

Start here for

Question Number: **6**

$$u \quad v \quad u(x+2) \quad v = x^2 + 4$$

$$a) f(x) = (x+2)(x^2+4) \quad u' = 1 \quad v' = 2x$$

$$i) = x^3 + 4x + 2x^2 + 8 = 0$$

$$f'(x) = 3x^2 + 4x + 4 = 0$$

$$uv' + vu'$$

$$2x^2 + 4x + x^2 + 4$$

$$3x^2 + 4x + 4$$

$$\frac{-4 \pm \sqrt{16 - 4 \times 3 \times 4}}{6}$$

$$\frac{-4 \pm \sqrt{-32}}{6}$$

→ can't be done

to find a  $x$  value

∴ no stationary point

$$ii) f''(x) = 6x + 4 = 0$$

$$x = -\frac{4}{6}$$

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

$$-1 \left| -\frac{2}{3} \right| = -\frac{1}{3}$$

$$1 \times 6$$

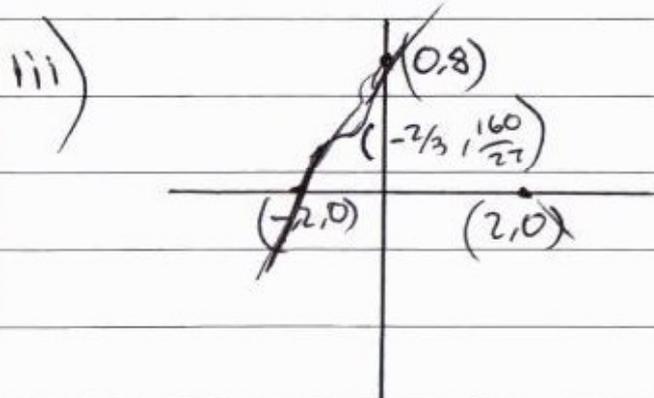
$$\frac{5}{3} \times \frac{16}{9}$$

$$7$$

$$\frac{95}{27}$$

$x < -\frac{2}{3}$  concave up

$x > -\frac{2}{3}$  concave down



$$b) i) 1 = \theta \times r \quad 9 = \theta \times 5$$

$$\frac{9}{5} = \theta$$

1.8 radians

$$\frac{\pi}{180}$$

$$103^\circ$$

$$1.8 \times \frac{180}{\pi}$$

$$103^\circ$$

$$ii) \angle OPT = \angle OQT \text{ given}$$

OT is common

$$PO = OQ \text{ (radii of circle =)}$$

$$\therefore \triangle OPT \equiv \triangle OQT \text{ (RHS)}$$

$$iii) PT = \sqrt{\quad}$$

$$PT^2 = a^2 + b^2 - 2ab \cos 103^\circ$$

$$50 - 50 \cos 103^\circ$$

$$PT^2 = 61$$

$$PT = 7.8 \text{ cm}$$

$$iv) \frac{1}{2} ab \sin 90$$

$$A = 39.1 \text{ cm}^2 - 22.5$$

$$A \text{ of shaded } 16.6 \text{ cm}^2$$

Additional writing space on back page.

10

~~A = A of PQRT~~  $\frac{1}{2} r^2 \theta$   
 ~~$\frac{1}{2} \times 1.8 \times 25$~~   
 ~~$= 22.5$~~

