

Graded Homework Assignment 3

1. To make a music video it costs \$750 to rent a studio plus \$5 for each copy produced.
(see section 9.1)

- Write a formula of the form $C(x) = ax + b$ that calculates the cost of producing x videos. $C(x) = 750 + 5x$
- A music video is produced. Find the cost of producing the video and making 2500 copies of a video. $C(2500) = 750 + 5(2500) = 13250$

2. The table below shows the average length of a major league baseball game (in minutes) for three consecutive years.

Year	2000	2001	2002
Length in Minutes	180	176	172

- What was the average length of a baseball game in the year 2000? 180 minutes
- By how many minutes did the average length change each year? -4
- Find a linear function f that models these data. Let $x = 0$ correspond to the year 2000. $f(x) = 180 - 4x$
- Use f to predict the average length of a game in the year 2004.
 $f(4) = 180 - 4(4) = 164$

For problems 3 through 7 consider the following two polynomials: (see page 324)

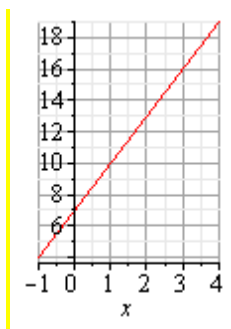
$$y = f(x) = x^4 - 2x^3 + 6x^2 - 8x + 2$$

$$y = g(x) = 3x + 7$$

- What is the degree of $f(x)$? 4, it is the highest power of x
- Find the numerical value of $f(0)$. $f(0) = 2$
- Find the numerical value of $f(-1)$.

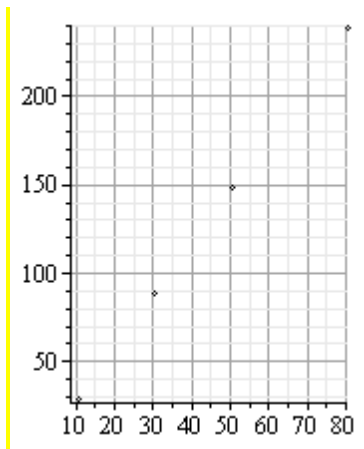
$$f(-1) = (-1)^4 - 2(-1)^3 + 6(-1)^2 - 8(-1) + 2 = 1 + 2 + 6 + 8 + 2 = 19$$

- Which polynomial is the linear function, and why is it called linear?
(linear functions have a degree of 1) $g(x)$ is linear because the highest power of x is 1.
- What does the graph of the linear function look like?



8. The following table lists the calories burned by a 180-pound person shopping at a mall:

Time (in minutes)	10	30	50	80
Calories	30	90	150	240



a. What type of polynomial function would model these data points? (sketch to function and observe and identify the resulting sketch)

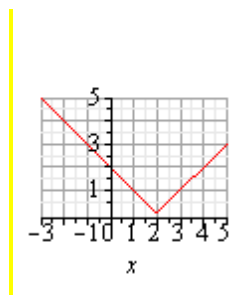
A linear function would model these data points

b. Find a function C that models the calories burned in t minutes.

The slope of the line can be obtained by taking the difference of the y's and the difference of the x's between any two points. i.e. $(150 - 90)/(50 - 30) = 60/20 = 3$. Then using the equation $y - y_c = m(x - x_c)$ where x_c and y_c are the coordinates of any point and m is the slope.
 $y - 30 = 3(x - 10)$ or $y = 3x - 30 + 30$ or $y = 3x$

9. Graph the absolute value function $y = f(x) = |x - 2|$ by completing and then using the table below: (see page 628)

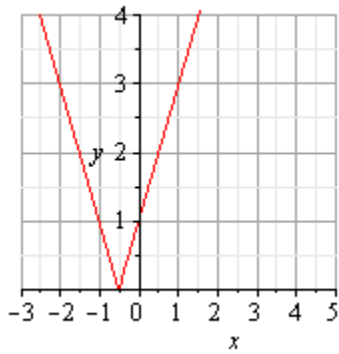
x	-3	-2	-1	0	1	2	3
y	5	4	3	2	1	0	1



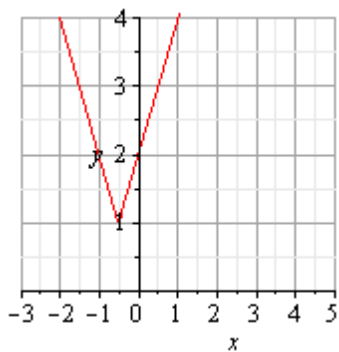
10. If $f(x) = \frac{1}{x-2}$, find $f(0)$. $f(0) = 1/(0 - 2) = -1/2$

11. For the rational function defined in problem 10, for what value of x is the function undefined? 2

12. Graph $y = f(x) = |2x + 1|$.



13. Graph $y = f(x) = |2x + 1| + 1$.



Solve for x if: (see page 628, example 1)

14. $|x| = 4$ $x = 4$ or -4

15. $|x| = -1$ no solution since the absolute value of x will always be greater than or equal to 0

16. $|x + 1| = 2$ $x + 1 = 2$ or $x + 1 = -2$, therefore $x = 1$ or $x = -3$

17. $|6x + 2| - 2 = 6$ $|6x + 2| = 8$ and $6x + 2 = 8$ or $6x + 2 = -8$ therefore $x = 1$ or $x = -5/3$

18. $\frac{12}{x+3} = 6$ $12 = 6(x + 3)$ or $12 = 6x + 18$ or $-6 = 6x$ and then $x = -1$

19. Two numbers are within 3 numbers of 10. What are the two numbers?

x is either $10 + 3 = 13$ or $10 - 3 = 7$ or $|x - 10| = 3$ is the absolute value equation

20. What is the domain and what is the range of the function $y = f(x) = x^2 - 4$?

(see example 5 page 774) Domain: $\{x, \text{ such that } x \text{ is real}\}$ Range: $\{y \text{ such that } y \geq -4\}$

