

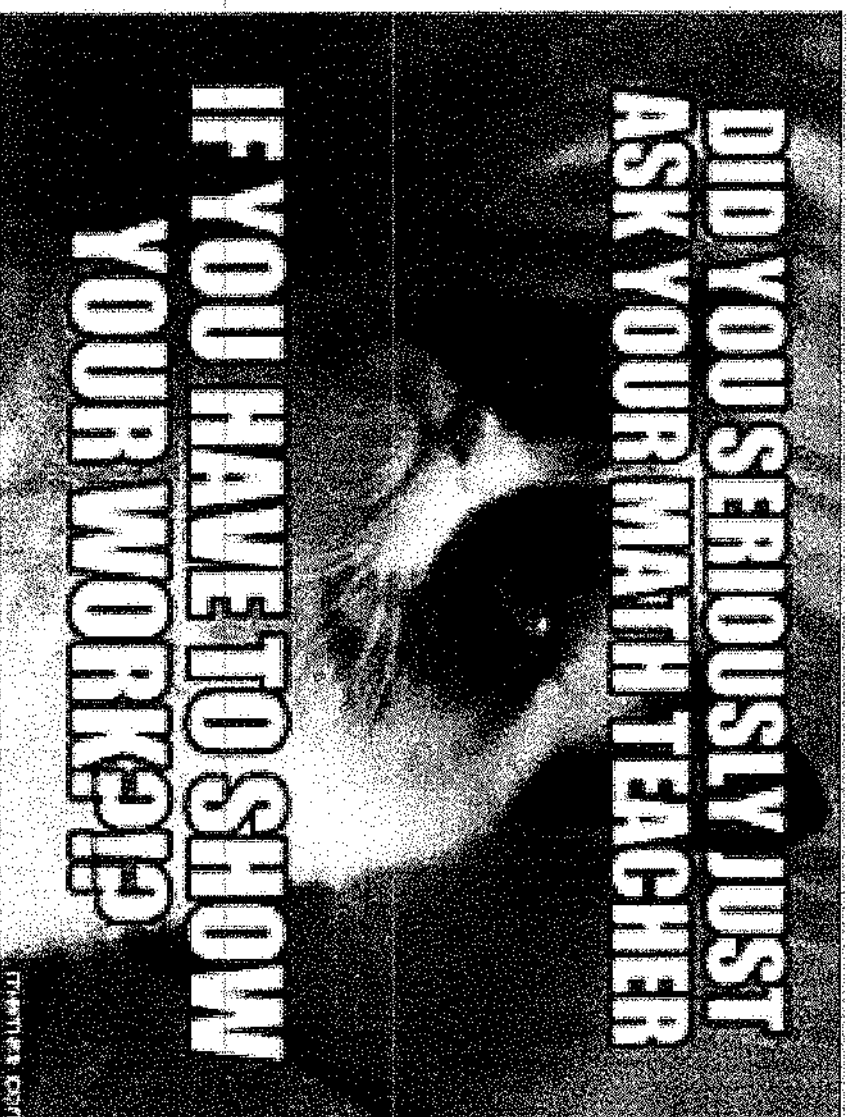
# Algebra 2 - Class Notes

Evaluating Functions

(Numbers from a Graph)

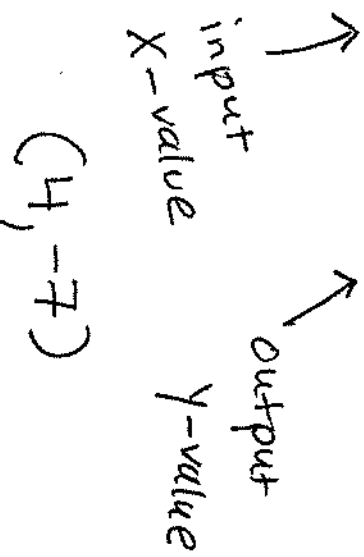
&

Function Operations

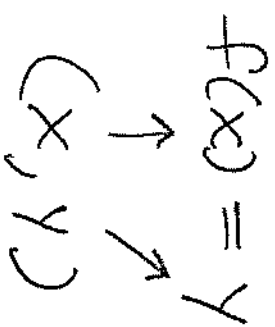


# What does the expression

## $f(4) = -7$ mean?



In function notation



Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

$$1) f(3) =$$

$$f(x) = x^2 - 3x - 1$$

$$f(3) = (3)^2 - 3(3) - 1$$

$$= 9 - 9 - 1$$

$$f(3) = \boxed{-1}$$

(3, -1)

Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

2)  $h(10)$

$$h(x) = |7x - 3|$$

$$h(10) = |7(10) - 3|$$

$$= |70 - 3|$$

$$= |67|$$

$(10, 67)$

$$h(10) = \boxed{67}$$

Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

3)  $f\left(\frac{1}{2}\right) =$

$$f(x) = x^2 - 3(x) - 1$$

$$f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 - 3\left(\frac{1}{2}\right) - 1$$

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

$$= \frac{1}{4} - \frac{3}{2} - 1$$

$$= \frac{1}{4} - \frac{6}{4} - \frac{4}{4}$$

$$\begin{aligned} &= \frac{1}{4} - \frac{6}{4} - \frac{4}{4} \\ &= \underbrace{-\frac{5}{4}} - \frac{4}{4} \end{aligned}$$

$$f\left(\frac{1}{2}\right) = \boxed{-\frac{9}{4}}$$

Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

4)  $g\left(-\frac{1}{4}\right)$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$g\left(-\frac{1}{4}\right) = \frac{1}{2}\left(-\frac{1}{4}\right) - \frac{2}{3}$$

$$= -\frac{1}{8} - \frac{2}{3} - \frac{2}{3}$$

$$= -\frac{3}{24} - \frac{16}{24}$$

$$g\left(-\frac{1}{4}\right) = \left|-\frac{19}{8}\right|$$

Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

5)  $h(2.5)$

$$h(x) = |7x - 3|$$

$$\begin{array}{r} 3 \\ 2.5 \\ \times 7 \\ \hline 17.5 \end{array}$$

$$h(2.5) = |7(2.5) - 3|$$

$$= |17.5 - 3|$$

$$= |14.5|$$

$$h(2.5) = \boxed{14.5}$$

Use the following functions to evaluate #

1 — 6.

$$f(x) = x^2 - 3x - 1$$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$h(x) = |7x - 3|$$

6)  $g(12)$

$$g(x) = \frac{1}{2}x - \frac{2}{3}$$

$$g(12) = \frac{1}{2} \cdot (12) - \frac{2}{3}$$

$$= \frac{6 \cdot 3}{1 \cdot 3} - \frac{2}{3}$$

$$= \frac{18}{3} - \frac{2}{3}$$

$$g(12) = \boxed{\frac{16}{3}}$$



# Function Operations

Addition	$f(x) + g(x) \Leftrightarrow (f + g)(x)$
Subtraction	$f(x) - g(x) \Leftrightarrow (f - g)(x)$
Multiplication	$f(x)g(x) \Leftrightarrow (fg)(x)$ or $(f \cdot g)(x)$ <i>f(x) \cdot g(x)</i> <span style="margin-left: 100px;">solid</span>
Division	$\frac{f(x)}{g(x)} \Leftrightarrow \left(\frac{f}{g}\right)(x)$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$(f+g)(x) =$$

$$7. f(x) + g(x)$$

$$= 3x^2 - 8 + 4x - 1$$

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

no ( )  
in simplified  
form

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$(h - f)(x) =$$

$$8. \quad h(x) - f(x)$$

$$= 2x^2 + 5 - (3x^2 - 8)$$

$$= 2x^2 + 5 - 3x^2 + 8$$

$$= \boxed{-x^2 + 13}$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$(f - g)(x) =$$

$$9. \quad f(x) - g(x)$$

$$= 3x^2 - 8 - (4x - 1)$$

$$= 3x^2 - 8 - 4x + 1$$

$$= \boxed{3x^2 - 4x - 7}$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$(g - f + h)(x) =$$

$$10. g(x) - f(x) + h(x)$$

$$= 4x - 1 - (3x^2 - 8) + 2x^2 + 5$$

$$= 4x - 1 - 3x^2 + 8 + 2x^2 + 5$$

$$= \boxed{-x^2 + 4x + 12}$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$(g \cdot h)(x) =$$

$$(gh)(x) =$$

$$g(x)h(x) =$$

$$11. g(x) \cdot h(x)$$

*Solid = multiplication*

$$= (4x-1)(2x^2+5)$$

*"FOIL"*

*Distribute each term*

$$= 8x^3 + 20x - 2x^2 - 5$$

$$= \boxed{8x^3 - 2x^2 + 20x - 5}$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

12.  $h(x) \cdot f(x)$

$$= (2x^2 + 5)(3x^2 - 8) \quad \text{"FOIL"}$$

$$= \underline{6x^4} - \underline{16x^2} + \underline{15x^2} - 40$$

$$= \underline{6x^4 - x^2 - 40}$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

$$13) (f + g)(3)$$

$$= f(3) + g(3)$$

$$= 19 + 11$$

$$= \boxed{30}$$

$$f(x) = 3x^2 - 8$$

$$f(3) = 3(3)^2 - 8$$

$$= 3(9) - 8$$

$$= 27 - 8$$

$$= 19$$

$$g(x) = 4x - 1$$

$$g(3) = 4(3) - 1$$

$$= 12 - 1$$

$$= 11$$



Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

14.  $(g - h)(-2)$

$$= g(-2) - h(-2)$$

$$= -9 - 13$$

$$= \boxed{-22}$$

$$g(x) = 4x - 1$$

$$g(-2) = 4(-2) - 1$$

$$= -8 - 1$$

$$= -9$$

$$h(x) = 2x^2 + 5$$

$$h(-2) = 2(-2)^2 + 5$$

$$= 2(4) + 5$$

$$= 8 + 5$$

$$= 13$$

Use the following functions to evaluate #7-15.

$$f(x) = 3x^2 - 8$$

$$g(x) = 4x - 1$$

$$h(x) = 2x^2 + 5$$

15.  $(g \circ h)(3)$

$$h(x) = 2x^2 + 5$$

$$= g(3) \cdot h(3)$$

$$h(3) = 2(3)^2 + 5$$

$$= 11 \cdot 23$$

$$= 2(9) + 5$$

$$= 18 + 5$$

$$= \boxed{253}$$

$$= 23$$

$$23$$

$$\begin{array}{r} 23 \\ \times 11 \\ \hline \end{array}$$

$$23$$

$$0$$

$$\begin{array}{r} 23 \\ + 230 \\ \hline 253 \end{array}$$

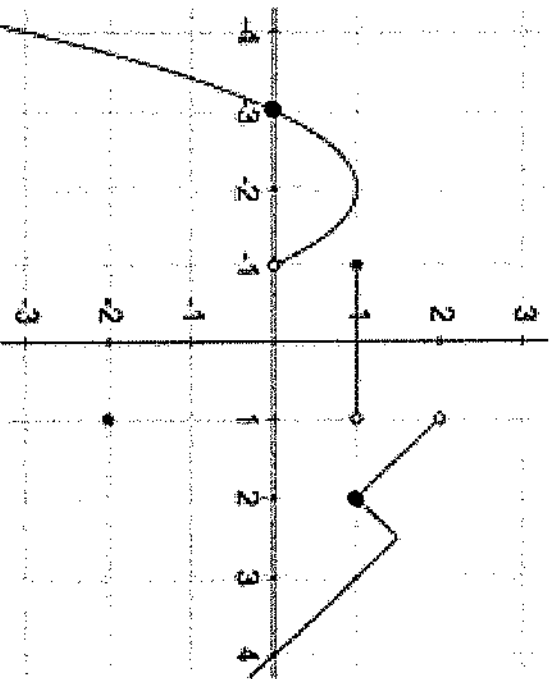
$$f(x) = y$$

When looking at a graph:

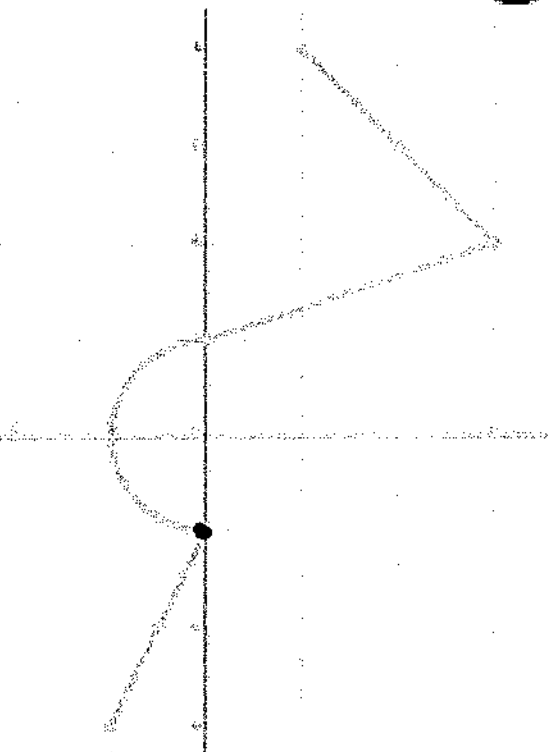
1. Find the x-value given.
2. Ask: Where does the function exist at that x-value?
3. That y-value is the answer.

Use the following graphs to answer #16 - 25.

$f(x)$



$g(x)$



16.  $f(2) = \boxed{1}$

$X=2$

17.  $g(1) = \boxed{0}$

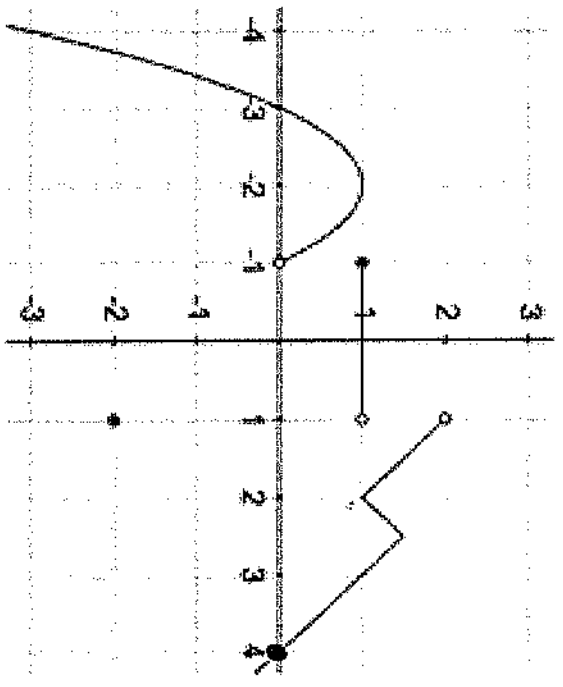
$X=1$

18.  $f(-3) = \boxed{0}$

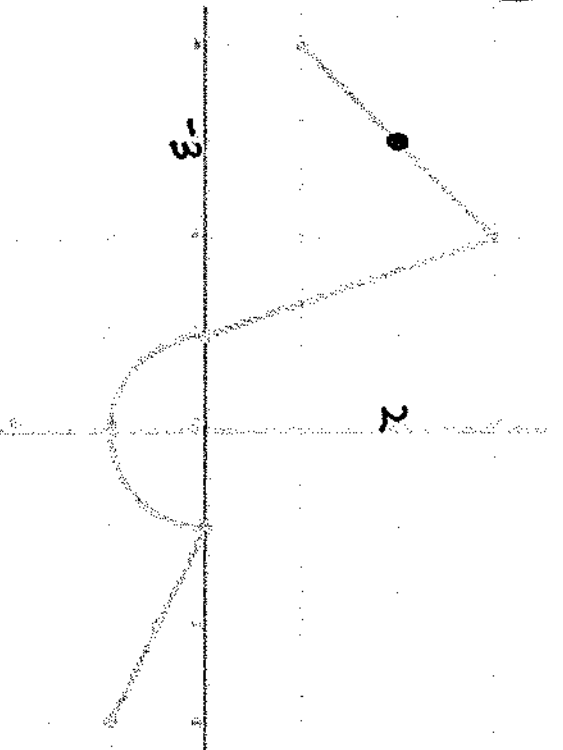
Back to  $f(x)$   $X=-3$

Use the following graphs to answer #16 - 25.

$f(x)$



$g(x)$

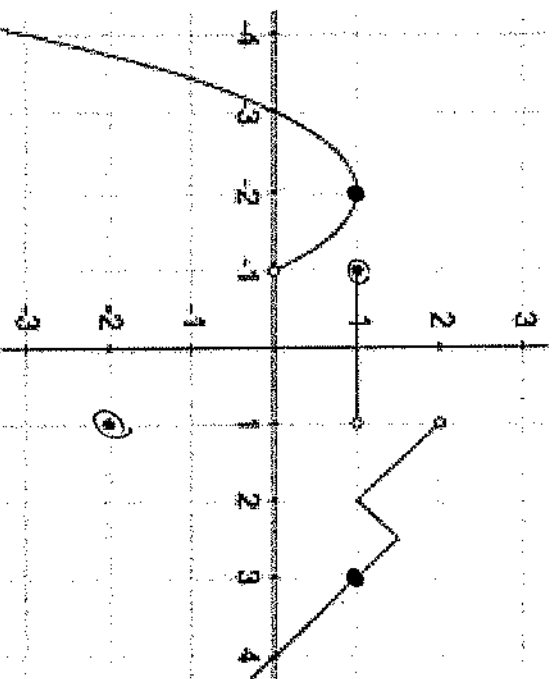


19.  $f(4) = \boxed{0}$   
 $X=4$

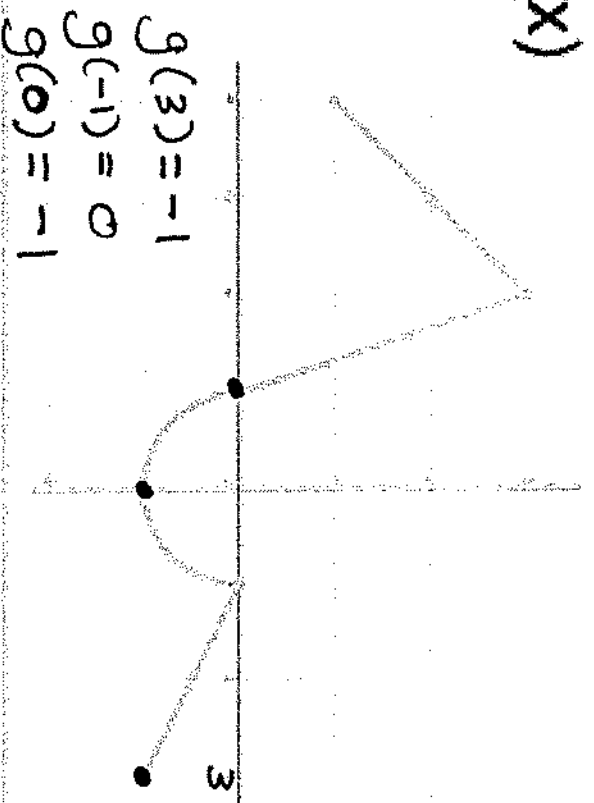
20.  $g(-3) = \boxed{2}$   
 $X=-3$

Use the following graphs to answer #16 - 25.

$f(x)$



$g(x)$



$$f(3) = 1$$

$$f(-2) = 1$$

$$f(-1) = 1$$

$$f(1) = -2$$

$$g(3) = -1$$

$$g(-1) = 0$$

$$g(0) = -1$$

21.  $f(3) - g(3)$

$$= 1 - (-1)$$

$$= 0 + 1$$

$$= 1 - (-1)$$

$$= 1 + 1$$

$$= \boxed{11}$$

$$= 1 + 1$$

$$= \boxed{2}$$

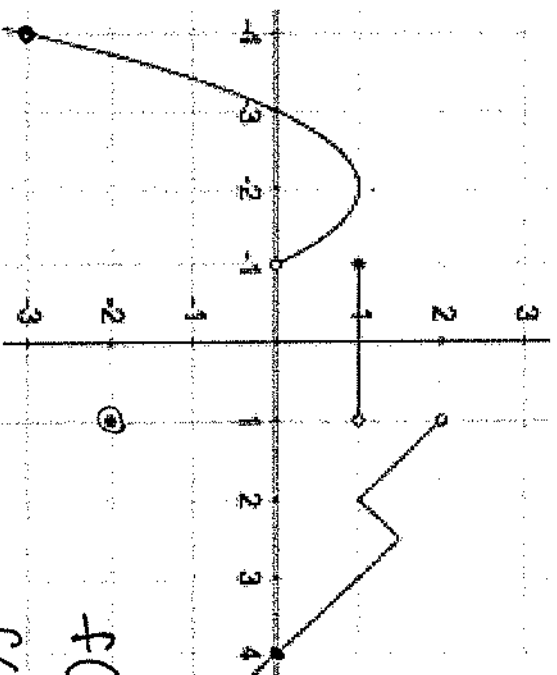
22.  $g(-1) + f(-2)$

23.  $f(-1) - g(0)$

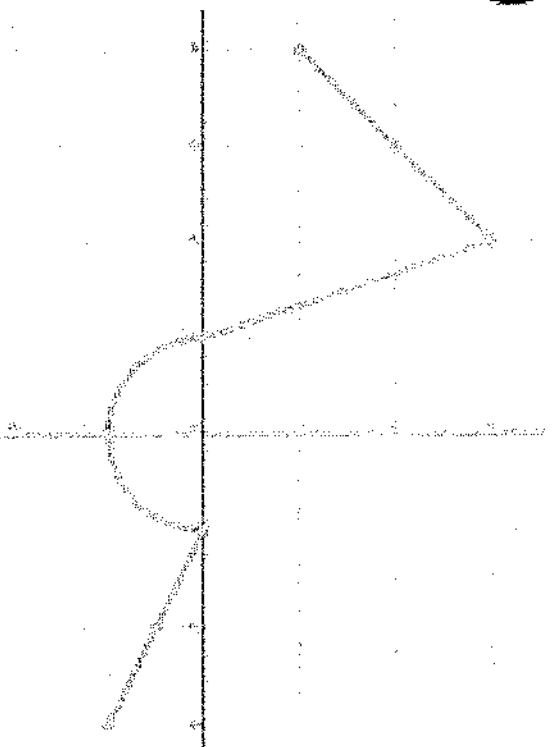
$$= \boxed{27}$$

Use the following graphs to answer #16 - 25.

$f(x)$



$g(x)$



$$f(4) = 0$$

$$f(-4) = -3$$

24.  $10f(1)$

$$f(1) = -2$$

$$10(-2)$$

$$= \boxed{-20}$$

25.  $f(4) + f(-4)$

$$0 + (-3)$$

$$= \boxed{-3}$$