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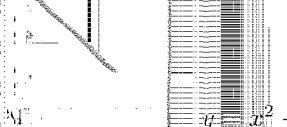
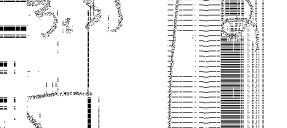
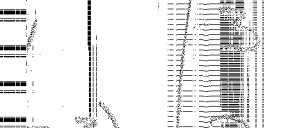
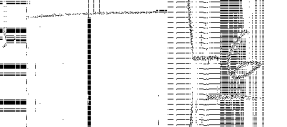
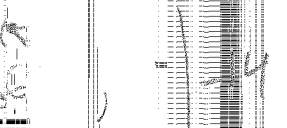


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$$\frac{14}{x}$$

$$y = \frac{14}{x}$$



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$$x = \dots$$

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So

$$y = x^2 - 2$$

$$x_v = \frac{-(-2)}{2}$$



ality: givin

$$x = \dots$$

$$y = \dots$$

$$y = -x^2$$

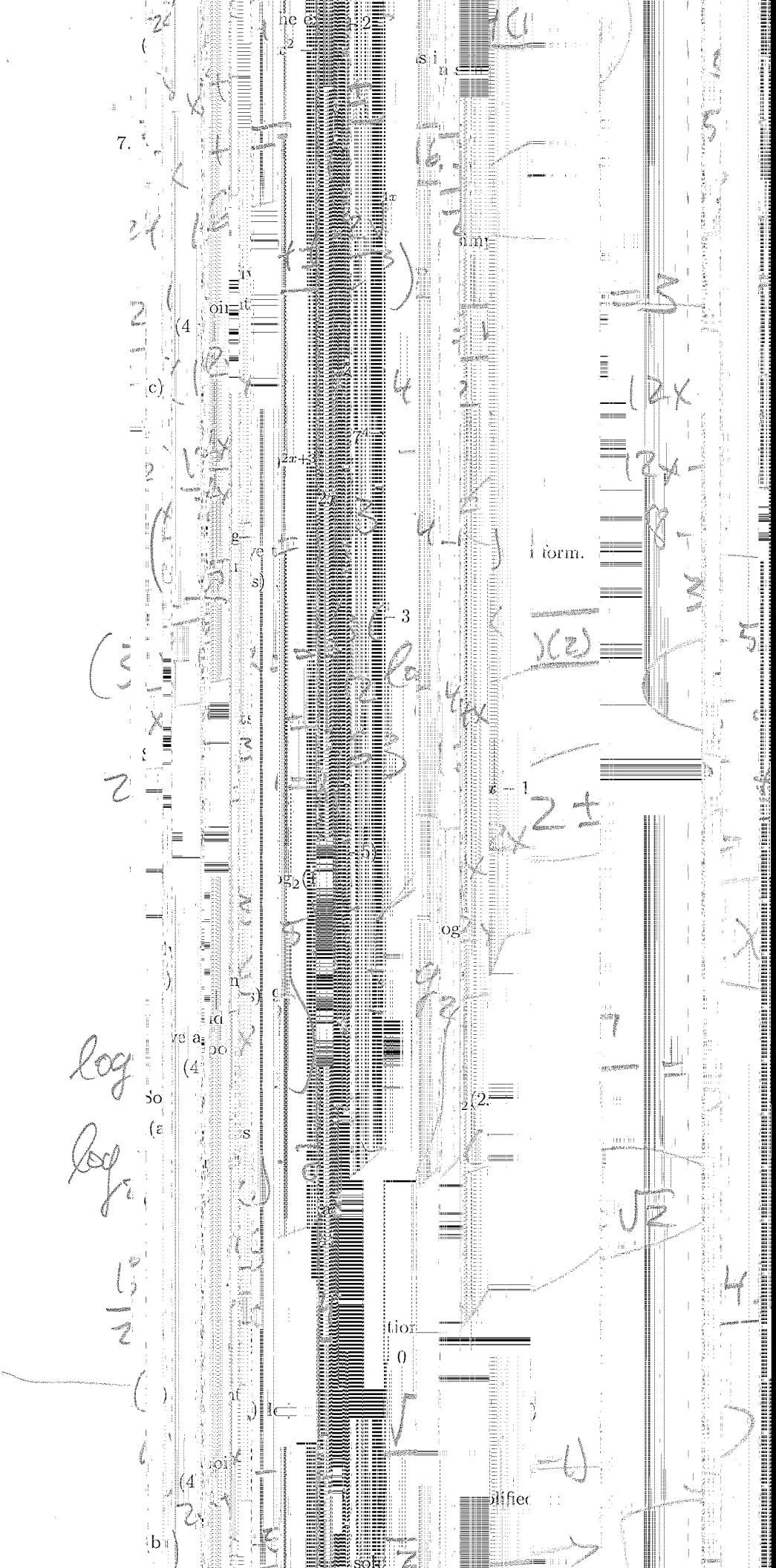
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Handwritten mathematical work on a grid background. The page contains several sections of calculations and diagrams.

**Top Section:** Includes the expression  $4x^2$  and a diagram of a rectangle with a diagonal line. A circled area on the right contains the fraction  $\frac{1+4x}{3xy}$ .

**Middle Section:** Features the text "div in  $f(x)$ " and the expression  $\frac{y+3y}{3y}$ . Below this is a diagram of a rectangle with a diagonal line and the label  $H(x)$ .

**Bottom Section:** Contains the text "n that" and the expression  $\frac{1+4x}{3xy}$ . There are also some scribbles and other faint markings.

1) Let  $f(x) = 2x^2 - 9x + 8$

$f(5) = 2(5)^2 - 9(5) + 8 = 50 - 45 + 8 = 13$   
 $f(3) = 2(3)^2 - 9(3) + 8 = 18 - 27 + 8 = -1$

(a) Find  $f(5) - g(3)$

$g(x) = 2x^2$   
 $f(5) - g(3) = 13 - 18 = -5$

(b)

$\sqrt{x^2 - 19}$   
 $\sqrt{25 - 19} = \sqrt{6}$

simplify by

$(2x^2 + 1) \circ g(x)$   
 $2(2x^2 + 1)^2 + 1$

Find  $\int \sqrt{x^2 - 9} dx$

$\int \sqrt{x^2 - 9} dx = \frac{x}{2} \sqrt{x^2 - 9} - \frac{9}{2} \ln|x + \sqrt{x^2 - 9}| + C$

$f(x)$

$u^2 - 2$   
 $2 + 19$

$2 - 8$   
 $x^2 + -2$

$4x + 1$

$2x$

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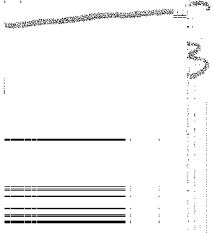
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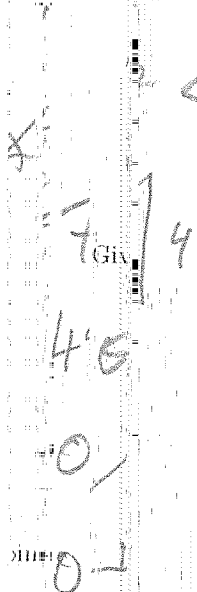
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16.

Prove the identity  $\cos(2\theta) = \cos^2\theta - \sin^2\theta$

Let  $\theta = \frac{\pi}{6}$

$\cos(2 \cdot \frac{\pi}{6}) = \cos(\frac{\pi}{3}) = \frac{1}{2}$

$\cos^2(\frac{\pi}{6}) - \sin^2(\frac{\pi}{6}) = (\frac{\sqrt{3}}{2})^2 - (\frac{1}{2})^2 = \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

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

17.

Prove the identity  $\tan(3\theta) = \frac{3\tan\theta - \tan^3\theta}{1 - 3\tan^2\theta}$

Let  $\theta = \frac{\pi}{6}$

$\tan(3 \cdot \frac{\pi}{6}) = \tan(\frac{\pi}{2})$  (undefined)

$\frac{3\tan(\frac{\pi}{6}) - \tan^3(\frac{\pi}{6})}{1 - 3\tan^2(\frac{\pi}{6})} = \frac{3(\frac{1}{\sqrt{3}}) - (\frac{1}{\sqrt{3}})^3}{1 - 3(\frac{1}{\sqrt{3}})^2} = \frac{\frac{3}{\sqrt{3}} - \frac{1}{3\sqrt{3}}}{1 - \frac{3}{3}} = \frac{\frac{9-1}{3\sqrt{3}}}{0} = \frac{8}{3\sqrt{3} \cdot 0}$  (undefined)

18.

Find the value of  $\theta$  if  $\tan\theta = \frac{1}{\sqrt{3}}$

$\theta = \frac{\pi}{6}$

Let  $\theta = \frac{\pi}{6}$

$\tan(\frac{\pi}{6}) = \frac{1}{\sqrt{3}}$

$\tan(2 \cdot \frac{\pi}{6}) = \tan(\frac{\pi}{3}) = \sqrt{3}$

$\frac{2 \cdot \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{3}} \cdot \frac{1}{\sqrt{3}}}{1 - 2 \cdot \frac{1}{\sqrt{3}} \cdot \frac{1}{\sqrt{3}}} = \frac{\frac{2}{\sqrt{3}} - \frac{1}{3}}{1 - \frac{2}{3}} = \frac{\frac{2\sqrt{3}-1}{3}}{\frac{1}{3}} = 2\sqrt{3}-1$

$$\frac{\sqrt{74}}{5}$$

Let  $\theta = \frac{\pi}{12}$

$\tan(\frac{\pi}{12}) = \frac{2-\sqrt{3}}{1+\sqrt{3}}$

$\tan(2 \cdot \frac{\pi}{12}) = \tan(\frac{\pi}{6}) = \frac{1}{\sqrt{3}}$

$\frac{2 \cdot \frac{2-\sqrt{3}}{1+\sqrt{3}} - \frac{2-\sqrt{3}}{1+\sqrt{3}} \cdot \frac{2-\sqrt{3}}{1+\sqrt{3}}}{1 - 2 \cdot \frac{2-\sqrt{3}}{1+\sqrt{3}} \cdot \frac{2-\sqrt{3}}{1+\sqrt{3}}} = \frac{1}{\sqrt{3}}$