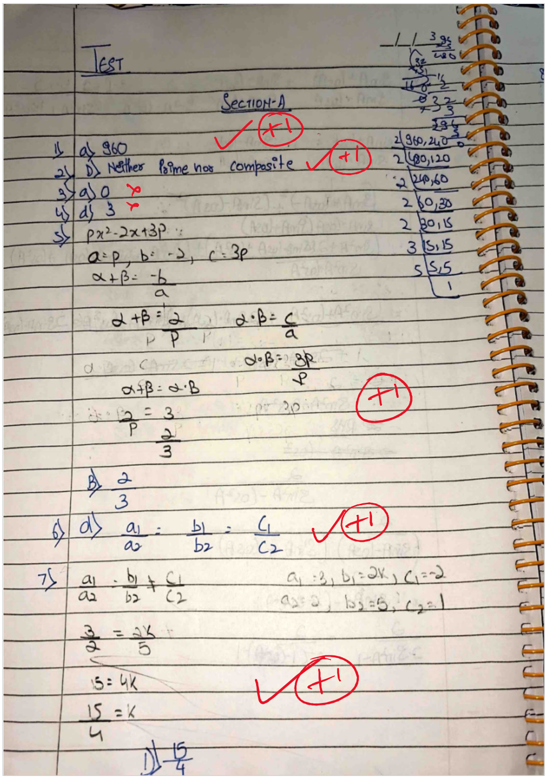
Maths

14 September 2026 09:09

Book 13 Sep 2026



TEST

SECTION-A

1) a) 960 ✓ +1

2) D) Neither Prime nor composite ✓ +1

3) a) 0 ✗

4) d) 3 ✗

5) $px^2-2x+3P$

$a=P,\ b=-2,\ c=3P$

$\alpha+\beta=\frac{-b}{a}$

$\alpha+\beta=\frac{2}{P}$ $\alpha\cdot\beta=\frac{c}{a}$

$\alpha\cdot\beta=\frac{3P}{P}$

$\alpha+\beta=\alpha\cdot B$

$\frac{2}{P}=3$ +1

$\frac{2}{3}$

B) $\frac{2}{3}$

6) d) $\frac{a_1}{a_2}=\frac{b_1}{b_2}=\frac{c_1}{c_2}$ ✓ +1

7) $\frac{a_1}{a_2}=\frac{b_1}{b_2}\neq\frac{c_1}{c_2}$ $a_1=3,\ b_1=2K,\ c_1=-2$

$a_2=2,\ b_2=5,\ c_2=1$

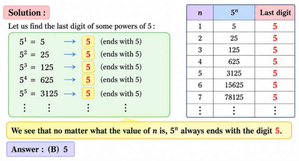
$\frac{3}{2}=\frac{2K}{5}$

$15=4K$ ✓ +1

$\frac{15}{4}=K$

D) $\frac{15}{4}$

2 | 960, 240
2 | 480, 120
2 | 240, 60
2 | 60, 30
2 | 30, 15
3 | 15, 15
5 | 5, 5
1



Solution :

Let us find the last digit of some powers of 5 :

$5^1 = 5 \rightarrow$ 5 (ends with 5)
$5^2 = 25 \rightarrow$ 5 (ends with 5)
$5^3 = 125 \rightarrow$ 5 (ends with 5)
$5^4 = 625 \rightarrow$ 5 (ends with 5)
$5^5 = 3125 \rightarrow$ 5 (ends with 5)
⋮ ⋮ ⋮ ⋮

n	5^n	Last digit
1	5	5
2	25	5
3	125	5
4	625	5
5	3125	5
6	15625	5
7	78125	5
⋮	⋮	⋮

We see that no matter what the value of n is, 5^n always ends with the digit 5.

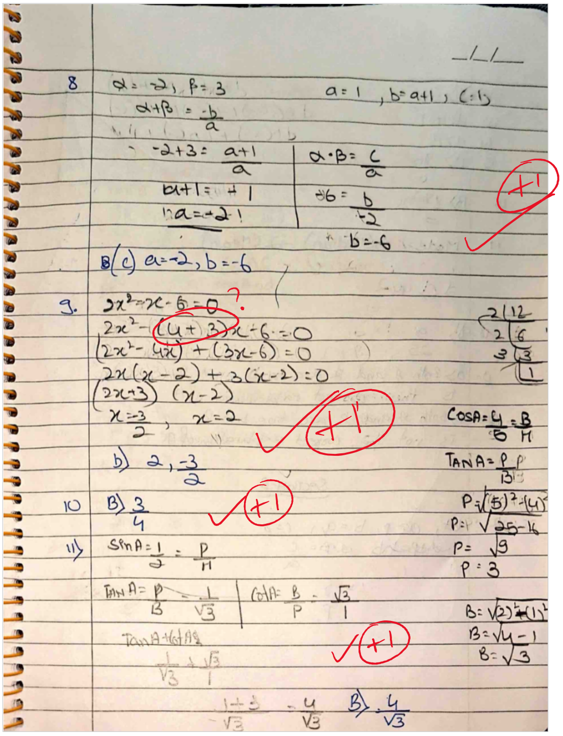
Answer : (B) 5

④ No. of zeros is 2

$\frac{64}{80}$ Good performance.

Needs improvement:

1. **Reading MCQs carefully** — several marks were lost on straightforward questions.
2. **Signs in quadratic roots** — Q9.



8 $\alpha=-2,\ \beta=3$ $a=1,\ b=a+1,\ c=b$

$\alpha+\beta=\frac{-b}{a}$

$-2+3=\frac{a+1}{a}$ | $\alpha\cdot\beta=\frac{c}{a}$

$a+1=+1$ | $-6=\frac{b}{-2}$

$a=-2$ | $b=-6$

B (c) $a=-2,\ b=-6$ ✓ +1

9. $2x^2-x-6=0$?

$2x^2-(4+3)x-6=0$

$(2x^2-4x)+(3x-6)=0$

$2x(x-2)+3(x-2)=0$

$(2x+3)(x-2)$

$x=\frac{-3}{2},\ x=2$ ✓ +1

b) $2, \frac{-3}{2}$

2 | 12
2 | 6
3 | 3
1

$\cos A=\frac{4}{5}=\frac{B}{H}$

$\tan A=\frac{P}{B}$

$P=\sqrt{(5)^2-(4)^2}$

$P=\sqrt{25-16}$

$P=\sqrt{9}$

$P=3$

10 B) $\frac{3}{4}$ ✓ +1

11) $\sin A=\frac{1}{2}=\frac{P}{H}$

$\tan A=\frac{P}{B}=\frac{1}{\sqrt{3}}$ | $\cot A=\frac{B}{P}=\frac{\sqrt{3}}{1}$

$B=\sqrt{(2)^2-(1)^2}$

$B=\sqrt{4-1}$

$B=\sqrt{3}$

$\tan A+\cot A$ ✓ +1

$\frac{1}{\sqrt{3}}+\frac{\sqrt{3}}{1}$

$\frac{1+3}{\sqrt{3}}=\frac{4}{\sqrt{3}}$ B) $\frac{4}{\sqrt{3}}$

$2x^2-x-6=0$

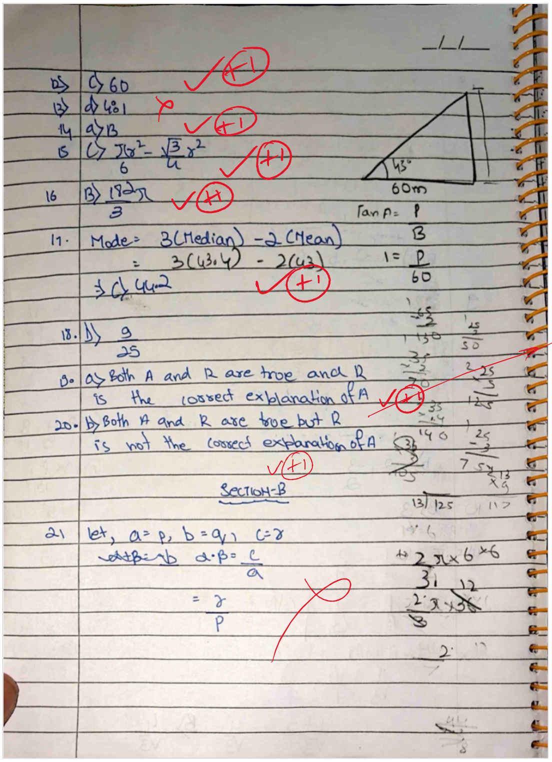
$2x^2-(4-3)x-6=0$

$2x^2-4x+3x-6=0$

$2x(x-2)+3(x-2)=0$

$(2x+3)(x-2)$

$x=-\frac{3}{2},\ 2$



12> c> 60 ✓ (+1)

13> d> 4:1 ✗

14 a> B ✓ (+1)

15 c> $\frac{\pi r^2}{6} - \frac{\sqrt{3}}{4}r^2$ ✓ (+1)

16 B> $\frac{182\pi}{3}$ ✓ (+1)

17. Mode = 3(Median) − 2(Mean)

= 3(43.4) − 2(43)

⇒ c> 44.2 ✓ (+1)

18. D> $\frac{9}{25}$

19. a> Both A and R are true and R is the correct explanation of A ✓ (+1)

20. b> Both A and R are true but R is not the correct explanation of A ✓ (+1)

Tan A = $\frac{P}{B}$

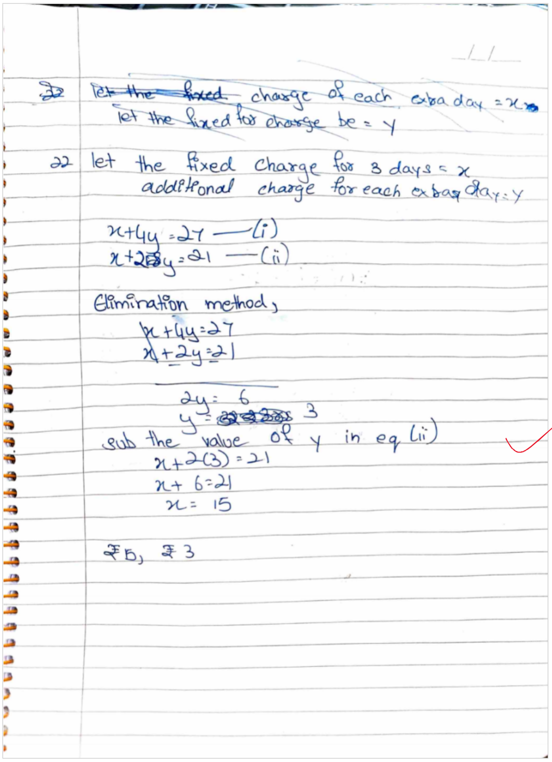
$1 = \frac{P}{60}$

SECTION-B

21 let, a = p, b = q, c = r

~~α+β = −b~~ $\alpha \cdot \beta = \frac{c}{a}$

$= \frac{r}{p}$ ✗



~~22 let the fixed charge of each extra day = x~~
~~let the fixed for charge be = y~~

22 let the fixed charge for 3 days = x
additional charge for each extra day = y

$x + 4y = 27$ —(i)
$x + 2y = 21$ —(ii)

Elimination method,

$x + 4y = 27$
$x + 2y = 21$

$2y = 6$
$y = 3$

sub the value of y in eq (ii)

$x + 2(3) = 21$
$x + 6 = 21$
$x = 15$

₹15, ₹3

✓ (+2)

Q20 Not part of syllabus

(49)

$\frac{15}{64}$

21. $px^2 + qx + r$

$a = p$, $b = q$, $c = r$

$\alpha + \beta = -\frac{b}{a}$ | $\alpha \cdot \beta = \frac{c}{a}$

$\alpha + \beta = -\frac{q}{p}$ | $\alpha \cdot \beta = \frac{r}{p}$

find $\alpha^3\beta + \beta^3\alpha$

Formula: $a^2 + b^2 = (a+b)^2 - 2ab$

Now

$\alpha^3\beta + \beta^3\alpha$

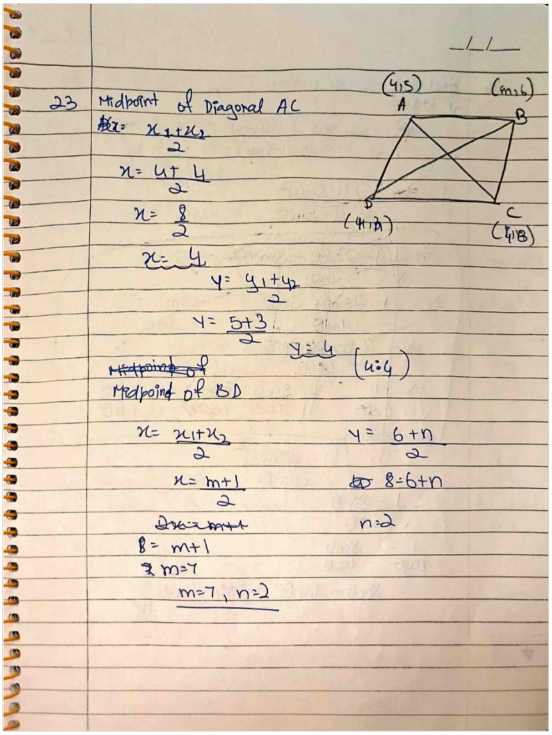
$\alpha\beta(\alpha^2 + \beta^2)$

$\alpha\beta\{(\alpha+\beta)^2 - 2\alpha\beta\}$

$\frac{r}{p}\{\frac{q^2}{p^2} - \frac{2r}{p}\}$

$\frac{rq^2}{p^3} - \frac{2r^2}{p^2}$

(Ans)



(4,5)
A
(m,6)
B
D
(1,n)
C
(4,3)

_/_/_

23 Midpoint of Diagonal AC

~~Ax~~ $x = \frac{x_1+x_2}{2}$

$x = \frac{4+4}{2}$

$x = \frac{8}{2}$

$x = 4$

$y = \frac{y_1+y_2}{2}$

$y = \frac{5+3}{2}$

$y = 4$ (4,4)

~~Midpoint of~~

Midpoint of BD

$x = \frac{x_1+x_2}{2}$ $y = \frac{6+n}{2}$

$x = \frac{m+1}{2}$ ~~8~~ $8 = 6+n$

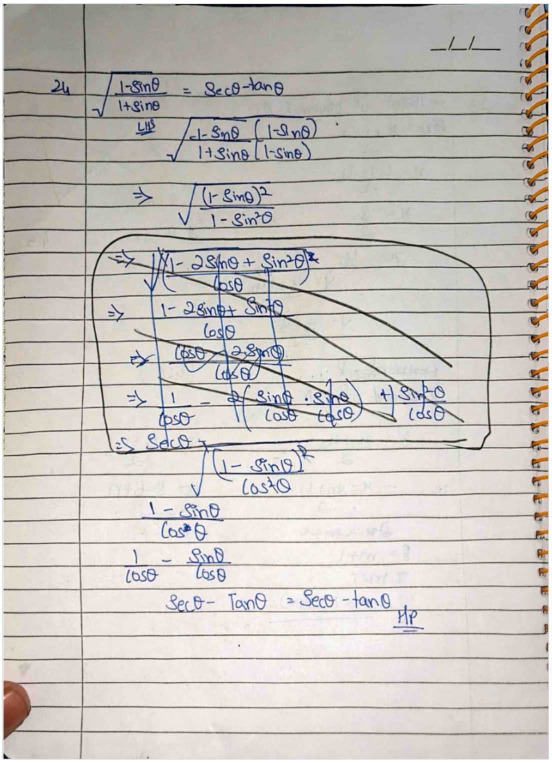
~~2x = m+1~~ $n=2$

$8 = m+1$

$m=7$

$m=7, n=2$

✓ +2



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24 $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$

LHS $\sqrt{\frac{1-\sin\theta}{1+\sin\theta}\frac{(1-\sin\theta)}{(1-\sin\theta)}}$

$\Rightarrow \sqrt{\frac{(1-\sin\theta)^2}{1-\sin^2\theta}}$

~~$\Rightarrow \sqrt{\left(\frac{1-2\sin\theta+\sin^2\theta}{\cos\theta}\right)^2}$~~

~~$\Rightarrow \frac{1-2\sin\theta+\sin^2\theta}{\cos\theta}$~~

~~$\Rightarrow \frac{\cos\theta - 2\sin\theta}{\cos\theta}$~~

~~$\Rightarrow \frac{1}{\cos\theta} - 2\left(\frac{\sin\theta}{\cos\theta}\cdot\frac{\sin\theta}{\cos\theta}\right) + \frac{\sin^2\theta}{\cos\theta}$~~

~~$\Rightarrow \sec\theta$~~

$\sqrt{\frac{(1-\sin\theta)^2}{\cos^2\theta}}$

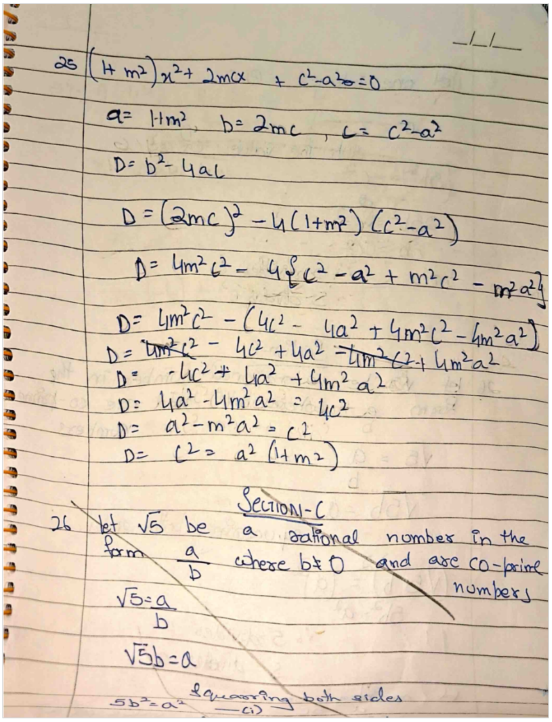
$\frac{1-\sin\theta}{\cos\theta}$

$\frac{1}{\cos\theta} - \frac{\sin\theta}{\cos\theta}$

$\sec\theta - \tan\theta = \sec\theta - \tan\theta$

HP

✓ +2



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25 $(1+m^2)x^2+2mcx + c^2-a^2=0$

$a=1+m^2,\ b=2mc,\ c=c^2-a^2$

$D=b^2-4ac$

$D=(2mc)^2-4(1+m^2)(c^2-a^2)$

$D=4m^2c^2-4\{c^2-a^2+m^2c^2-m^2a^2\}$

$D=4m^2c^2-(4c^2-4a^2+4m^2c^2-4m^2a^2)$

$D=\cancel{4m^2c^2}-4c^2+4a^2-\cancel{4m^2c^2}+4m^2a^2$

$D=-4c^2+4a^2+4m^2a^2$

$D=4a^2-4m^2a^2=4c^2$

$D=a^2-m^2a^2=c^2$

$D=c^2=a^2(1+m^2)$

✓ +2

~~SECTION-C~~

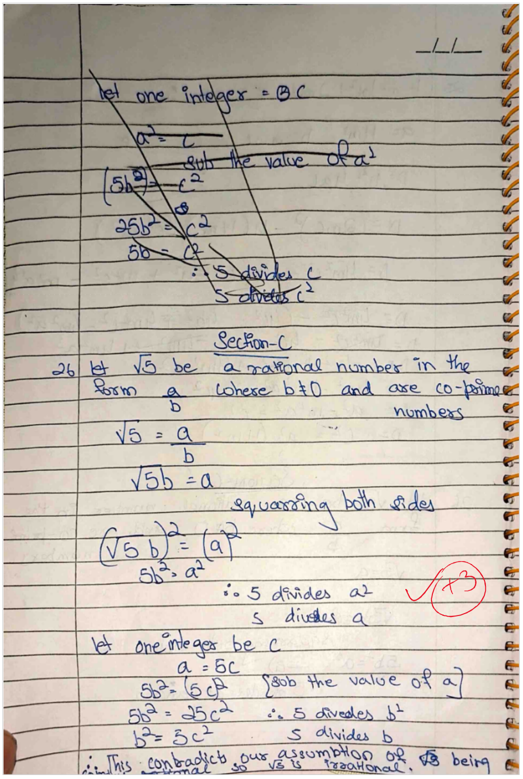
~~26 let $\sqrt{5}$ be a rational number in the form $\frac{a}{b}$ where $b\neq 0$ and are co-prime numbers~~

~~$\sqrt{5}=\frac{a}{b}$~~

~~$\sqrt{5}b=a$~~

~~squarring both sides~~

~~$5b^2=a^2$ —(i)~~



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~~let one integer = c~~

~~$a^2=c$~~

~~sub the value of a^2~~

~~$(5b^2)=c^2$~~

~~$25b^2=c^2$~~

~~$5b=c^2$~~

~~∴ 5 divides c~~

~~5 divides c^2~~

Section-C

26 let $\sqrt{5}$ be a rational number in the form $\frac{a}{b}$ where $b\neq 0$ and are co-prime numbers

$\sqrt{5}=\frac{a}{b}$

$\sqrt{5}b=a$

squarring both sides

$(\sqrt{5}b)^2=(a)^2$

$5b^2=a^2$

∴ 5 divides a^2

5 divides a

✓ +3

let one integer be c

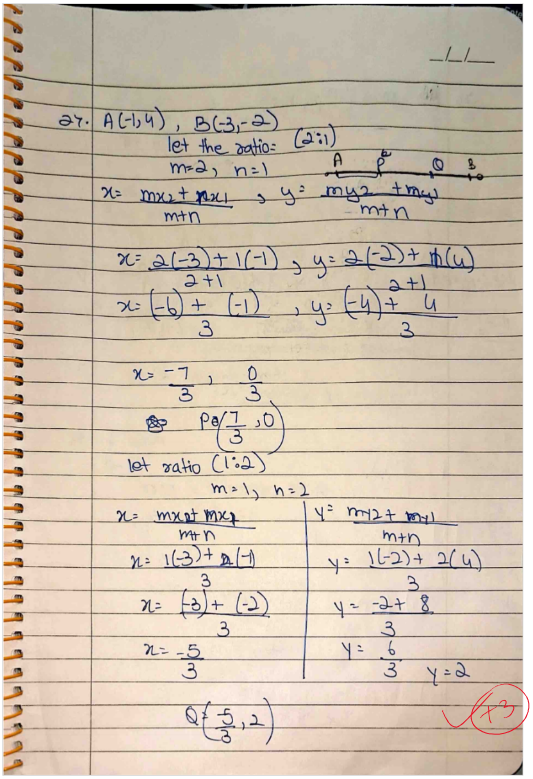
$a=5c$

$5b^2=(5c)^2$ [sub the value of a]

$5b^2=25c^2$ ∴ 5 divedes b^2

$b^2=5c^2$ 5 divides b

∴ This contradicts our assumption of $\sqrt{3}$ being rational so $\sqrt{5}$ is irrational.



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27. A(-1,4) , B(-3,-2)

let the ratio= (2:1)

m=2, n=1

$x = \frac{mx_2 + nx_1}{m+n}$, $y = \frac{my_2 + ny_1}{m+n}$

$x = \frac{2(-3)+1(-1)}{2+1}$, $y = \frac{2(-2)+1(4)}{2+1}$

$x = \frac{(-6)+(-1)}{3}$, $y = \frac{(-4)+4}{3}$

$x = \frac{-7}{3}$, $\frac{0}{3}$

$P\left(\frac{7}{3},0\right)$

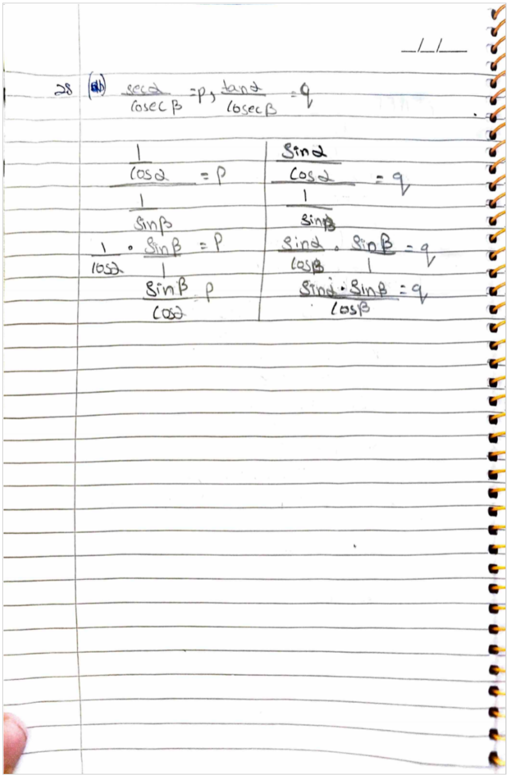
let ratio (1:2)

m=1, n=2

$x = \frac{mx_2 + nx_1}{m+n}$	$y = \frac{my_2 + ny_1}{m+n}$
$x = \frac{1(-3)+2(-1)}{3}$	$y = \frac{1(-2)+2(4)}{3}$
$x = \frac{(-3)+(-2)}{3}$	$y = \frac{-2+8}{3}$
$x = \frac{-5}{3}$	$y = \frac{6}{3}$ y=2

$Q\left(\frac{-5}{3},2\right)$

✓ +3



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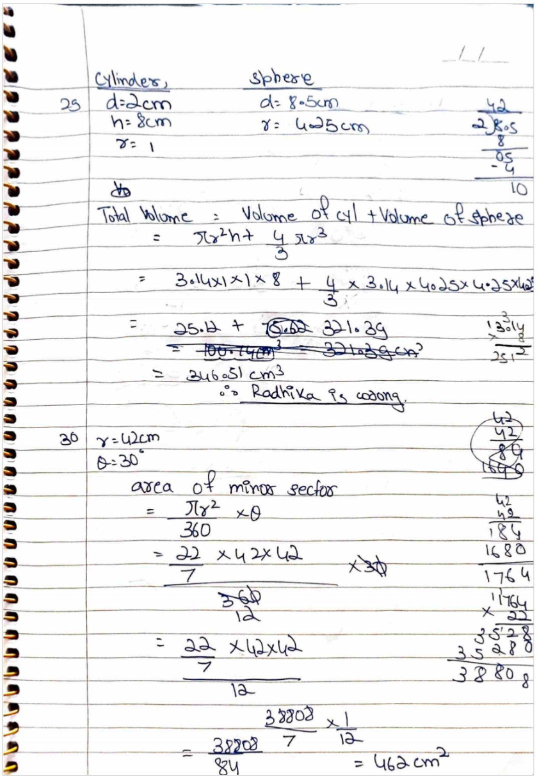
28 (b) $\frac{\sec\alpha}{\operatorname{cosec}\beta} = p$, $\frac{\tan\alpha}{\operatorname{cosec}\beta} = q$

$\frac{\frac{1}{\cos\alpha}}{\frac{1}{\sin\beta}} = p$	$\frac{\frac{\sin\alpha}{\cos\alpha}}{\frac{1}{\sin\beta}} = q$
$\frac{1}{\cos\alpha} \cdot \frac{\sin\beta}{1} = p$	$\frac{\sin\alpha}{\cos\beta} \cdot \frac{\sin\beta}{1} = q$
$\frac{\sin\beta}{\cos\alpha} = p$	$\frac{\sin\alpha \cdot \sin\beta}{\cos\beta} = q$



Cylinder,
25 $d = 2cm$
$h = 8cm$
$r = 1$

sphere
$d = 8.5cm$
$r = 4.25cm$

Total Volume = Volume of cyl + Volume of sphere

$= \pi r^2 h + \frac{4}{3}\pi r^3$

$= 3.14 \times 1 \times 1 \times 8 + \frac{4}{3} \times 3.14 \times 4.25 \times 4.25 \times 4.25$

$= 25.12 + \cancel{75.62}\ 321.39$

~~$= 100.74cm^3 = 321.39 cm^3$~~

$= 346.51 cm^3$

∴ Radhika is wrong.

$$\begin{array}{r} 4.2 \\ 2\overline{)8.5} \\ 8 \\ \hline 05 \\ -4 \\ \hline 10 \end{array} \qquad \begin{array}{r} 3.14 \\ \times 8 \\ \hline 25.12 \end{array}$$

✓ +3

30 $r = 42cm$
$\theta = 30°$

area of minor sector

$= \frac{\pi r^2}{360} \times \theta$

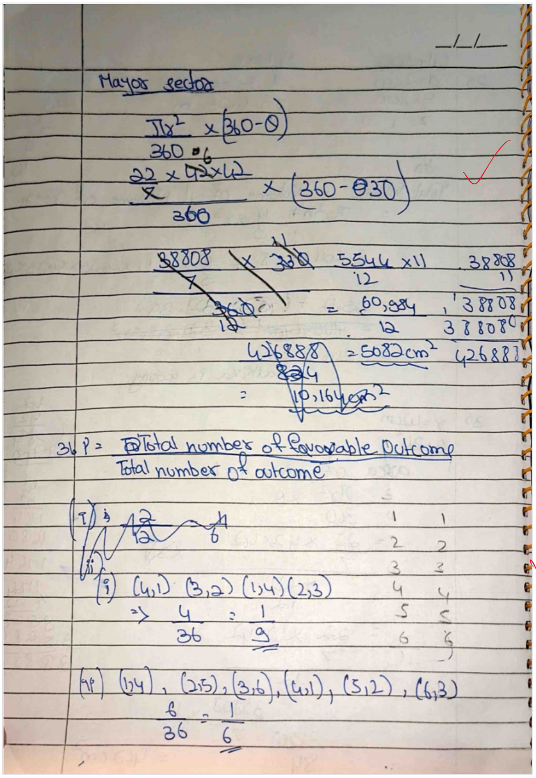
$= \frac{\frac{22}{7} \times 42 \times 42}{\cancel{360}\ 12} \times \cancel{30}$

$= \frac{\frac{22}{7} \times 42 \times 42}{12}$

$\frac{38808}{7} \times \frac{1}{12}$

$= \frac{38808}{84} = 462 cm^2$

$$\begin{array}{r} 42 \\ \times 42 \\ \hline 84 \\ 1680 \\ \hline 1764 \end{array} \qquad \begin{array}{r} 1764 \\ \times 22 \\ \hline 3528 \\ 35280 \\ \hline 38808 \end{array}$$



Mayor sector

$\frac{\pi r^2}{360} \times (360 - \theta)$

$\frac{\frac{22}{7} \times 42 \times 42}{360} \times (360 - 30)$

$\frac{\frac{38808}{7}}{\cancel{360}\ 12} \times \cancel{330}\ 11$ $\frac{5544 \times 11}{12}$

$= \frac{60,984}{12}$ $= 5082cm^2$

~~$\frac{426888}{84}$~~
~~$= 10,164 cm^2$~~

$$\begin{array}{r} 38808 \\ \times 11 \\ \hline 38808 \\ 388080 \\ \hline 426888 \end{array}$$

✓ +3

36 $P = \frac{\text{Total number of favourable Outcome}}{\text{Total number of outcome}}$

~~(i) $\frac{2}{12} = \frac{1}{6}$~~

(i) (4,1) (3,2) (1,4) (2,3)

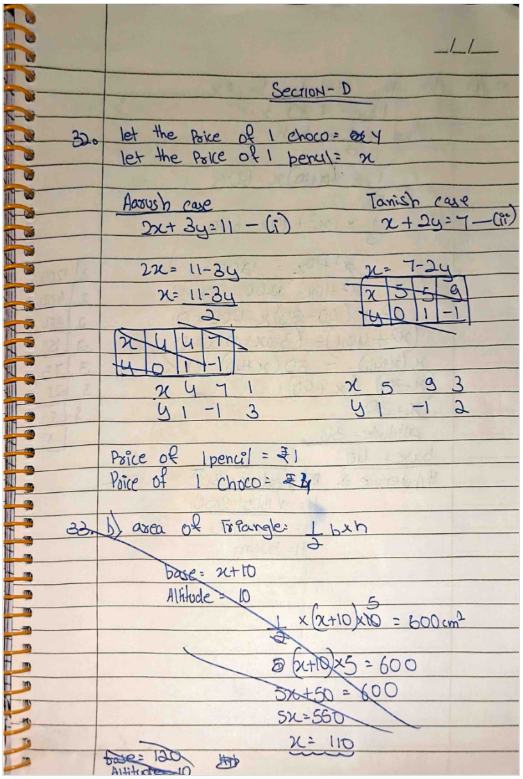
$\Rightarrow \frac{4}{36} = \frac{1}{9}$

1	1
2	2
3	3
4	4
5	5
6	6

(ii) (1,4), (2,5), (3,6), (4,1), (5,2), (6,3)

$\frac{6}{36} = \frac{1}{6}$

✓ +3



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SECTION - D

32. let the Price of 1 choco = ~~x~~ y
let the Price of 1 pencil = x

Aarush case
$2x + 3y = 11$ — (i)

Tanish case
$x + 2y = 7$ — (ii)

$2x = 11 - 3y$

$x = \frac{11 - 3y}{2}$

~~x~~	~~4~~	~~4~~	~~7~~
~~y~~	~~0~~	~~1~~	~~-1~~

x	4	7	1
y	1	-1	3

$x = 7 - 2y$

~~x~~	~~5~~	~~5~~	~~9~~
~~y~~	~~0~~	~~1~~	~~-1~~

x	5	9	3
y	1	-1	2

Price of 1 pencil = ₹1
Price of 1 Choco = ₹4

33. b) area of Triangle = $\frac{1}{2} b \times h$

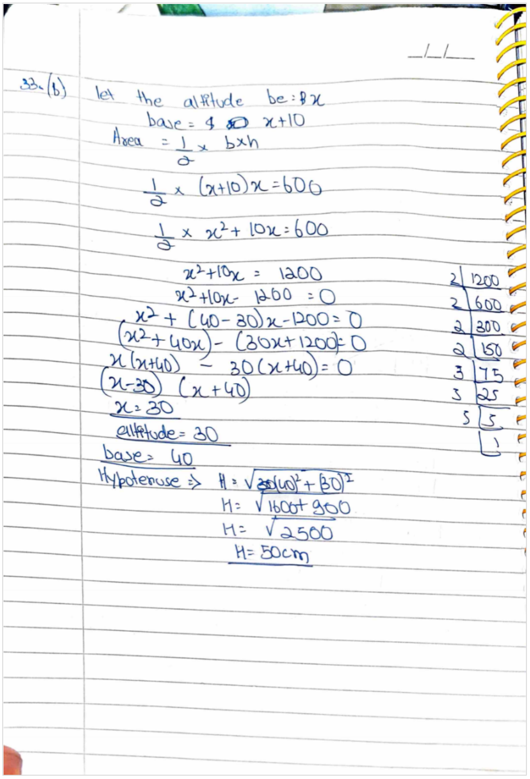
~~base = $x+10$~~
~~Altitude = 10~~

~~$\frac{1}{2} \times (x+10) \times \overset{5}{\cancel{10}} = 600 cm^2$~~

~~$(x+10) \times 5 = 600$~~
~~$5x + 50 = 600$~~
~~$5x = 550$~~
$x = 110$

~~base = 120~~
~~Altitude = 10~~

✓ (+5)



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33. (b) let the altitude be : x
base = ~~4 80~~ $x+10$
Area = $\frac{1}{2} \times b \times h$

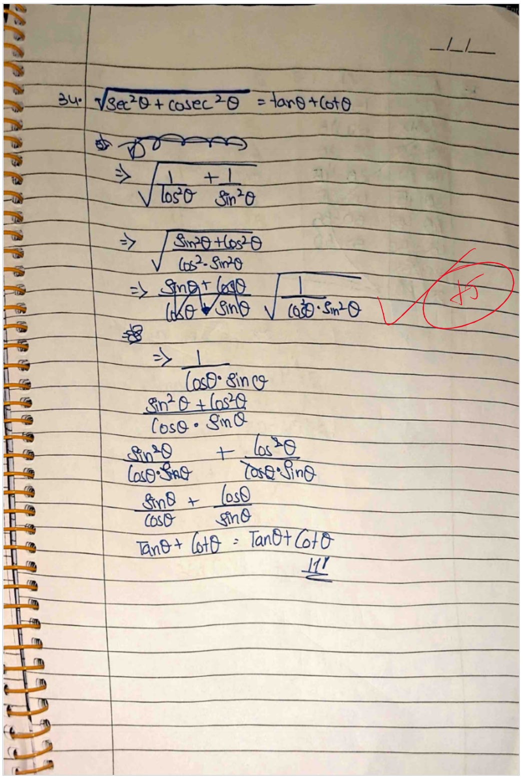
$\frac{1}{2} \times (x+10)x = 600$

$\frac{1}{2} \times x^2 + 10x = 600$

$x^2 + 10x = 1200$
$x^2 + 10x - 1200 = 0$
$x^2 + (40 - 30)x - 1200 = 0$
$(x^2 + 40x) - (30x + 1200) = 0$
$x(x+40) - 30(x+40) = 0$
$(x-30)(x+40)$
$x = 30$
altitude = 30
base = 40
Hypotenuse ⇒ $H = \sqrt{\cancel{30}(40)^2 + (30)^2}$
$H = \sqrt{1600 + 900}$
$H = \sqrt{2500}$
H = 50cm

2	1200
2	600
2	300
2	150
3	75
3	25
5	5
	1

✓ (+5)



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34. $\sqrt{\sec^2\theta + \operatorname{cosec}^2\theta} = \tan\theta + \cot\theta$

$\Rightarrow \sqrt{\frac{1}{\cos^2\theta} + \frac{1}{\sin^2\theta}}$

$\Rightarrow \sqrt{\frac{\sin^2\theta + \cos^2\theta}{\cos^2 \cdot \sin^2\theta}}$

$\Rightarrow \frac{\sin\theta + \cos\theta}{\cos\theta \cdot \sin\theta}$ $\sqrt{\frac{1}{\cos^2\theta \cdot \sin^2\theta}}$ ✓ 45

✓ 1

$\Rightarrow \frac{1}{\cos\theta \cdot \sin\theta}$

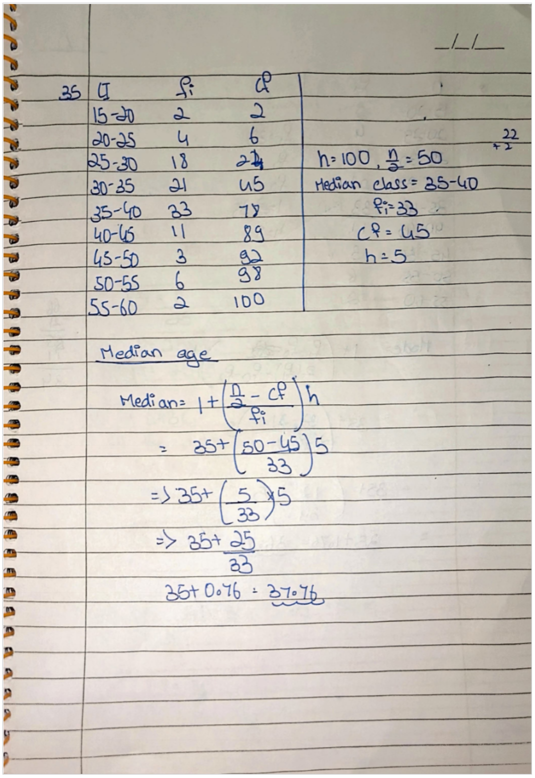
$\frac{\sin^2\theta + \cos^2\theta}{\cos\theta \cdot \sin\theta}$

$\frac{\sin^2\theta}{\cos\theta \cdot \sin\theta} + \frac{\cos^2\theta}{\cos\theta \cdot \sin\theta}$

$\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}$

$\tan\theta + \cot\theta = \tan\theta + \cot\theta$

LHS = RHS



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35

CI	f_i	cf
15-20	2	2
20-25	4	6
25-30	18	24
30-35	21	45
35-40	33	78
40-45	11	89
45-50	3	92
50-55	6	98
55-60	2	100

22
+2

$n = 100$, $\frac{n}{2} = 50$

Median class = 35-40

$f_i = 33$

$cf = 45$

$h = 5$

Median age

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f_i}\right)h$$

$$= 35 + \left(\frac{50-45}{33}\right)5$$

$$\Rightarrow 35 + \left(\frac{5}{33}\right) \times 5$$

$$\Rightarrow 35 + \frac{25}{33}$$

$$35 + 0.76 = 37.76$$

_/_/_

CI	f_i
15-20	2
20-25	4
25-30	12.
30-35	21.
35-40	33
40-45	11.
45-50	3
50-55	6
55-60	2

$f_1 = 33$
$f_0 = 21$
$f_2 = 11$
$l = ~~3~~ 35$
$h = 5$

$$\begin{array}{r} 66 \\ -21 \\ \hline 45 \\ -11 \\ \hline 34 \end{array}$$

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2(f_1) - f_0 - f_2}\right)h$$

$$= 35 + \left(\frac{33-21}{2(33)-21-11}\right)5$$

$$= 35 + \left(\frac{12}{34}\right)5$$

$$= 35 + 1.76 = \underline{36.76}$$

✓ +5

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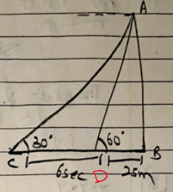
Section - E

Case- Study -2



37. (i) $\tan\theta = \frac{P}{B}$

$\tan 60 = \frac{P}{25}$

$\sqrt{3} = \frac{P}{25}$

$P = 25\sqrt{3}$

Height $= 25\sqrt{3}$ ✓ +1

(ii) In ΔABC

let the distance = [illegible]

$\tan 30 = \frac{AB}{BD}$

$\frac{1}{\sqrt{3}} = \frac{25\sqrt{3}}{BD}$

$= \underline{75m}$

+2

iii) $DC = BD - BC = 75 - 25 = 50m$

$T = \frac{D}{S}$

$T = \frac{50}{6}$

$= \frac{25}{3} = 8.33 m/s$

✓ +1

Case study 3

(i) ~~6a~~ TSA of cube = $6a^2$

~~a = 6cm~~

~~TSA = $\cancel{6}\times6\times6$~~

~~= 216cm^2~~

$^{3}36$
$\times 6$
216

Diagonal $\sqrt{3}\ a$

$\sqrt{3}\ 6$

$6\sqrt{3}$

(ii) $7\times7\times7$

$= 343cm^3$

$^{2}44$
$\times 7$
308

(iii) CSA = $2\pi r^2$

$\frac{2\times22}{\cancel{7}}\times\cancel{49}\,7$

44×7

$= 308cm^2$

Case 1

left

✓ +4