

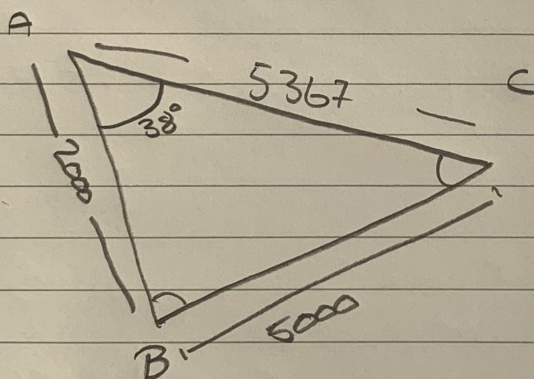
Ashleigh Rosser 1384378

Part time maths friday afternoons
maths Exam 1 06/11/2020 @ 1330

Question 3

iv) $\tan^2 x - 14 \tan x + 24 = 0$

b) Distance AC + Angles



Angle C =

Angle B =

cosine Rule

$$AC^2 = (2000)^2 + (5000)^2 - 2(2000)(5000) \cos 38$$

$$AC^2 = 4000000 + 25000000 - 1900000$$

$$AC = \sqrt{28,810,000}$$

$$AC = 5,367 \text{ m.}$$

$$29,000,000$$

Sin Rule

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

⑦

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Question THREE

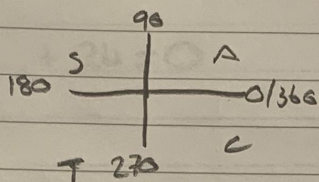
i) $\sin x = 0.75$

$$x = \sin^{-1}(0.75)$$

$$= 48.59^\circ$$

$$x = 180 - 48.59$$

$$= 131.41^\circ$$



ii) $-5 \cos x = 2$ Angles

iii) $8 \tan x = 1$

⑥

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d) solve by factorising

i) $x^2 + 11x + 30 = 0$

$$(x+5)(x+6) = 0.$$

$$x+5=0$$

$$x+6=0$$

$$x = -5$$

$$x = -6.$$

ii) $x^2 + 13x + 22 = 0.$

$$(x+2)(x+11) = 0.$$

$$x+2=0$$

$$x+11=0.$$

$$x = -2$$

$$x = -11.$$

iii) $x^2 + 100 = 0.$

$$x^2 = 0 - 100$$

$$x = \pm\sqrt{-100}$$

iv) $2x^2 + 7x + 5 = 0$ 2/5.

$$(x+2)(x+1)$$

$$x = \frac{-5}{2} \text{ or } x = -1$$

(5)

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Question Two

B) Solve for x and y

$$y = x^2 + 2x + 2$$

$$y = 2x^2 + 11x + 10.$$

$$\frac{dy}{dx} = 2x' - 2x + 2$$

$$\frac{dy}{dx} = 4x' + 11x + 10$$

$$c) \quad \overset{a}{9}x^2 - \overset{b}{4}x - \overset{c}{5} = 0.$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-4 \pm \sqrt{(4)^2 - 4(9)(-5)}}{2(9)}$$

$$x = \frac{-4 \pm \sqrt{16 - -180}}{18}$$

$$x = \frac{4 \pm \sqrt{196}}{18}$$

$$x = \frac{4 + 14}{18}$$

$$x = \frac{18}{18}$$

$$x = 1$$

$$x = \frac{4 - 14}{18}$$

$$x = -0.55$$

③

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Question 1

Vii) $y = \sqrt{3x^3 + 2x + 5}$

$$\frac{dy}{dx} = \sqrt{9x^2 + 2 \times (1 + 0)}$$

$$= \sqrt{9x^2 + 2}$$

=

b) 3rd derivative $y = \sin x$.

$$\frac{du}{dx} = \sin x$$

$$= \cos x \times \frac{d}{dx}$$

$$\cos x \times 1 = \cos x$$

4 second order partial derivatives

c) $z = 5x^3y^2 + 3x^2 + 4y^4$

③

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(a)

$$\begin{aligned} \text{iii)} \quad y &= 3\sin 2x - 2\cos 2x + \tan \frac{x}{3} \\ \frac{dy}{dx} &= 6\cos(2x) + 4(\sin 2x) + \frac{1}{3}\sec^2\left(\frac{1}{3}x\right) \\ &= \frac{1}{3}\sec^2\left(\frac{1}{3}x\right) + 6(\cos 2x) + 4(\sin 2x) \end{aligned}$$

$$\begin{aligned} \text{v)} \quad y &= e^{2x} \tan 3x \quad (\text{Product rule}) \\ \frac{dy}{dx} &= e^{2x} (\tan 3x)' + (\tan 3x) \left(\frac{dy}{dx} (e^{2x}) \right) \\ &= e^{2x} \sec^2(3x)(3) + (\tan 3x) (e^{2x} 2) \\ &= e^{2x} (3\sec^2 3x) + 0.693(\tan 3x)(e^{2x}) \end{aligned}$$

$$\text{vi)} \quad y = \frac{\sin 5x}{x^3 + 3x + 4}$$

$$\begin{aligned} \frac{dy}{dx} &= \frac{(x^3 + 3x + 4)(\cos 5x)5 - (\sin 5x)(3x^2 + 3)}{(x^3 + 3x + 4)^2} \\ &= \frac{5x^3(\cos 5x) - 3x^2(\sin 5x) + (5\cos 5x) + 20\cos 5x - 3\sin 5x}{(x^3 + 3x + 4)^2} \end{aligned}$$

①

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Question 1

i) $y = 8x^3 - 2x^2 - x + 1$ Power rule.

$$\frac{dy}{dx} = 8(3x^2) + -2(2x) + -1x + 0$$

$$= 24x^2 - 4x - 1 + 0$$

$$= 24x^2 - 4x - 1$$

$$\frac{dy}{dx} = 24x^2 - 4x - 1$$

ii) $y = -3(x-5)^2$

$$\frac{dy}{dx} = -3\left(\frac{d}{dx} x - 5^2\right)$$

$$= -3(2x - 5)$$

$$= -6x + 3 \times 2 \times 5$$

$$= -6x + 30$$

iii) $y = \frac{7}{x^3} + 4e^{3x}$

sum

$$\frac{dy}{dx} = \left(\frac{7}{x^3} + 4e^{3x}\right)$$

$$= \frac{-21}{x^4} + 4e^3$$

$$= \frac{4e^3 x^4 - 21}{x^4}$$