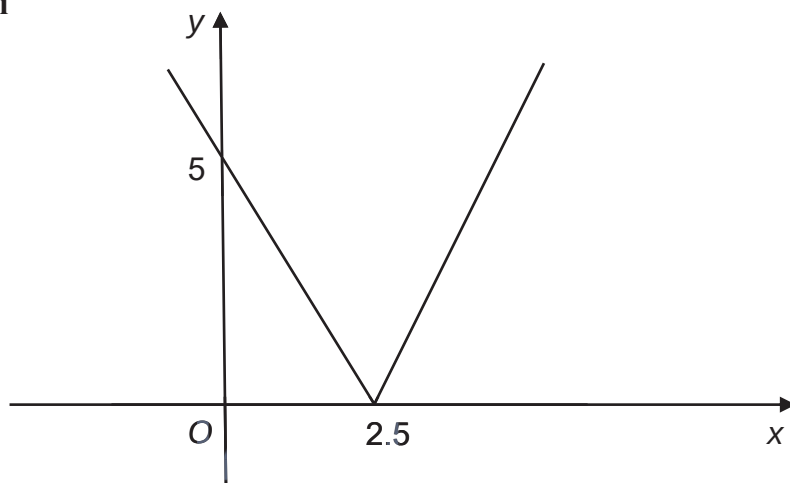


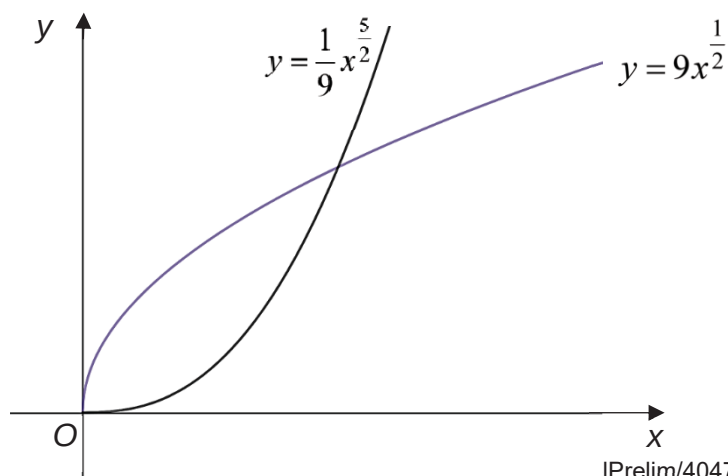
Answers 4E/5N Prelim 2020 AMath Paper 1

No.	Answers	No.	Answers
1	$f'(x) = \frac{-19}{(2x-3)^2} \therefore \text{Decreasing Function}$	8i	$p > 2$
2	$m = 0.0405$	8ii	$b^2 - 4ac > 32$ Since $b^2 - 4ac$ is always positive for all real values of k , the line will intersect the curve at 2 distinct pts.
3i	$b = (a+2)^2 + 1$	10i	$a = 3 \quad b = 6$
3ii	$a \geq 1$ or $a \leq -5$ (reject)	10ii	$g(x) = -8\sin^3 x + 6\sin x - 5$
4i	$\frac{dy}{dx} = \frac{3k(x+1)}{\sqrt{2x+3}}$	11i	$t = \frac{3\pi}{4}$
4ii	$k = \frac{3}{4}$	11ii	$\left(\frac{27\pi}{8} - 9\right) \text{ units}^2$
5i	$P(0, 7)$	12ii	12 seconds
5ii	$2y = -3x + 1$	12iii	When $v = 0$, $t = 7$ or $t = -6$ (reject) Since the particle is at instantaneous rest when $t = 7$, the particle changes its direction only once.
6ii	$x = 45^\circ, 114.3^\circ, 155.7^\circ$	13ii	$\theta = 0.936 \text{ rad}$
7ii	$x = \frac{17}{3}$ or $x = -7$		
7iii	$m \geq 5$		

7i



9i



Answers to A Math 2020 Prelim P2

1. $k = \frac{20}{3}$

2. $x = 0.631$

3. (ii) $\frac{5x^2 - 30x + 10}{2x^3 - 13x^2 + 24x - 9} = \frac{-3}{5(2x-1)} + \frac{14}{5(x-3)} - \frac{7}{(x-3)^2}$

(iii) $\frac{-3}{5} \ln(2x-1) + \frac{28}{5} \ln(x-3) + \frac{14}{(x-3)} + c$

4. (i) $3 \ln(3x+1)$ (ii) 5.08

5. (ii) 594 (iii) -4752

6. (ii) $\therefore$ equation is $x^2 - \frac{9}{2}x + 4 = 0$ or $2x^2 - 9x + 8 = 0$

7. (ii) $\frac{7-3\sqrt{5}}{2}$

8. (a) Radius = 7 units and centre is $(-2, 5)$

(b) (i) Equation of C_2 is $(x-5)^2 + (y-4)^2 = 25$ (ii) Coordinates are $(8, 8)$

9. (i) $4 \cos 4x - 3 \sin 4 = 5 \cos(4x + 0.644)$ (ii) $5e^{-3x} \cos(4x + 0.644)$ (iii) $x = 0.232$

10. (i) $f(x) = 3x^2 - 3x^{\frac{3}{2}} - \frac{9}{x} + 7$ (ii) $2x + 21y + 40 = 0$

11. (a) (i) $y = \ln(4x^2 - 1) + 2$

(b) (ii) $p = 5$, $q = 8$ (ii) Inaccurate $A = 700$

12. (i) when $x = -\frac{1}{6}$, $y = \frac{2}{\left(2\left(-\frac{1}{6}\right) + 1\right)} + 9\left(-\frac{1}{6}\right) - 5 = -\frac{7}{2}$ (ii) coordinates are $\left(-\frac{5}{6}, -\frac{31}{2}\right)$

(iii)

$$\begin{aligned} \frac{d^2y}{dx^2} &= 8(2x+1)^{-3} \cdot 2 \\ &= \frac{16}{(2x+1)^3} \end{aligned}$$

$\left(-\frac{1}{6}, -\frac{7}{2}\right)$ is a minimum point, $\left(-\frac{5}{6}, -\frac{31}{2}\right)$ is a maximum point.

