

2008 Promotion exam.

$$1 \quad -5 \times 3 = 3 \times -5 - 3 = -15 - 3 = -18 \quad [C]$$

$$2 \quad 2x + 3y = 6$$

$$3y = -2x + 6$$

$$y = -\frac{2}{3}x + 2$$

$$\Rightarrow \text{gradient} = -\frac{2}{3} \quad [B]$$

$$3 \quad w = x + yz$$

$$w - x = yz$$

$$\frac{w - x}{z} = y \quad [D]$$

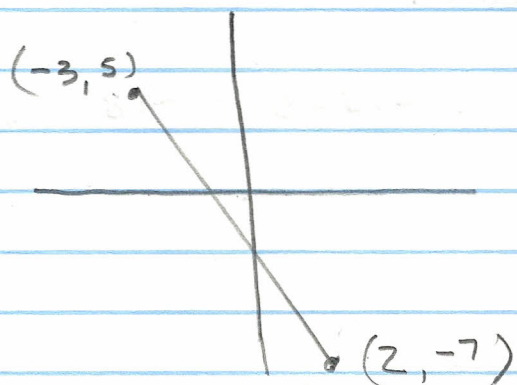
$$4 \quad \frac{6(2) - (-3)}{-3 - 3} = \frac{12 + 3}{-6} = \frac{-15}{6} = -\frac{5}{2} \quad [A]$$

5 $x \rightarrow x^2$ is a many-to-one mapping [B]

$$6(a) \quad 3x^3 \times \frac{1}{2}x^{-5} = \frac{3}{2}x^{3+(-5)} = \frac{3}{2}x^{-2}$$

$$(b) \quad \frac{5a^5}{(a^2 \times 4a)} = \frac{5a^5}{4a^{2+1}} = \frac{5a^5}{4a^3} = 5a^2$$

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(i) mid point coordinates

$$= \left\{ \frac{-3+2}{2}, \frac{5+(-7)}{2} \right\}$$

$$= \left\{ -\frac{1}{2}, \frac{2}{2} \right\} = \left(-\frac{1}{2}, 1 \right)$$

$$(ii) \text{ gradient of } PQ = \frac{-7-5}{2-(-3)} = \frac{-12}{5}$$

$$(iii) \text{ Length of } PQ = \sqrt{(2-(-3))^2 + (-7-5)^2}$$

$$= \sqrt{5^2 + (-12)^2}$$

$$= \sqrt{25 + 144}$$

$$= \sqrt{169} = 13$$

$$IV \quad y = mx + c \quad m = -\frac{12}{5}$$

$$(y=5) = -\frac{12}{5}(x-(-3))$$

$$y-5 = -\frac{12}{5}(x+3)$$

$$8 \quad (i) \quad x = y^2$$

$$(ii) \quad \text{when } y = 7 \Rightarrow x = 7^2 = 49$$

$$\text{when } x = 81 \Rightarrow y = \sqrt{81} = 9$$

$$9 \quad \begin{array}{r} 2p + 3q = -11 \quad (\times 3) \\ -3p + 2q = -3 \quad (\times 2) \end{array}$$

$$\begin{array}{r} 6p + 9q = -33 \\ -6p + 4q = -6 \end{array}$$

$$\hline 13q = -39 \quad \text{adding}$$

$$q = -3$$

$$\therefore 2p + 3(-3) = -11$$

$$2p - 9 = -11$$

$$2p = -2$$

$$p = -1$$

$$10 \quad y = \frac{k}{x^2}$$

$$3 = \frac{k}{2^2}$$

$$(i) \quad k = 3 \times 4 = 12$$

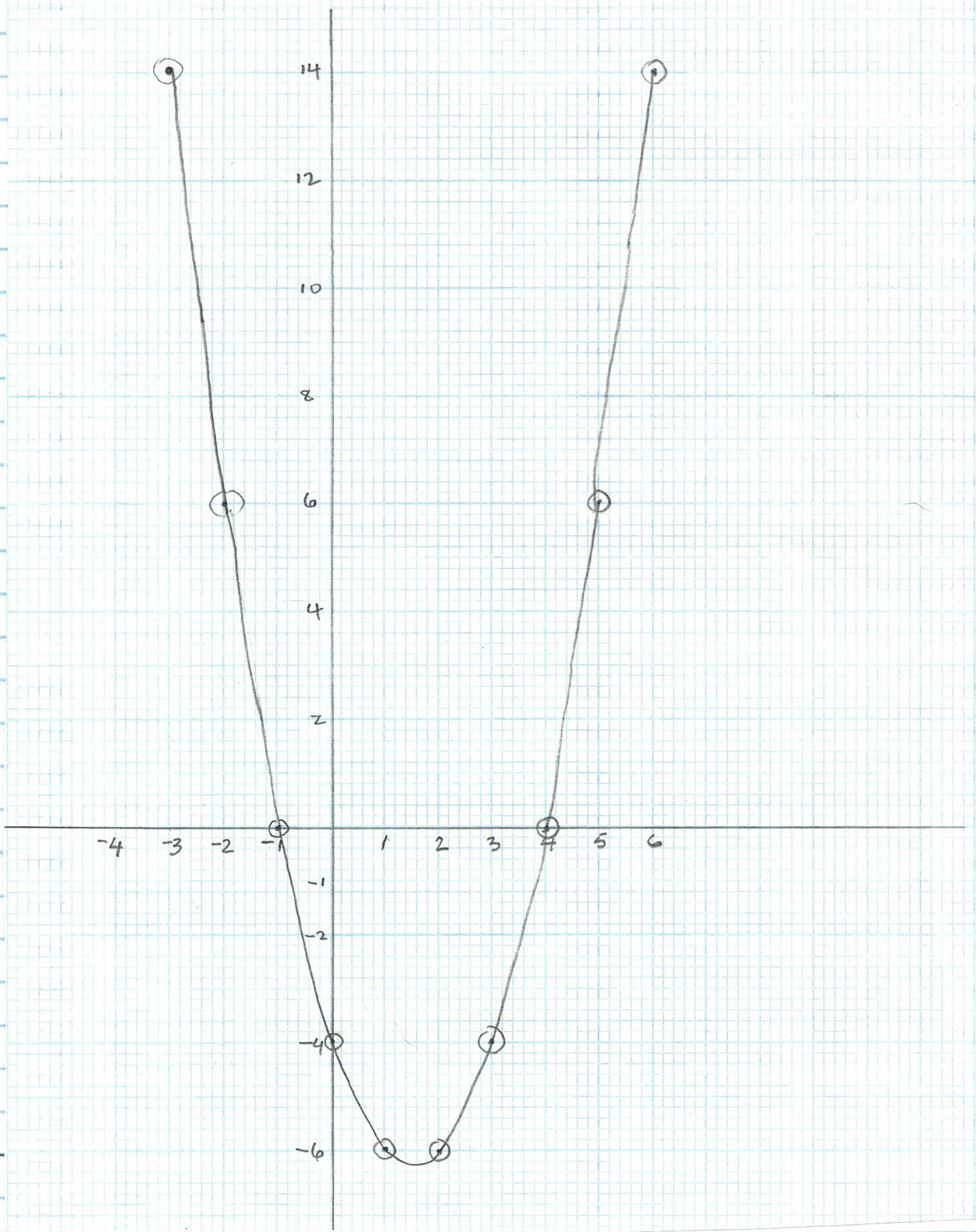
$$(ii) \quad y = \frac{12}{x^2} \quad \therefore \text{when } x = 6, \quad y = \frac{12}{6^2} = \frac{12}{36} = \frac{1}{3}$$

$$f(x) = x^2 - 3x - 4$$

11	x	-3	-2	-1	0	1	2	3	4	5	6
	$y = f(x)$	14	6	0	-4	-6	-6	-4	0	6	14

GRAPH OF $f(x) = x^2 - 3x - 4$ for $-3 \leq x \leq 6$

SCALE 1cm - 1unit



12 after one year

$$I = \frac{500 \times 4 \times 1}{100} = \$20$$

after second year

$$I = \frac{520 \times 4 \times 1}{100} = \$20.80$$

Total interest = \$40.80
earned.

13(i) gross salary = $3500 \times 12 = \$42000$

(ii) tax free allowances

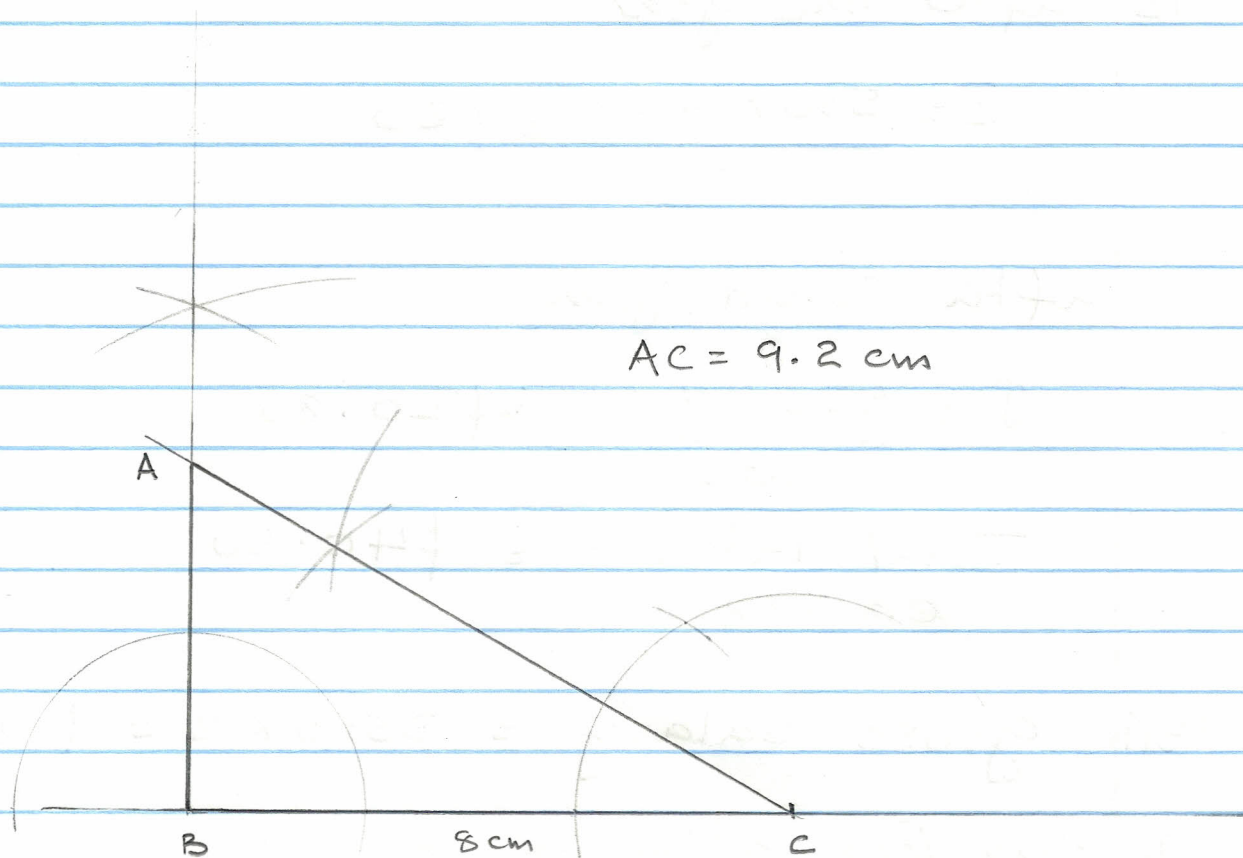
5% of 42000 =	\$ 2100
Personal allowance =	<u>\$ 4000</u>
Total tax free allowances	\$ 6100

iii Taxable yearly income
= $42000 - 6100 = \$35900$

iv Income tax: 10% of 25000 = \$ 2500
20% of (35900 - 25000) = \$ 2180

tax paid \$ 4680

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15 area of minor sector AOB

$$= \frac{120}{360} \times \frac{22}{7} \times 7^2 = \frac{154}{3} \text{ cm}^2$$

(ii) perimeter of region

$$= 7 + 7 + \frac{240}{360} \times \frac{22}{7} \times 2 \times 7$$

$$= 14 + \frac{88}{3}$$

$$= \frac{130}{3} \text{ cm}$$

b (i) Volume = $\frac{22}{7} \times 7^2 \times 15$

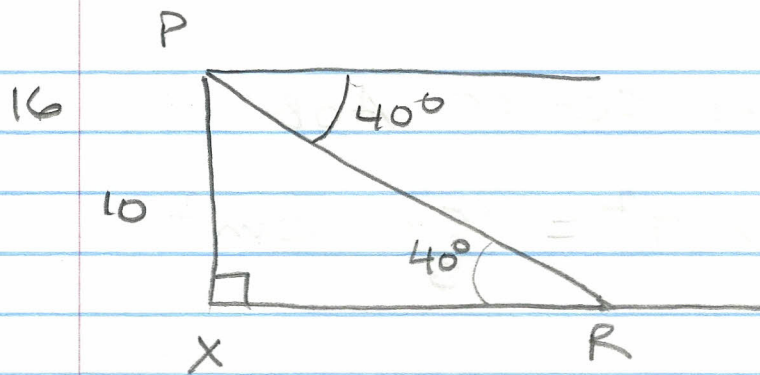
$$= 2310 \text{ cm}^3$$

(ii) surface area of CLOSED container

$$= 2\pi R^2 + 2\pi R h$$

$$= 2 \times \frac{22}{7} \times 7^2 + 2 \times \frac{22}{7} \times 7 \times 15$$

$$= 308 + 660 = 968 \text{ cm}^2$$



$$(i) \quad \tan 40 = \frac{10}{XR}$$

$$XR = \frac{10}{\tan 40} = 11.9 \text{ m}$$

$$(ii) \quad \text{area of } \triangle PXR = \frac{1}{2} \times 11.9 \times 10$$

$$= 59.5 \text{ m}^2$$

(iii) OMIT.

17	H (cm)	no.	mid point	mid point \times no.
	141 - 145	3	143	429
	146 - 150	9	148	1332
	151 - 155	15	153	2295
	156 - 160	12	158	1896
	161 - 165	1	163	163
		<u>40</u>		<u>6115</u>

(i) mean height = $\frac{6115}{40} = 152.875$ cm

(ii) range = $165.5 - 140.5$
 $= 25$ cm

(iii) Probability = $\frac{15 + 12 + 1}{40}$
 $= \frac{28}{40}$

18 $2x^2 - 5x + 3 = 0$

$a = 2$ $b = -5$ $c = 3$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)}$$

$$= \frac{5 \pm \sqrt{25 - 24}}{4}$$

$x = \frac{6}{4} = \frac{3}{2}$ and $x = \frac{4}{4} = 1$