Homework 2-8
Average Rate of Change Homework

1. For the function $g(x)$ given in the table below, calculate the average rate of change for each of the following intervals.

x	-3	-1	4	6	9
$g(x)$	8	-2	13	12	5

(a) $-3 \le x \le -1$

$\frac{-2-8}{-1-(-3)} = \frac{-10}{2}$

$= -5$

(b) $-1 \le x \le 6$

$\frac{12-(-2)}{6-(-1)} = \frac{14}{7}$

$= 2$

(c) $-3 \le x \le 9$

$\frac{5-8}{9-(-3)} = \frac{-3}{12}$

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

(d) Explain how you can tell from the answers in (a) through (c) that this is **not** a table that represents a linear function.

This table does not have a constant rate of change!

2. Consider the simple quadratic function $f(x) = x^2$. Calculate the average rate of change of this function over the following intervals:

(a) $0 \le x \le 2$

(0, 0)
(2, 4)

$\frac{4-0}{2-0} = 2$

(b) $2 \le x \le 4$

(2, 4)
(4, 16)

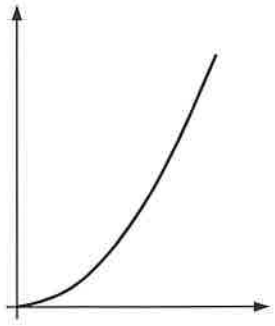
$\frac{16-4}{4-2} = 6$

(c) $4 \le x \le 6$

(4, 16)
(6, 36)

$\frac{36-16}{6-4} = 10$

(d) Clearly the average rate of change is getting larger at x gets larger. How is this reflected in the graph of f shown sketched to the right?



The graph is getting steeper as the x-values are increasing

3. What makes the average rate of change of a linear function different from that of any other function? What is the special name that we give to the average rate of change of a linear function?

Linear functions have a constant rate of change.

→ we call this the "slope"

4. Factor the expression $2x^2+3xy-2y^2$

M:4
A

$2x^2+4xy-1xy-2y^2$

$2x(x+2y)\ -1y(x+2y)$

$(x+2y)(2x-1y)$

5. Given $f(x)=3x^2+7x-20$ and $g(x)=x-2$ state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x)+\frac{r(x)}{g(x)}$.

$$\begin{array}{r} 3x+13 \\ x-2\overline{)\,3x^2+7x-20} \\ -(3x^2+6x)\ \downarrow \\ \hline 13x-20 \\ -(13x+26) \\ \hline 6 \end{array}$$

$3x+13+\frac{6}{x-2}$

OR

$$\begin{array}{r|rrr} 2 & 3 & 7 & -20 \\ & \downarrow & 6 & 26 \\ \hline & 3 & 13 & 6 \\ & x & c & R \end{array}$$

$3x+13+\frac{6}{x-2}$

6. What is the sum of $\frac{2}{x}$ and $\frac{x}{2}$?

(1) 1 (2) $\frac{2+x}{2x}$ (3) $\frac{4+x}{2x}$ (4) $\frac{4+x^2}{2x}$

Skip!

$\left(\frac{2}{2}\right)\frac{2}{x}+\frac{x}{2}\left(\frac{x}{x}\right)$

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

☐ I got ☐ I almost got it... ☐ I need more practice... ☐ I don't get it... Help!