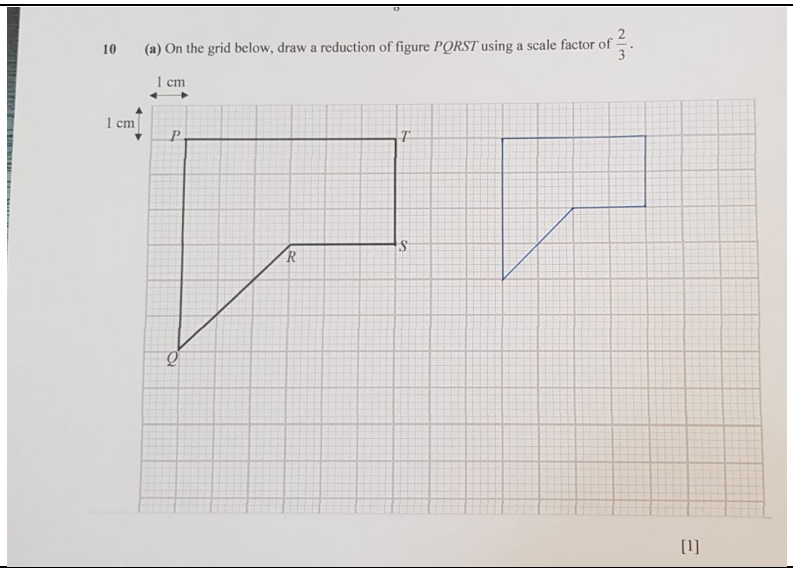
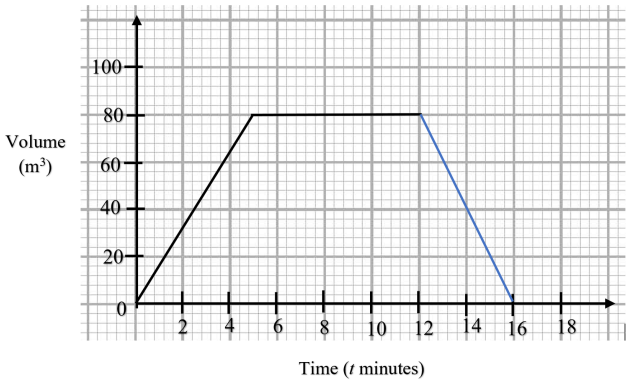
Marking Scheme to 4 NA Prelims Paper 1

No.	Workings and Steps
1	$\sqrt{\frac{4.26\times 8.53}{97.1}}$ $=\sqrt{\frac{4\times 9}{100}}$ $=0.6$
2	$2x+3>10$ $2x>7$ $x>3.5$ $x=5$
3a	When $x = 0$, $y = 4$ point A = (0. 4)
b	Gradient = -1.5
4	$\frac{3+4+5}{3}-3$ = 1 unit reps \$30 12 units rep 12 x \$30 = \$360
5	$\frac{35pr}{12p}\div\frac{5r^4}{6p^3q^2}$ $=\frac{35pr}{12p}\times\frac{6p^3q^2}{5r^4}$ $=\frac{7p^3q^2}{2r^3}$
6	arc length $=\frac{360-110}{360}\times 2\pi\times 15$ $=\frac{125}{6}\pi$

	perimeter $= \frac{125\pi}{6} + 30$
7a	tan angle $MAD = \frac{2}{3}$
b	tan angle $CMN = \frac{CN}{10}$ $\frac{2}{3} = \frac{CN}{10}$ $CN = \frac{2}{3} \times 10 = 6.67$ cm
8	$-\frac{13}{3}$, -3, 3.03, $3\frac{1}{3}$
9a	October and November
b	percentage increase $= \frac{1.7 - 1.67}{1.67} \times 100\%$ $= 1.80\%$
10a	

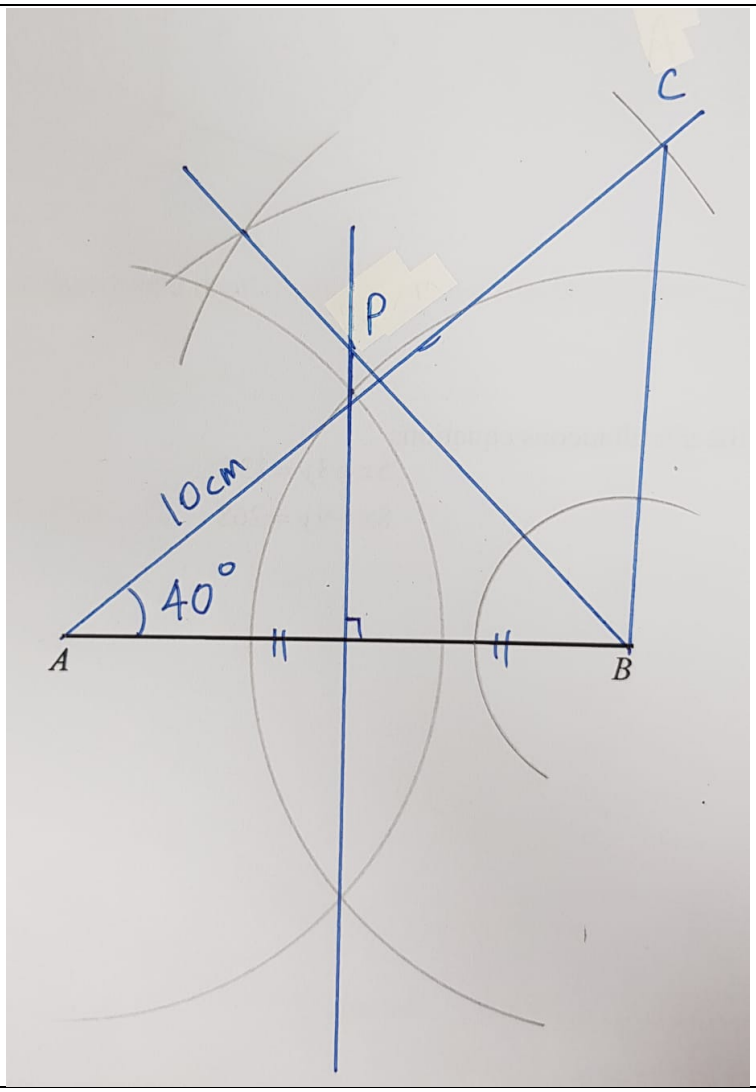
bi	scale factor = $\frac{18}{10} = 1.8$
ii	$y = 4 \text{ x } 1.8 = 7.2$
11a	$4y - 10x - 3y + 6x$ $= y - 4x$
b	$\frac{2x-5}{2} - \frac{3x}{5}$ $= \frac{2(2x-5) - 6x}{10}$ $= \frac{4x-25}{10}$
12a	$\frac{1}{6} \times 90 = 15$
b	$\frac{(45-15) \div 3}{2}$ OR $(45-15) \div 3 \times 2$ $= 20$ $= 20$
13ai	64
aii	2.4
b	13 
14	total distance = $20 \times \frac{39}{60} + 7.5 = 20.5\text{km}$

	total time taken = $\frac{39}{60}+\frac{1}{2}=\frac{23}{20}$ h average speed = $20.5\div\frac{23}{20}=17.8$ km/h
15a	angle *DCA*
b	$\frac{AC}{BF}=\frac{CD}{BA}$ $AC=\frac{28}{40}\times 64$ AC = 44.8 cm BC = 44.8 – 40 = 4.8 cm
16a	$324 = 2^2 \times 3^4$
bi	LCM = $2^3 \times 3^4 \times 5^2 \times 7$
bii)	HCF = $2 \times 3^2 = 18$
17a	value of handbag = $\frac{189}{1.054657}$ = S$179.21
b	watch in A$ = $255 x 1.054 = A$268.77 total cost = A$268.77 x 1.0205 = A$274.28 It is cheaper to buy in Singapore.
18	$e-2=\frac{8}{e+3}$ $(e-2)(e+3)=8$ $e^2+e-6=8$ $e^2+e-14=0$ $e=\frac{-1\pm\sqrt{1-4(1)(-14)}}{2}$ $e=\frac{-1\pm\sqrt{57}}{2}$

	$e = 3.27$ or -4.27
19a	angle $ACE = 180^\circ - 80^\circ = 100^\circ$ Angle ACE = **<u>100º</u>** because angle BAC and angle ACE are **<u>interior angles</u>**, ***<u>AB // CE</u>*** OR Angle $ACE = 100^\circ$ because $\angle BCE = 47^\circ$ (alt. $\angle$s, AB // CE) and $\angle ACE$ is the sum of $\angle ACE$ and $\angle BCE$
b	$\angle BCD = 100^\circ - 53^\circ = 47^\circ$ $\angle CBD = 123^\circ - 47^\circ = 76^\circ$
20	P(late) = 1 – 0.3 – 0.52 = 0.18
21	$p = \frac{22.40}{28} \times 100\%$ $p = 80\%$
22	slant height $= \sqrt{26^2 - 10^2}$ $= 24$ perpendicular height $= \sqrt{24^2 - 10^2}$ $= \sqrt{476}$ $= 21.81742$ Volume

	$= \frac{1}{3} \times 20 \times 20 \times \sqrt{476}$ $= 2910$
23	1 int angle of pentagon $= \frac{(5-2)\times 180°}{5} = 108º$ 1 int angle of heptagon $= \frac{(8-2)\times 180°}{8} = 135\ º$ $x = 360º - 108º - 135°$ $x = 117º$
24a	$25x + 15y = 680$ $5x + 3y = 136$
b	$16x + 18y = 536$ $8x + 9y = 268$
c	$5x + 3y = 136$ ……(1) $8x + 9y = 268$ ……(2) (1) × 3 $15x + 9y = 408$ ……(3) (3) – (2) $7x = 140$ $x = 20$ subst $x = 20$ into (1) $5(20) + 3y = 136$ $y = 12$ x = 20 y = 12

	<u>Alternative Method(Substitution)</u> $5x + 3y = 136$ …….(1) $8x + 9y = 268$ …….(2) From (1) $3y = 136 – 5x$ ……..(3) Subst (3) into (2) $8x + 3(136 – 5x) = 268$ $8x + 408 – 15x = 268$ $-7x = -140$ $x = 20$ Subst $x = 20$ into (3) $y = 12$ x = 20 y = 12
d	diff = \$20 – \$12 = \$8

25a	
b	Refer to picture above
c	Refer to picture above
d	PA = 5.3 cm

26	Volume of water discharged by the 2 pipes per second $= \pi \times 5^2 \times 300 \times 2$ $= 47123.9 \text{ cm}^3$ Since $47123.9 < 60\,000$ The two pipes **<u>are not able</u>** to discharge the water as quickly as it enters as **<u>the volume of water discharged per second by the two pipes is less than the volume of water that enters the tank.</u>**