

2007 Third Form Promotion Exam Solutions

1) $\sqrt{\frac{60.1}{0.99} + 3.95} = 8.04$

closest integer = 8

(B)

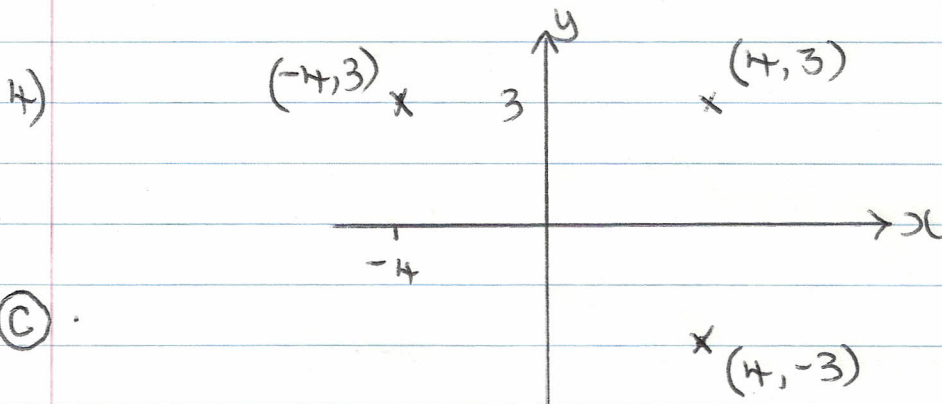
2) amt. of money spent = $nr + nm$
 # of pens = $n + n$

(D) average cost per pen = $\frac{nr + nm}{m+n} = \frac{2nr}{m+n}$

3) $12 \times 5 = 15 \times 4 = 60$

smallest value of $n = 5$

(C)



#	Answer
1	B
2	D
3	C
4	C
5	A

(C)

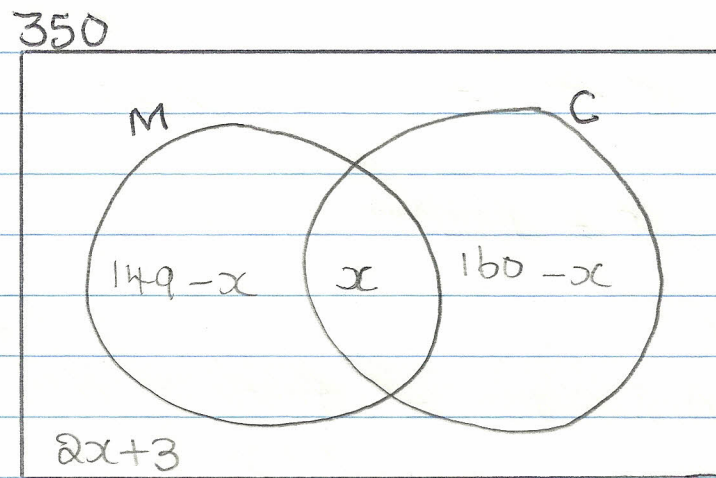
5) $V = \frac{1}{3} \times \text{base area} \times \text{height} = \frac{1}{3} \pi r^2 h$

$= \frac{1}{3} \times \pi \times \left(\frac{1}{\pi}\right)^2 \times 3$

$= \frac{1}{\pi}$

(A)

6) i)



$$\text{ii) } 149 - x + x + 160 - x + 2x + 3 = 350$$

$$312 + x = 350$$

$$x = 350 - 312 = 38$$

iii) P(candidate passed neither Maths nor Chemistry)

$$= \frac{2(38) + 3}{350} = \frac{79}{350}$$

7) i) amt. of depreciation after 1 year = $5\% \times 6000$

$$= \$300$$

ii) value after year 1 = $95\% \times 6000 = \$5700$

$$\text{OR } (6000 - 300) = \$5700$$

value after year 2 = $95\% \times 5700 = \$5415$

value after year 3 = $95\% \times 5415 = \$5144.25$

$$8) \quad \frac{a^2 - bc}{b+c} = \frac{4^2 - (-2)(3)}{-2+3}$$

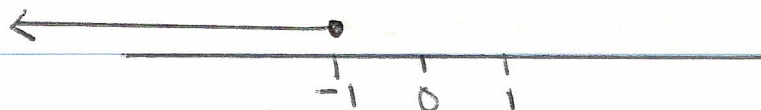
$$= \frac{16 + 6}{1} = 22$$

$$9) \quad 4(2-x) \geq 3(x+1) + 12$$

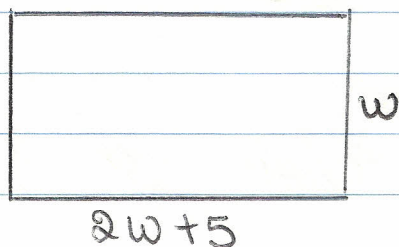
$$8 - 4x \geq 3x + 3 + 12$$

$$8 - 15 \geq 7x$$

$$\frac{-7}{7} \geq x \quad x \leq -1$$



10)



$$i) \quad \text{length} = (2w + 5) \text{ m}$$

$$ii) \quad \text{area} = w(2w + 5)$$

$$= 2w^2 + 5w$$

$$\begin{aligned} \text{ii)} \quad x - y &= -5 && \text{eqn ①} \\ 3x + 2y &= -5 && \text{eqn ②} \end{aligned}$$

$$2x - 2y = -10 \quad \text{eqn ①} \times 2$$

adding

$$\begin{array}{r} 2x - 2y = -10 \\ \underline{3x + 2y = -5} \\ 5x = -15 \\ x = \frac{-15}{5} = -3 \end{array}$$

$$\begin{aligned} -3 - y &= -5 \\ -3 + 5 &= y \quad \therefore y = 2 \end{aligned}$$

ALTERNATIVELY

$$\begin{aligned} x - y &= -5 \\ x &= y - 5 \end{aligned}$$

$$\begin{aligned} 3(y - 5) + 2y &= -5 \\ 3y - 15 + 2y &= -5 \\ 5y &= -5 + 15 \\ 5y &= 10 \\ y &= \frac{10}{5} = 2 \end{aligned}$$

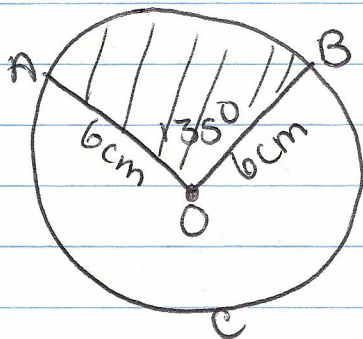
$$x = 2 - 5 = -3$$

$$12) \quad y \propto \frac{1}{x^2 + x} \quad y = \frac{k}{x^2 + x}$$

$$\begin{aligned} \text{i)} \quad \frac{1}{9} &= \frac{k}{9^2 + 9} \\ \frac{90}{9} &= k \quad \therefore k = 10 \end{aligned}$$

$$\begin{aligned} \text{ii)} \quad y &= \frac{10}{x^2 + x} \\ y &= \frac{10}{4^2 + 4} = \frac{10}{20} = \frac{1}{2} \end{aligned}$$

13)



$$a) \ i) \ \text{area of minor sector } AOB = \frac{135^\circ}{360^\circ} \times 3.14 \times 6^2$$

$$= 42.39 \text{ cm}^2$$

$$ii) \ \text{perimeter} = OA + OB + \text{length of major arc } AB$$

$$= 6 + 6 + \left(\frac{360^\circ - 135^\circ}{360^\circ} \times 2 \times 3.14 \times 6 \right)$$

$$= 35.55 \text{ cm}$$

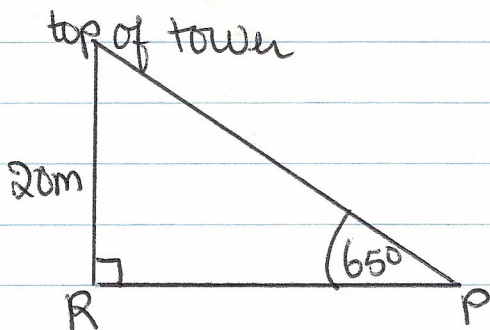
$$b) \ \text{volume of cylinder} = 3.14 \times 6^2 \times 15$$

$$= 1695.6 \text{ cm}^3$$

14) Rotation no longer 3rd form syllabus

$$iii) \ \text{gradient of } A'B' = \frac{7-4}{8-4} = \frac{3}{4}$$

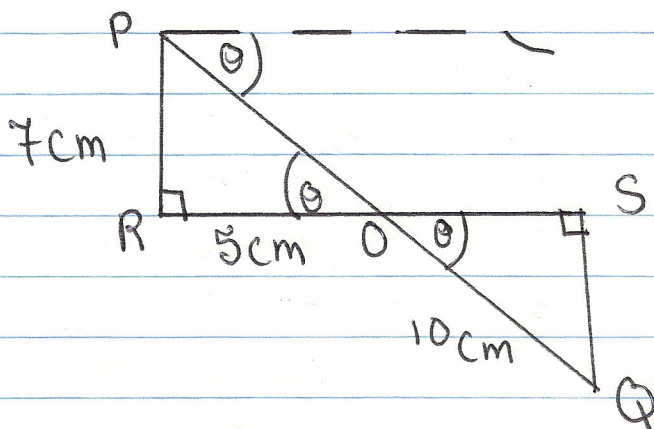
15)



$$\tan 65^\circ = \frac{20}{RP}$$

$$RP = \frac{20}{\tan 65^\circ} = 9.33 \text{ m}$$

16)



i) $\tan \theta = \frac{7}{5}$

$\theta = \tan^{-1} \frac{7}{5} = 54.5 \text{ cm}$

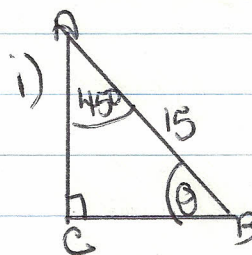
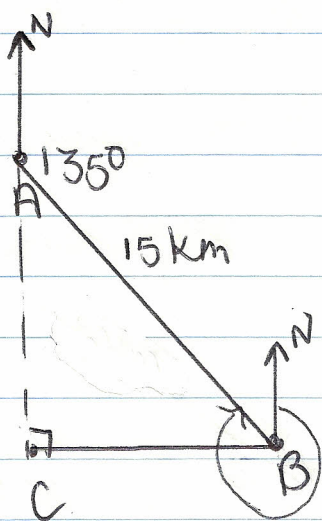
ii) $\cos \theta = \frac{OS}{10}$

$10 \cos \theta = OS$

$10 \cos 54.5 = OS \quad \therefore OS = 5.81$

$RS = RO + OS$
 $= 5 + 5.81$
 $= 10.81 \text{ cm}$

17)



$\sin 45^\circ = \frac{BC}{15}$

$BC = 15 \sin 45^\circ$
 $= 10.6 \text{ km}$

ii) $\theta = 90^\circ - 45^\circ = 45^\circ$
 Bearing of A from B

$= 270^\circ + 45^\circ = 315^\circ$

18)	(in mins) Waiting time	Mid-point x	No. of students f	fx
	1-5	3	5	15
	6-10	8	8	64
	11-15	13	3	39
	16-20	18	7	126
	21-25	23	2	46
			<u>25</u>	<u>290</u>

i) mean waiting time = $\frac{290}{25} = 11.6$ mins

ii) $P(\text{student waits less than } 15.5 \text{ mins}) = \frac{16}{25}$

19)

$$9x^2 + 6x = 11$$

$$9x^2 + 6x - 11 = 0$$

$$a = 9, b = 6, c = -11$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(9)(-11)}}{18}$$

$$= \frac{-6 \pm \sqrt{432}}{18}$$

$$= \frac{-6 \pm \sqrt{144 \times 3}}{18}$$

$$= \frac{-6 \pm 12\sqrt{3}}{18}$$

$$\begin{array}{r} 36 \\ \times 11 \\ \hline 360 \\ 396 \\ \hline 396 \end{array}$$

$$\begin{array}{r} 396 \\ + 36 \\ \hline 432 \end{array}$$