3}{3} + 156.25 + 10 + 5 \right) dx$$

$$\left(\frac{5x^3}{3} \left(\frac{x^4}{4} + \frac{2x^2}{2} + x \right) + C \right) dx$$

$$c) \int 5 \sin 3x \, dx$$

$$5 \int -\frac{1}{3} \cos 3x + C$$

$$= 5 \times -\frac{1}{3} \cos 3x + C$$

$$= -\frac{5}{3} \cos 3x + C$$

$$d) \int_0^5 (x+5)(x+1) \, dx$$

$$156.25 + 75 + 5$$

$$5 \int_0^5 x^2 + \frac{6x}{x} + 5x + 5 \, dx > \left[\frac{x^3}{3} + \frac{6x^2}{2} + 5 \right]$$

$$\left[\frac{5^3}{3} + 30 + 5 \right] \left[\frac{(5)^4}{4} + \frac{6(5)^2}{2} + 5 \right]_0^5 - [0]$$

$$= 236.25$$