

14) For normal
 because tangent is perpendicular to normal therefore the slope
 to normal is $-1/5$

given $y = mx + c$
 substitute to get straight

$$-5 = -1/5(-2) + c$$

$$-5 = 2/5 + c$$

$$-5 - 2/5 = c$$

$$c = -27/5$$

$y = -1/5x - 27/5$ is the equation of normal

3b) In Normal
Because tangent is perpendicular to normal because to define the
normal $\cdot -2/3$

Since $y = 0$
substitute to find x axis to find intercept
 $\therefore -1/3 = -2/3(x) + C$

$$-1/3 = 12/3 + C$$

$$-1/3 - 12/3 = C$$

$$\frac{-3-42}{6} = C$$

$$\frac{-7}{6} = C$$

$$\therefore C = -7/6$$

$$\therefore y = -2/3x - 7/6$$

Multiply through by 6

$$\therefore 6y = -4x - 7$$

11) In demand curve
 because tangent is perpendicular to normal vector to
 slope for normal is

Since $y = \text{max}$ is
 substituting the points given to find intercept

$2 = -\frac{1}{4}x + c$

$2 + \frac{1}{4}x = c$

$2 = \frac{1}{4}x + c$

$c = \frac{9}{4}$

$y = -\frac{1}{4}x + \frac{9}{4}$

through by 4

$\therefore 4y = 9 - x$

12) For tangent (2,8)

$y = 3x^2 - 2x$

slope = $\frac{dy}{dx} = 6x - 2$

At $x = 2$ as given

$\therefore \frac{dy}{dx} = 6(2) - 2 = 10$

\therefore If slope is 10

Since $y = \text{max}$ is

Substitute (2,8) in 1 equation

$8 = 10(2) + c$

$8 = 20 + c$

3a) $y = \frac{x^3}{2}$ for tangent $(-1, -1/2)$

Using Quotient rule

$$\frac{U \frac{dv}{dx} - v \frac{du}{dx}}{v^2}$$

$$\frac{dy}{dx} = \frac{2(x^2 - x^2(0))}{2^2}$$

$$\frac{dy}{dx} = \frac{6x^2 - 0}{4}$$

$$\therefore \frac{dy}{dx} = \frac{3x^2}{2}$$

Use $x = -1$ as given in the question

$$\left. \frac{dy}{dx} \right|_{x=-1} = \frac{3(-1)^2}{2}$$

$$= \frac{3}{2}$$

$$\therefore \text{slope}(m) = \frac{3}{2}$$

Since $y = mx + c$

Substitute $(-1, -1/2)$ in the equation

$$\therefore -1/2 = \left(\frac{3}{2}(-1)\right) + c$$

$$-1/2 = -3/2 + c$$

$$-1/2 + 3/2 = c$$

$$\frac{2}{2} = c$$

$$\therefore c = 1$$

$$3 - 50 = c$$

$$\therefore c = -47$$

$$\therefore y = 10x - 47$$

For Normal

Because tangent is perpendicular to normal therefore

$$\text{slope} = -\frac{1}{10}$$

$$\text{since } y = mx + c$$

substitute to find intercept

$$3 = -\frac{1}{10}(2) + c$$

$$3 = -\frac{1}{5} + c$$

$$3 + \frac{1}{5} = c$$

$$c = \frac{16}{5}$$

$$\therefore y = -\frac{1}{10}x + \frac{16}{5} \text{ (multiply through by 5)}$$

$$5y = -\frac{1}{5}x + 16$$

Maths Assignment
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$y = 2x^2$ for tangent

$\therefore \frac{dy}{dx} = 4x$

Use $x=1$ as given in the question

$\left. \frac{dy}{dx} \right|_{x=1} = 4$

The slope = 4

Since $y = mx + c$

Using the points given substitute to find

$2 = 4(1) + c$

$2 = 4 + c$

$c = -2$

\therefore tangent equation = $y = 4x - 2$

(a) $y = 11x - x^2$ for tangent $(-2, -5)$

$$\frac{dy}{dx} = 11 - 2x$$

substitute $x = -2$ as given in the question

$$\left. \frac{dy}{dx} \right|_{x=-2} = 11 - 2(-2)$$

$$\left. \frac{dy}{dx} \right|_{x=-2} = 15$$

$$= 5$$

\therefore The slope is 5

Since $y = mx + c$

Substitute to find the intercept

$$-5 = 5(-2) + c$$

$$-5 = -10 + c$$

$$c = -5 + 10$$

$$\therefore c = 5$$

$\therefore y = 5x + 5$ is the equation of tangent