Study Guideline

You need to follow three steps to study

Step 1: Watch the video link given in the start of the topic.

Step 2: Read the lecture notes attached.

Step 3: Read the topic from course book and do practice questions mention.

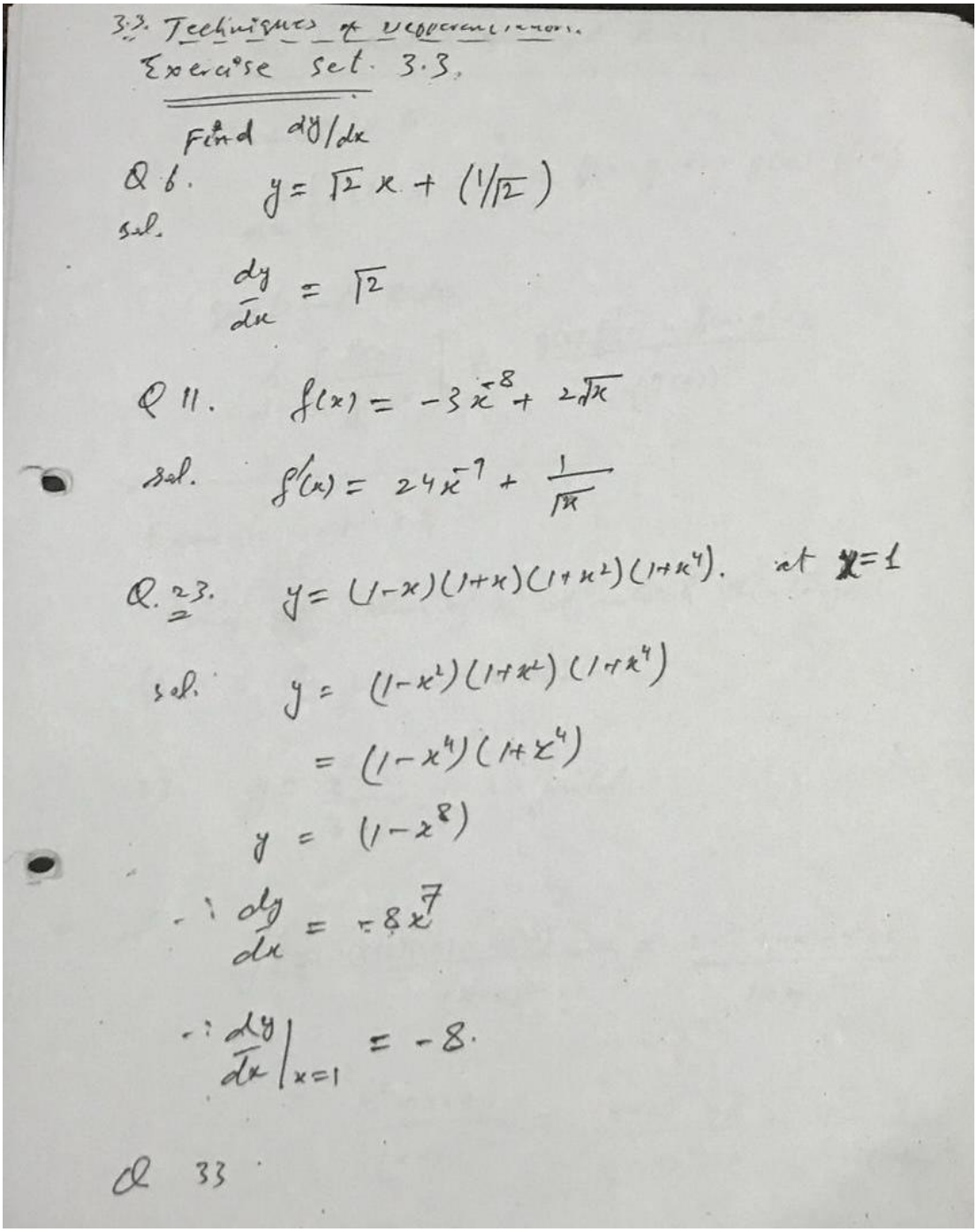
Topic: Techniques of differentiation

Step 1

https://www.youtube.com/watch?v=esxNDR1epeo

You can also watch other videos related to topic.

Step 2



3.3. Techniques of Differentiation.

Exercise set 3.3.

Find dy/dx

Q 6. $y = \sqrt{2}x + (1/\sqrt{2})$

sol.

$$\frac{dy}{dx} = \sqrt{2}$$

Q 11. $f(x) = -3x^{-8} + 2\sqrt{x}$

sol. $f'(x) = 24x^{-7} + \frac{1}{\sqrt{x}}$

Q. 23. $y = (1-x)(1+x)(1+x^2)(1+x^4)$. at $x=1$

sol. $y = (1-x^2)(1+x^2)(1+x^4)$

$= (1-x^4)(1+x^4)$

$y = (1-x^8)$

$\therefore \frac{dy}{dx} = -8x^7$

$\therefore \left.\frac{dy}{dx}\right|_{x=1} = -8.$

Q 33

Step 3: Read topic 3.3 from text book (Calculus by Howard Anton 8th edition)

Practice exercise 3.3 (Q.1 to Q.24, Q.37 to Q.38)

Topic: Product and Quotient Rule

Step 1

https://www.youtube.com/watch?v=esxNDR1epeo

You can also watch other videos related to topic.

Step 2

3.4 The product & quotient Rules

Product rule

$$\frac{d}{dx}\left[f(x)\cdot g(x)\right] = f(x)g'(x) + g(x)\cdot f'(x)$$

quotient Rule

$$\frac{d}{dx}\left[\frac{f(x)}{g(x)}\right] = \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$$

Exercise set 3.4

· Find all values of x at which the tangent line to the given curve is:

23 $y = \dfrac{x^2-1}{x+2}$; horizontal.

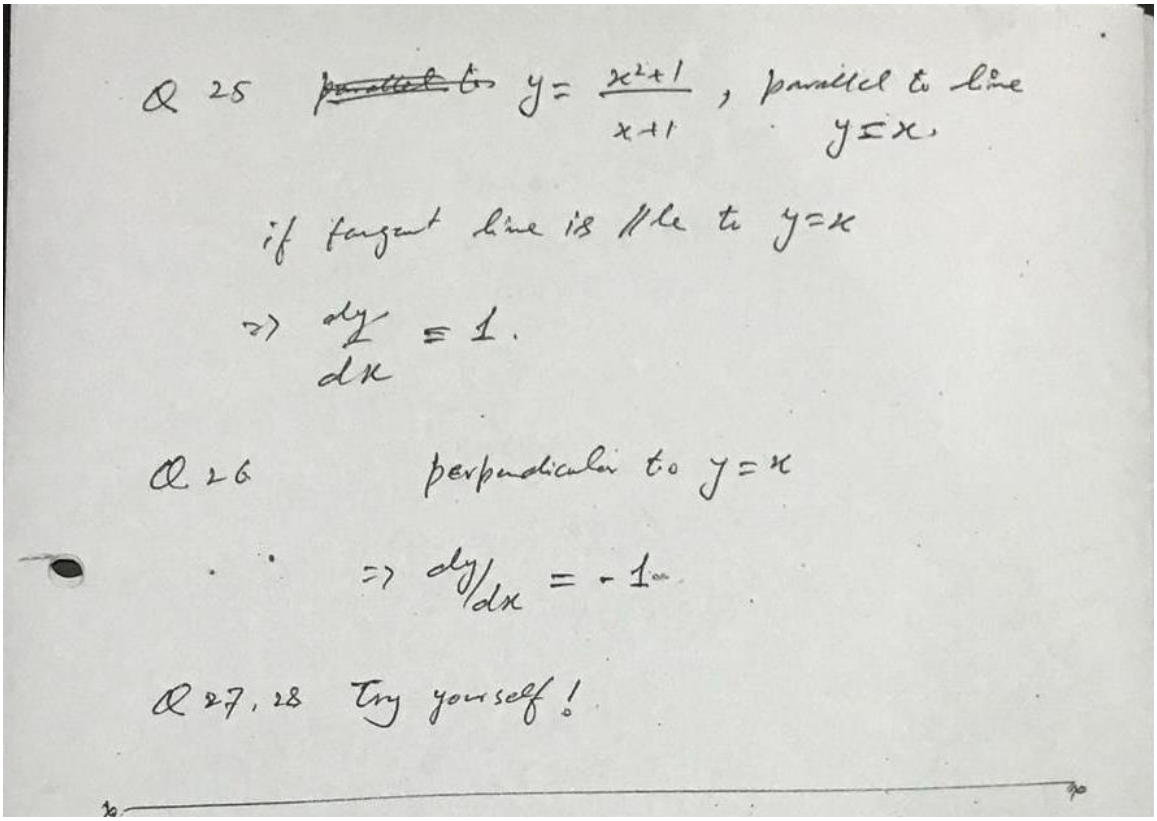
sol.

$$y' = \frac{(x+2)(2x) - (x^2-1)}{(x+2)^2} = \frac{2x^2+4x-x^2+1}{(x+2)^2}$$

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

when tangent line is horizontal $\Rightarrow dy/dx = 0$

$\Rightarrow 0 = x^2+4x+1 \Rightarrow \boxed{x = -2 \pm \sqrt{3}}$



Step 3: Read topic 3.4 from text book (Calculus by Howard Anton 8th edition)

Practice exercise 3.4 (Q.1 to Q.16, Q.23 to Q.28)