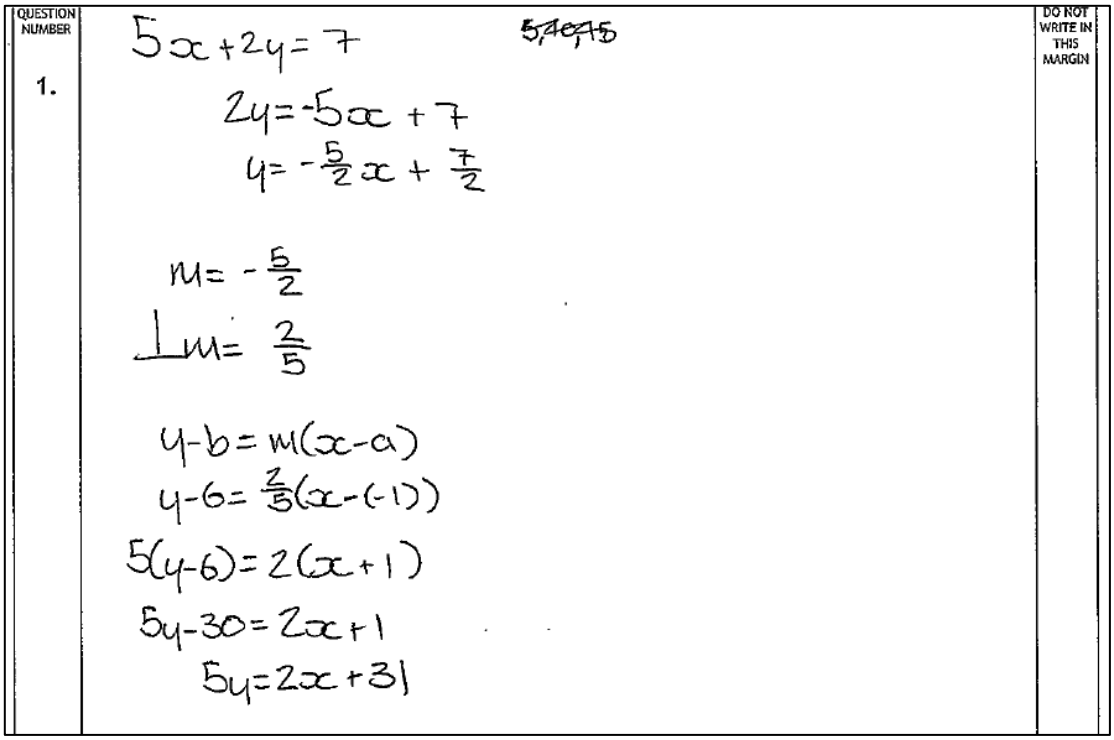
Candidate 1



QUESTION NUMBER

1.

$5x+2y=7$

$2y=-5x+7$

$y=-\frac{5}{2}x+\frac{7}{2}$

$m=-\frac{5}{2}$

$\perp m=\frac{2}{5}$

$y-b=m(x-a)$

$y-6=\frac{2}{5}(x-(-1))$

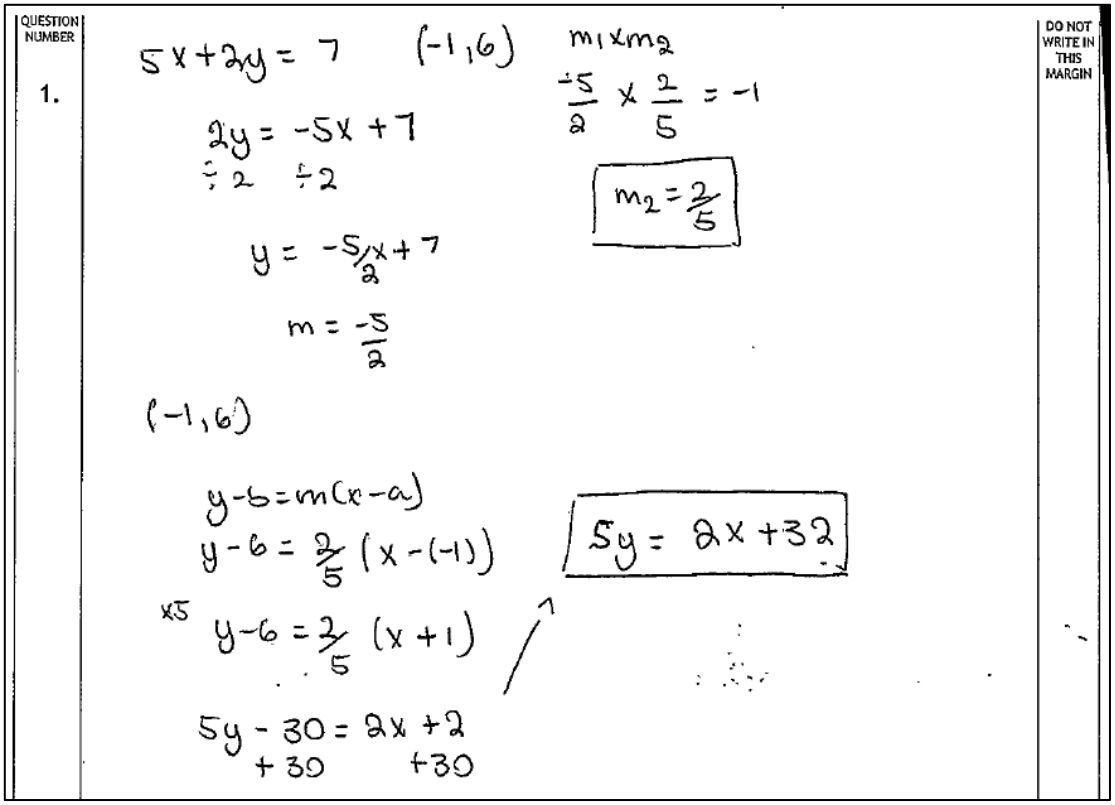
$5(y-6)=2(x+1)$

$5y-30=2x+1$

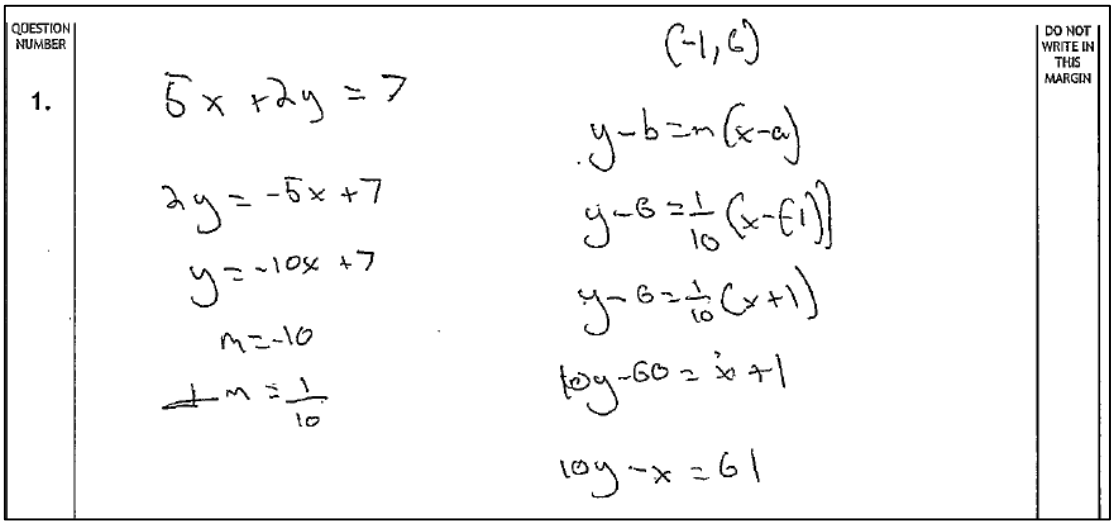
$5y=2x+31$

DO NOT WRITE IN THIS MARGIN

Candidate 2



Candidate 3



Candidate 4

2.

$2\log_3 6 - \log_3 4$

$\log_3 6^2 - \log_3 4$

$\log_3 36 - \log_3 4$

$\log_3 \frac{36}{4}$

$\log_3 9$

$3^x = 9$

$x = 2$

Candidate 5

QUESTION NUMBER

3.

DO NOT WRITE IN THIS MARGIN

$h(x) = 4 + \frac{1}{3}x$

$y = 4 + \frac{1}{3}x$

$x = 4 + \frac{1}{3}y$

-4

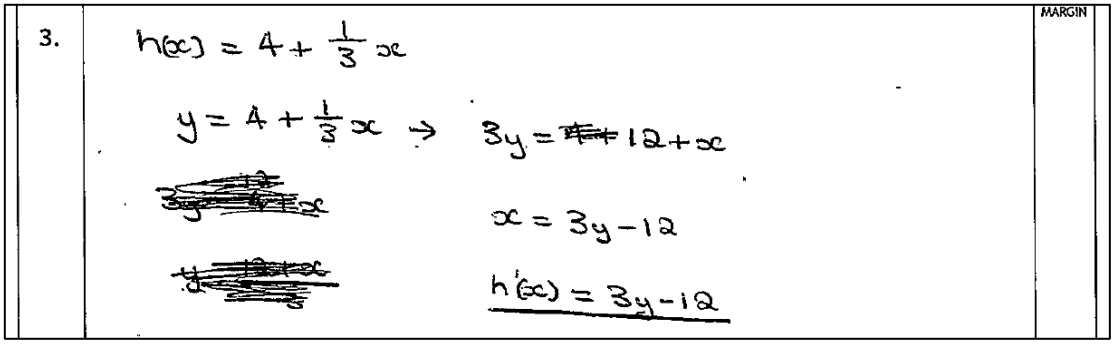
$x - 4 = \frac{1}{3}y$

$\times 3$

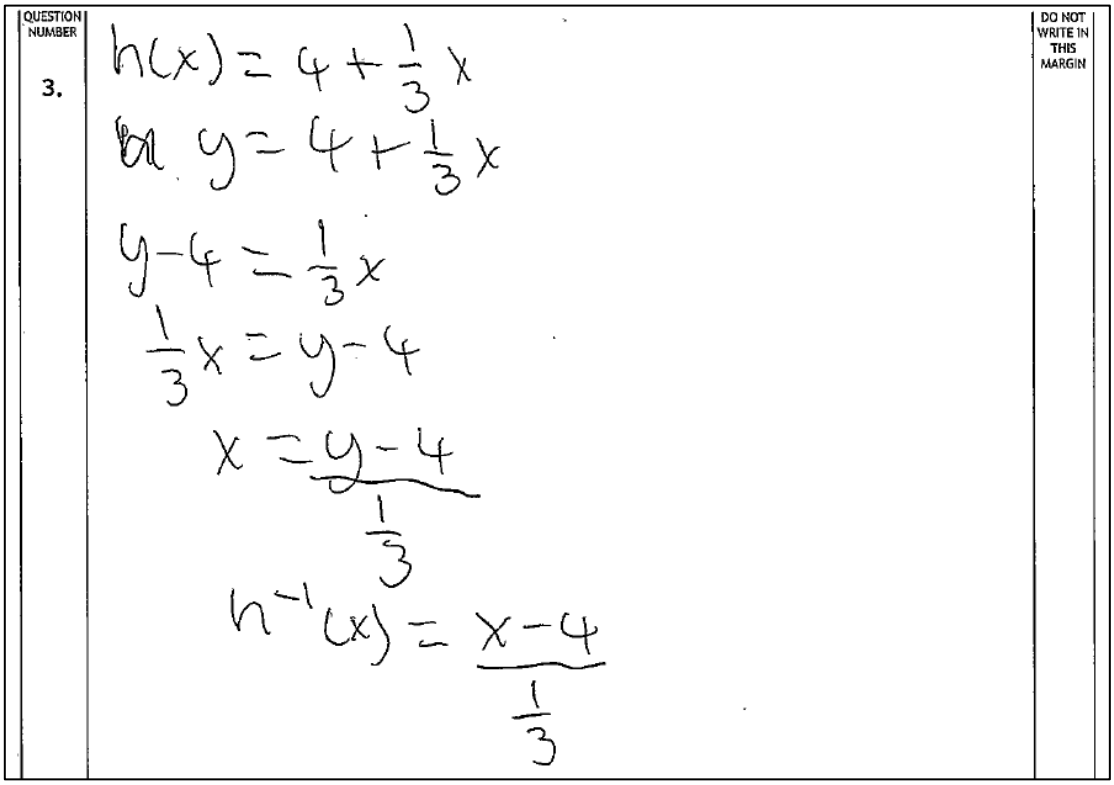
$3(x-4) = y$

$h^{-1}(x) = 3(x-4)$

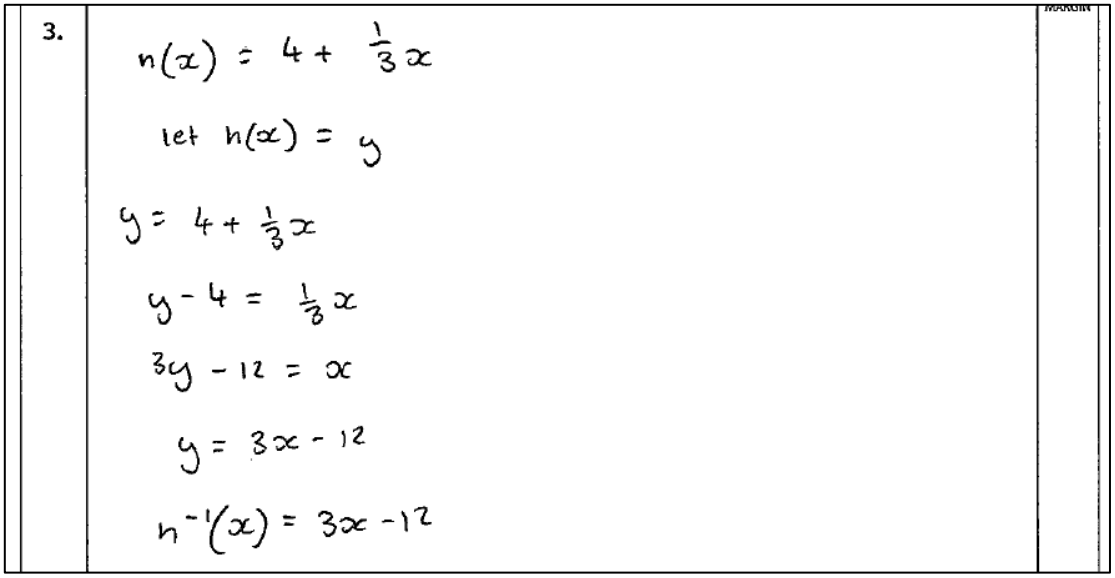
Candidate 6



Candidate 7



Candidate 8



3.

$n(x) = 4 + \frac{1}{3}x$

let $n(x) = y$

$y = 4 + \frac{1}{3}x$

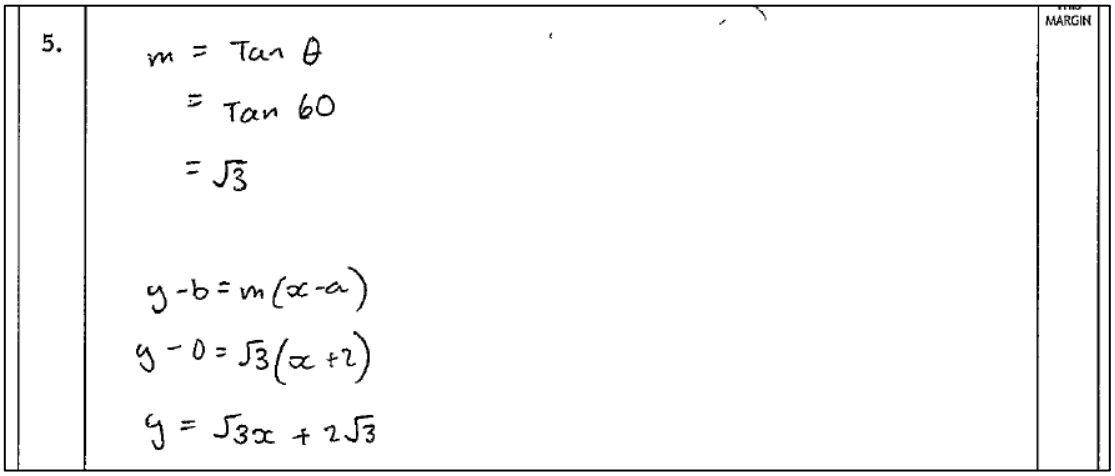
$y - 4 = \frac{1}{3}x$

$3y - 12 = x$

$y = 3x - 12$

$n^{-1}(x) = 3x - 12$

Candidate 9



5.

$m = \tan\theta$

$= \tan 60$

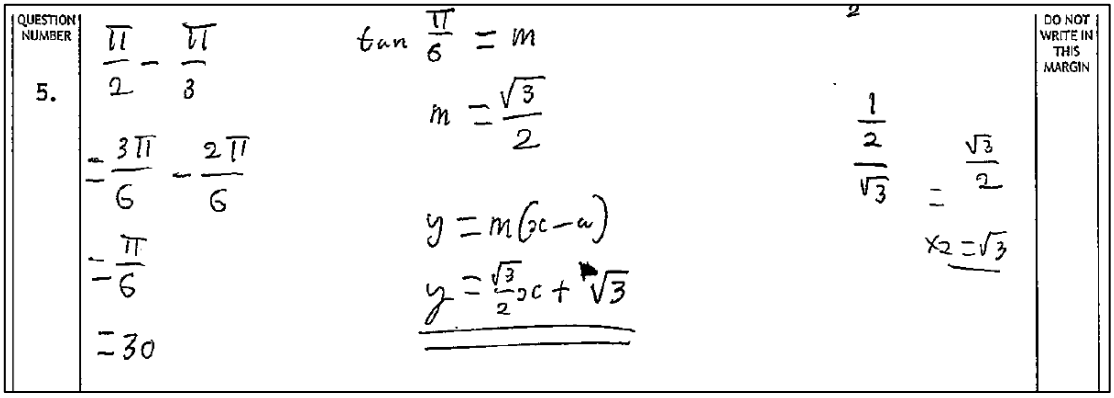
$= \sqrt{3}$

$y - b = m(x - a)$

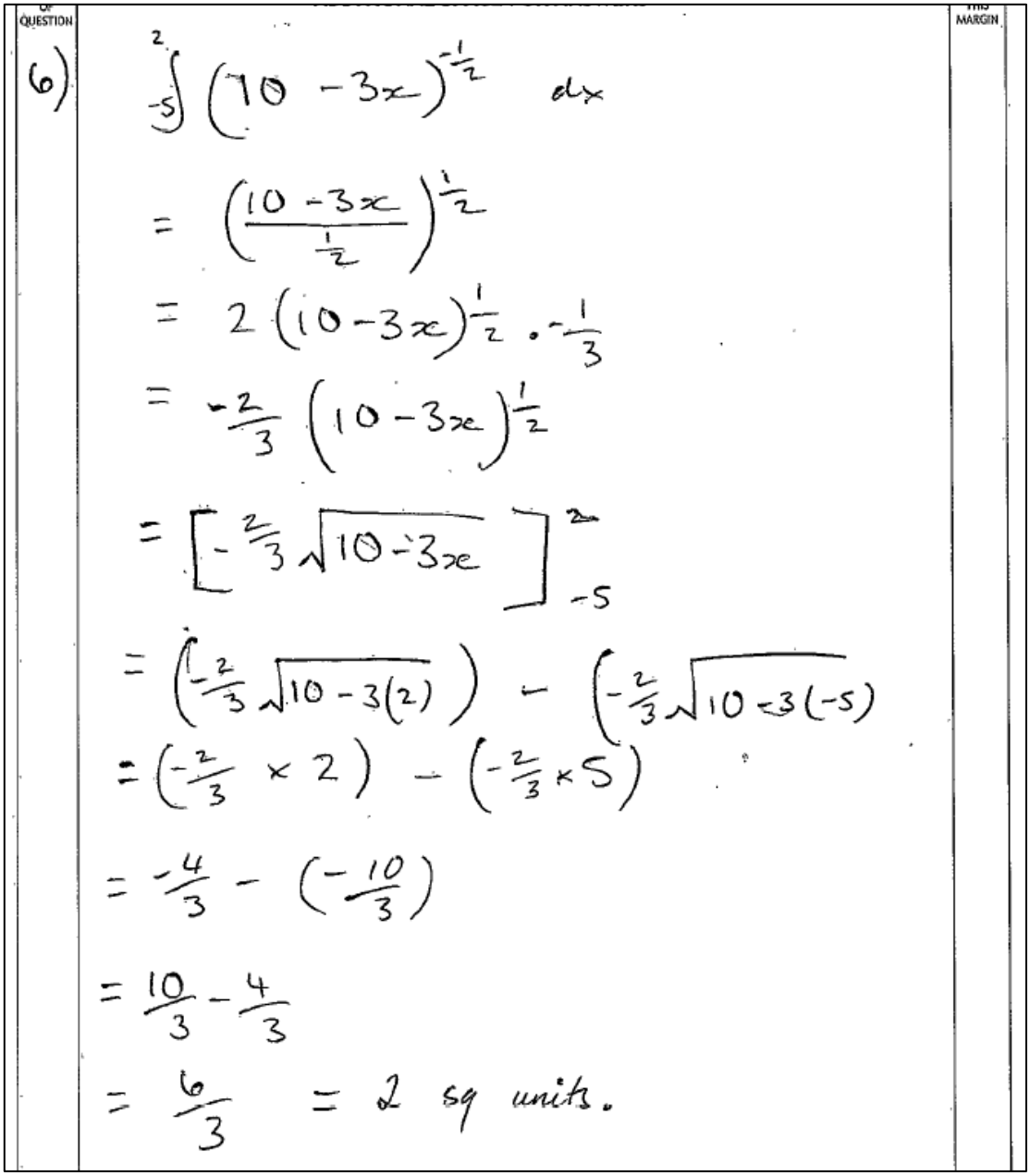
$y - 0 = \sqrt{3}(x + 2)$

$y = \sqrt{3}x + 2\sqrt{3}$

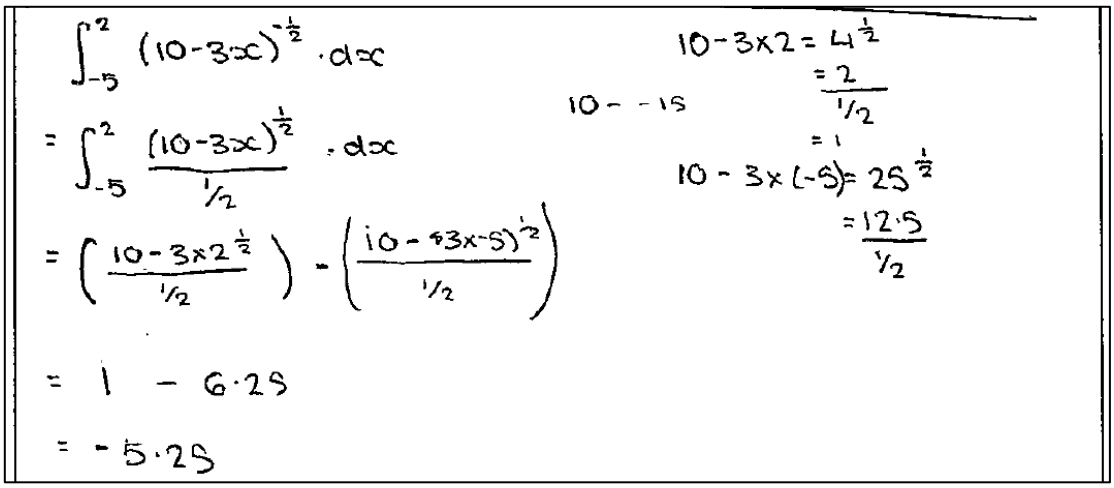
Candidate 10



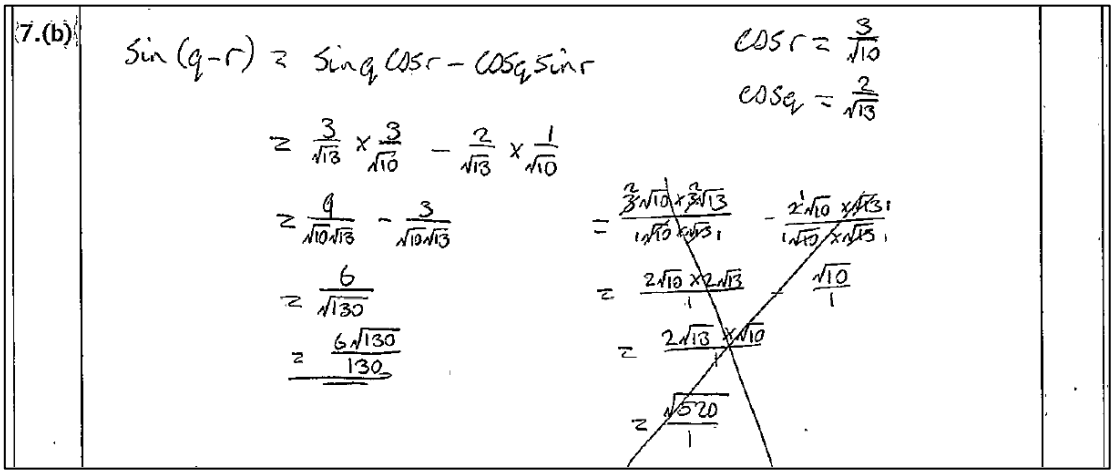
Candidate 11



Candidate 12



Candidate 13



Candidate 14

7.(b)

$$\begin{aligned}\sin(q-r) &= \sin q - \sin r \\ &= \frac{3}{\sqrt{13}} - \frac{1}{\sqrt{10}} \\ &= \frac{9}{13} - \frac{1}{10} \\ &= \frac{90}{130} - \frac{13}{130} \\ &= \frac{77}{130}\end{aligned}$$

Candidate 15

7.(b)

$$\begin{aligned}\sin(q-r) &= \sin q\cos r - \cos q \sin r \\ &= \frac{3}{\sqrt{13}} \times \frac{3}{\sqrt{10}} - \frac{2}{\sqrt{13}} \times \frac{1}{\sqrt{10}} \\ &= \frac{9}{\sqrt{13}\times\sqrt{10}} - \frac{2}{\sqrt{13}\times\sqrt{10}} \\ &= \frac{9}{\sqrt{13\times 10}} - \frac{2}{\sqrt{13\times 10}} \\ &= \frac{9}{\sqrt{130}} - \frac{2}{\sqrt{130}} \\ &= \frac{6}{\sqrt{130}} \\ &= \frac{6}{\sqrt{13}\sqrt{10}}\end{aligned}$$

$\sin q = \frac{3}{\sqrt{13}}$

$\cos r = \frac{3}{\sqrt{10}}$

$\cos q = \frac{2}{\sqrt{13}}$

$\sin r = \frac{1}{\sqrt{10}}$

1 130
2 65
3
4
5 26

Candidate 16

9.

$\cos 2x^\circ = 5\cos x^\circ - 3$ $\quad 0 \leqslant x \leqslant 360$

$2\cos^2 x - 1 = 5\cos x^\circ - 3$

$2\cos^2 x - 5\cos x - 4 = 0$

$(2\cos^2 x \quad)(\cos^2 x - \quad) = 0$

$b^2 - 4ac$

$-5^2 - 4 \times 2 \times -4$

$25 - 8 \times -4$

$25 + 32$

57.

Invalid discriminant.

Candidate 17

9.

$\cos 2x = 5\cos x - 3$ $\quad 0 \leq x < 360$

$2\cos x^2 - 1 = 5\cos x - 3$

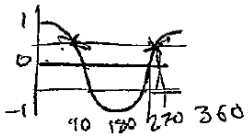
$2\cos x^2 - 5\cos x + 2 = 0$

$(2\cos x - 1)(\cos x - 2) = 0$

$2\cos x - 1 = 0$ $\quad \cos x - 2 = 0$

$2\cos x = 1$ $\quad \cos x = 2$

$\cos x = \frac{1}{2}$ $\quad$ no solution



$x = \frac{90}{2}, \frac{270}{2}, \frac{450}{2}, \frac{630}{2}$

$360 + 90$

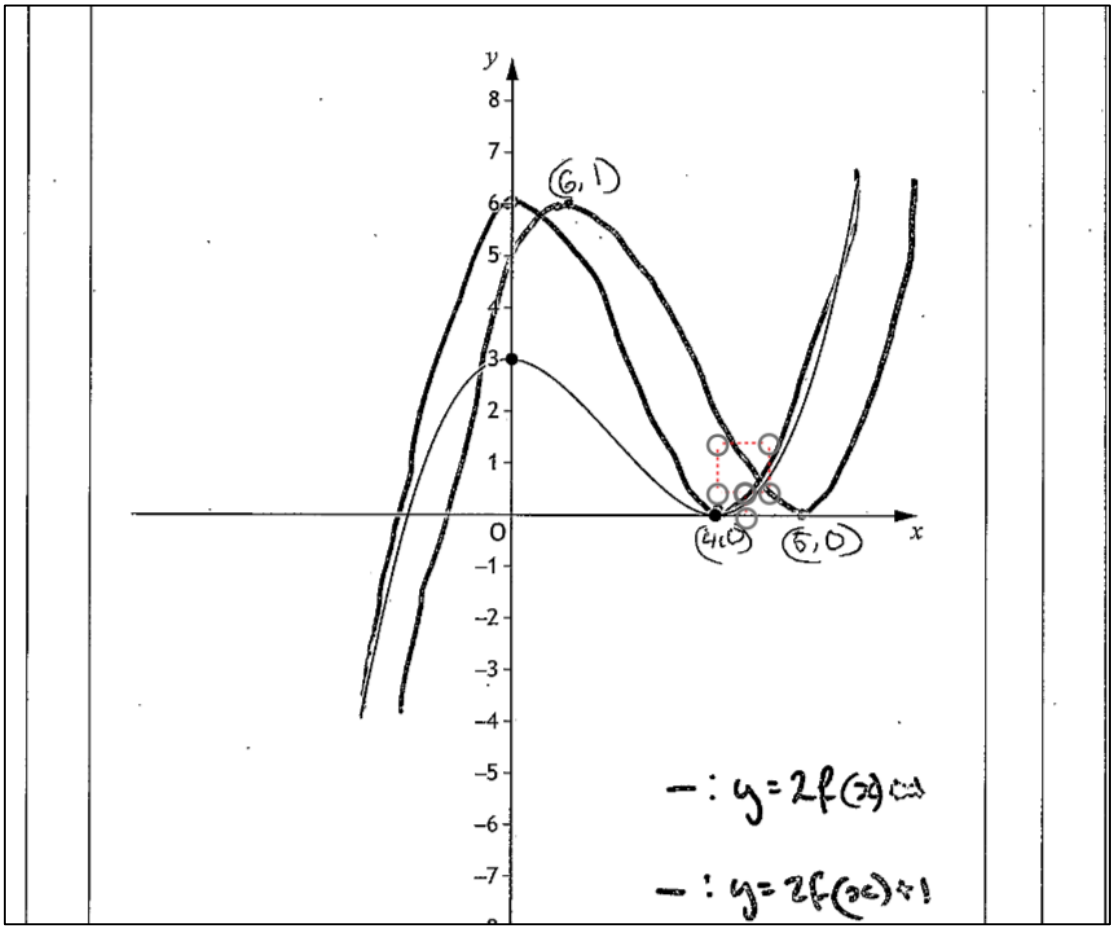
$540 + 90$

$= 45^\circ, 135^\circ, 225^\circ, 315^\circ$

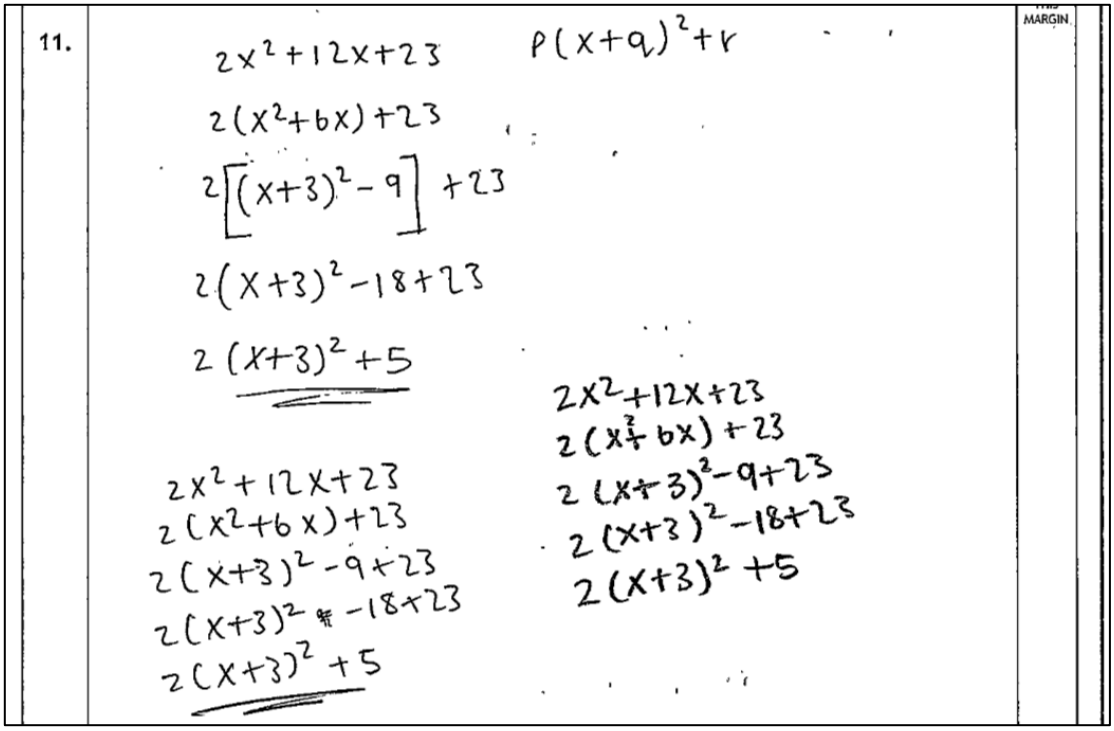
$= 45^\circ, 225^\circ$

Candidate 18

Question 10



Candidate 19



11.

$2x^2+12x+23$ $\quad p(x+q)^2+r$

$2(x^2+6x)+23$

$2[(x+3)^2-9]+23$

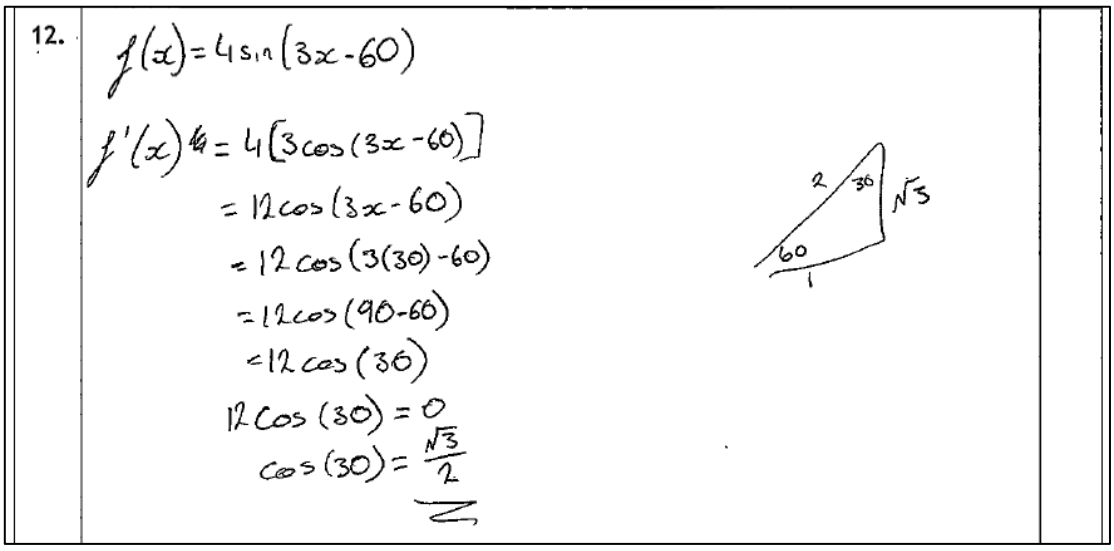
$2(x+3)^2-18+23$

$2(x+3)^2+5$

$2x^2+12x+23$
$2(x^2+6x)+23$
$2(x+3)^2-9+23$
$2(x+3)^2-18+23$
$2(x+3)^2+5$

$2x^2+12x+23$
$2(x^2+6x)+23$
$2(x+3)^2-9+23$
$2(x+3)^2-18+23$
$2(x+3)^2+5$

Candidate 20



12.

$f(x)=4\sin(3x-60)$

$f'(x)=4[3\cos(3x-60)]$

$=12\cos(3x-60)$

$=12\cos(3(30)-60)$

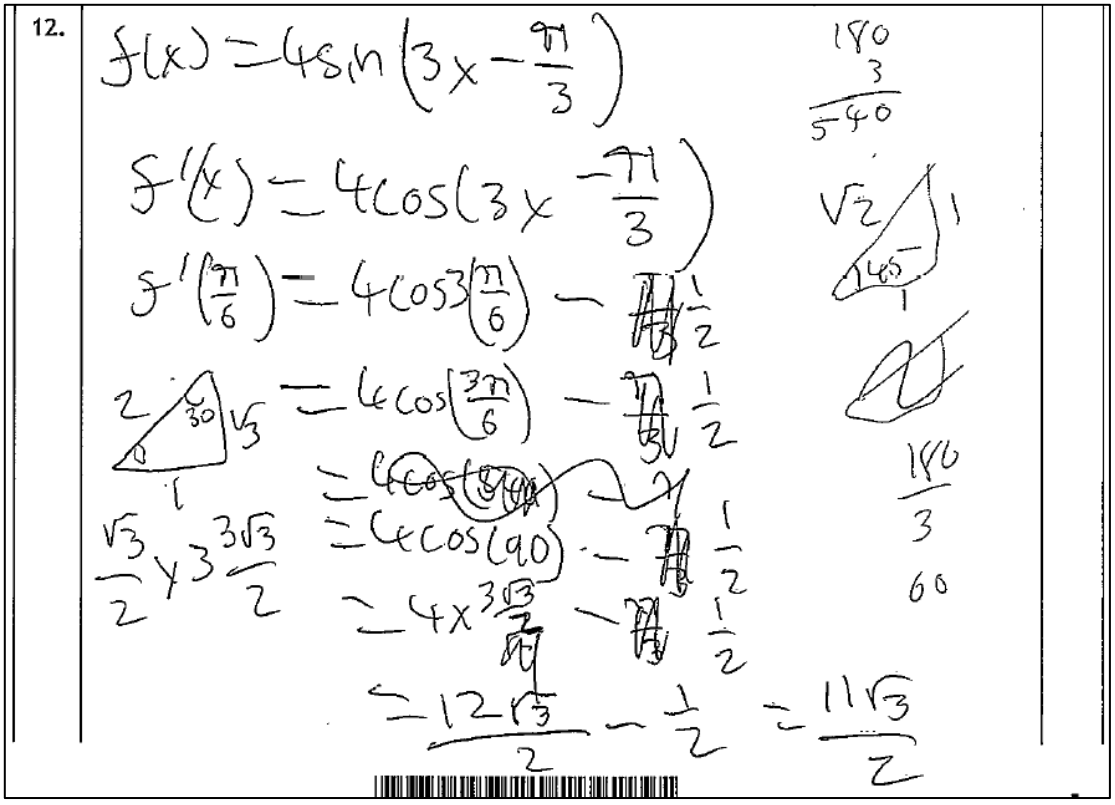
$=12\cos(90-60)$

$=12\cos(30)$

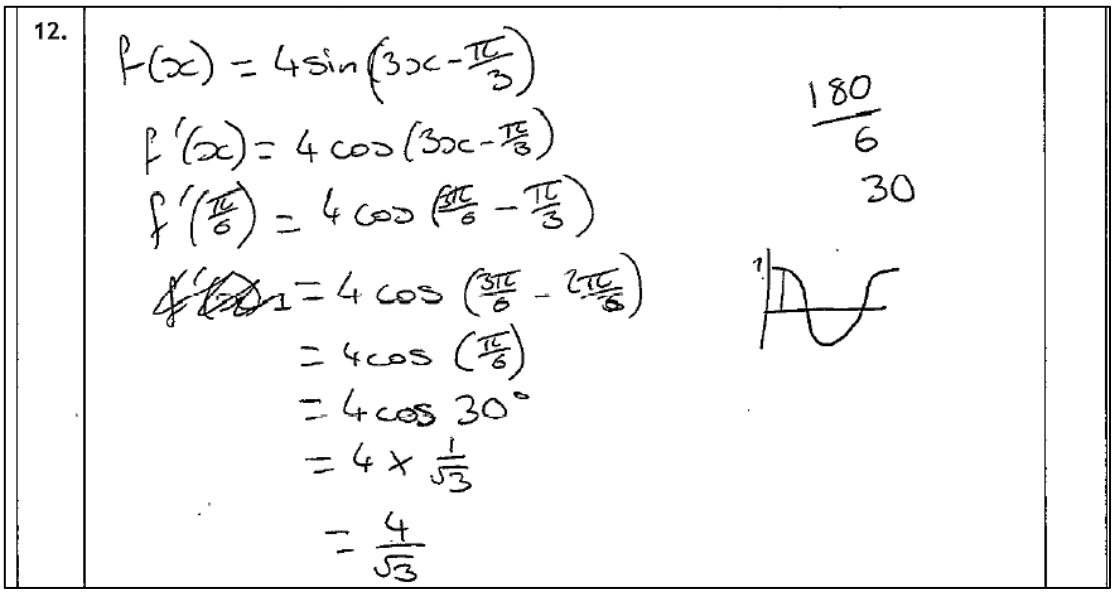
$12\cos(30)=0$

$\cos(30)=\frac{\sqrt{3}}{2}$

Candidate 21



Candidate 22



Candidate 23

14.(a) (i)

centre $= (7, -5)$

radius $= 10$

14.(a) (ii)

distance between centre of C_1 and P

$(7, -5)$

$(-2, 7)$

$= 9$ along, 13 up

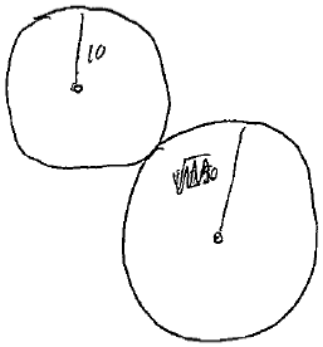
$= \sqrt{9^2 + 13^2}$

$= \sqrt{81 + 169}$

$= \sqrt{250}$

as the distance between the point $(\sqrt{250})$ is greater than the radius $(\sqrt{100})$, point P lies outside C_1.

14.(b)



$r = \sqrt{250} - \sqrt{100}$

$= \sqrt{25} \times \sqrt{10} - \sqrt{25} \times \sqrt{4}$

$= 5\sqrt{10} - 5\sqrt{4}$

$= 5\sqrt{10} - 10$

or

$r^2 = 250 - 100$

$r^2 = 150$

$r = \sqrt{150}$

$= 5\sqrt{2}\sqrt{3}$