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Pg. 677 # 17, 23, 61, 54

$$17.) r = 3 \sin \theta$$

$$y = r \sin \theta$$

$$\frac{y}{r} = \sin \theta$$

$$r = 3 \frac{y}{r}$$

$$r^2 = 3y$$

$$x^2 + y^2 = 3y$$

$$x^2 + y^2 - 3y = 0$$

$$x^2 + y^2 - 3y + \frac{9}{4} = \frac{9}{4}$$

$$x^2 + \left(y - \frac{3}{2}\right)^2 = \frac{9}{4}$$

$$23.) x = -y^2$$

100
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100 100 100

100 100



$$\#17. \quad r = 3 \sin \theta$$

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$x^2 + y^2 = r^2$$

$$(r \cos \theta)^2 + (r \sin \theta)^2 = r^2$$

$$r^2 (\cos^2 \theta + \sin^2 \theta) = r^2$$

$$\sin \theta = \frac{r}{3} = \frac{y}{r}$$

$$r^2 = 3y$$

$$x^2 + y^2 = 3y$$

$$x^2 = 3y - y^2$$

$$x = \pm \sqrt{3y - y^2}$$

$$x^2 + y^2 = 3y$$

$$x^2 + y^2 - 3y = 0$$

$$x^2 + y^2 - 3y + \frac{9}{4} = \frac{9}{4}$$

$$\boxed{x^2 + \left(y - \frac{3}{2}\right)^2 = \frac{9}{4}}$$

$$\#23. \quad x = -y^2$$

$$r \cos \theta = -(r \sin \theta)^2$$

$$r \cos \theta = -r^2 \sin^2 \theta$$

$$r \cos \theta = -r \sin^2 \theta$$

$$\frac{-\cos \theta}{\sin^2 \theta} = r$$

$$r = -\cot \theta \csc \theta$$

$$\#54. \quad a.) \text{ VI}$$

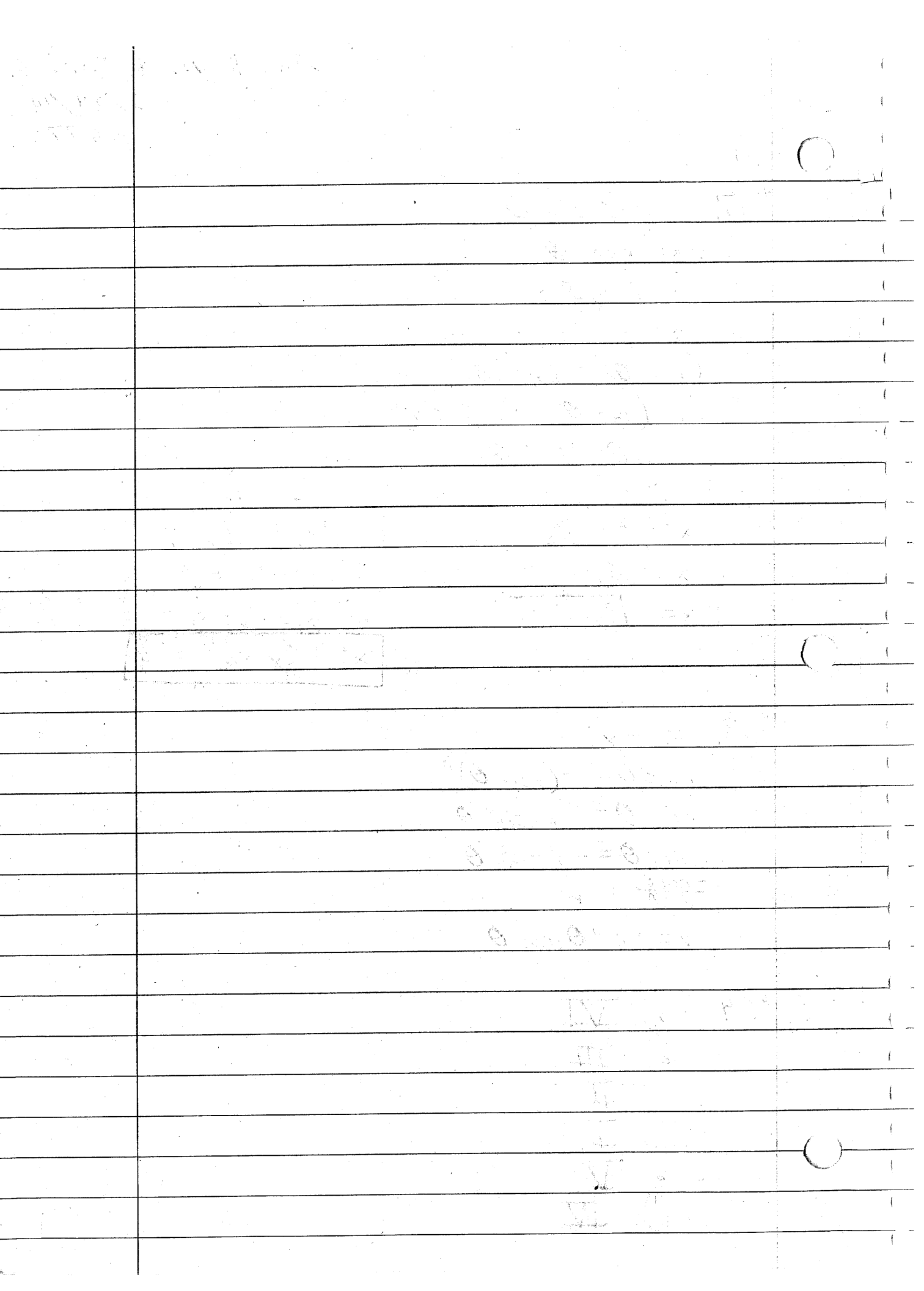
$$b.) \text{ III}$$

$$c.) \text{ II}$$

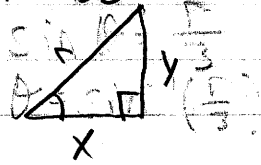
$$d.) \text{ I}$$

$$e.) \text{ V}$$

$$f.) \text{ IV}$$



17. $r = 3 \sin \theta \rightarrow \sin \theta = \frac{r}{3} = \frac{y}{r}$



$r = 3 \frac{y}{r}$

$r^2 = 3y \rightarrow r^2 = x^2 + y^2$

$3y = x^2 + y^2$

$x^2 + y^2 - 3y + 9/4 = 9/4$

$x^2 + (y - 3/2)^2 = 9/4$

23. $x = -y^2 \rightarrow r \cos(\theta) = -(r \sin(\theta))^2$

$x = r \cos(\theta) \quad r \cos(\theta) = -r^2 \sin^2(\theta)$

$y = r \sin(\theta) \quad -1/r = \sin^2(\theta) / \cos(\theta)$

$r = -\cos(\theta) / \sin^2(\theta)$

~~$-3y + 9/4 = 9/4$~~

10

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$\frac{1}{2} - \frac{3}{4} = \frac{2}{4} - \frac{3}{4} = -\frac{1}{4}$
 $\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$
 $\frac{3}{5} - \frac{1}{10} = \frac{6}{10} - \frac{1}{10} = \frac{5}{10} = \frac{1}{2}$
 $\frac{1}{4} + \frac{2}{8} = \frac{2}{8} + \frac{2}{8} = \frac{4}{8} = \frac{1}{2}$
 $\frac{5}{6} - \frac{1}{3} = \frac{5}{6} - \frac{2}{6} = \frac{3}{6} = \frac{1}{2}$
 $\frac{2}{5} + \frac{3}{10} = \frac{4}{10} + \frac{3}{10} = \frac{7}{10}$
 $\frac{3}{8} - \frac{1}{4} = \frac{3}{8} - \frac{2}{8} = \frac{1}{8}$
 $\frac{1}{3} + \frac{2}{9} = \frac{2}{9} + \frac{2}{9} = \frac{4}{9}$
 $\frac{4}{7} - \frac{1}{14} = \frac{8}{14} - \frac{1}{14} = \frac{7}{14} = \frac{1}{2}$
 $\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$
 $\frac{3}{4} - \frac{1}{8} = \frac{6}{8} - \frac{1}{8} = \frac{5}{8}$
 $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$
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 $\frac{4}{7} - \frac{1}{14} = \frac{8}{14} - \frac{1}{14} = \frac{7}{14} = \frac{1}{2}$

(9) $\frac{1}{2} - \frac{3}{4} = -\frac{1}{4}$
 $\frac{2}{3} + \frac{1}{6} = \frac{5}{6}$
 $\frac{3}{5} - \frac{1}{10} = \frac{1}{2}$
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