

Age Estimates

Overview: Students develop intuitive notions about the line $y = x$.

Objective: **Algebra I TEKS**
 b.2.a The student identifies and sketches the general forms of linear ($y = x$) and quadratic ($y = x^2$) parent functions.
 b.2.c The student interprets situations in terms of given graphs or creates situations that fit given graphs.

Terms: trend line

Materials: colored pencils or pens, pieces of flat spaghetti or brightly colored string, graphing calculator

Procedures: Students should be seated at tables in groups of 3 – 4.

Activity: How Old?

Read 12 names from the list below and ask students to guess the person's current age, filling in the first and second columns of the table. It is important that you list a variety of ages, from old to young.

Have students fill in the third column as you read the actual ages based on the birth dates below.

Name	Birthdate
Julie Andrews	10-01-1935
Bill Gates	10-28-1955
Ronald Reagan	02-06-1911
George W. Bush	07-06-1946
Shania Twain	08-28-1965
LeAnn Rimes	08-28-1982
Sophia Loren	09-20-1934
Bill Cosby	07-12-1937
Britney Spears	12-02-1981
McCaughey septuplets	11-19-1997
Jennifer Love Hewitt	02-21-1979
Jennifer Aniston	02-11-1969
Charlton Heston	10-04-1924
Leonardo DiCaprio	11-11-1974
Harrison Ford	07-13-1942
Tim Allen	06-12-1953
Oprah Winfrey	01-29-1954
Michelle Pfeiffer	04-29-1958
Michael J. Fox	06-09-1961
Jodie Foster	11-19-1962

Ben Affleck	08-15-1972
Drew Barrymore	02-22-1975
Frankie Muniz	12-05-1985
Mary Kate and Ashley Olsen	06-13-1986
Haley Joel Osment	04-10-1988
Jonathan Lipnicki	10-22-1990

- How well did you guess?
- How do you think we could judge if you are a good guesser?
- How do you think we could tell if you are an “over” guesser?
- How do you think we could tell if you are an “under” guesser?

Have students plot the data by hand on the grid and label the axes and a few ordered pairs.

Tell students that we want to use a trend line to get a feel for how good they estimate ages.

Instruct students to use a piece of spaghetti or string to sketch a trend line for their data. (Use the same color for the trend line as the color of the data points.) Do the same on the transparency of the Activity.

Instruct groups to compare their graphs within their group.

Based on the graphs:

- Who is the better guesser?
- Who is more of an “under” guesser? How can you tell?
- Who is more of an “over” guesser? How can you tell?

Instruct students to use a different color and sketch a “perfect-guess” line, a line that represents perfect guessing.

Ask students to write a sentence to describe the perfect-guess line and then translate to symbols. An example:

“All my guesses are the same as the actual ages”

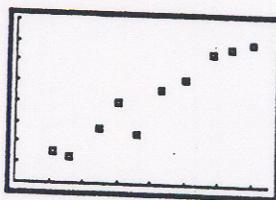
Guess = Actual

$G = A$ or $y = x$

Check that the line students sketched as their “good-guess” line is indeed the line $y = x$.

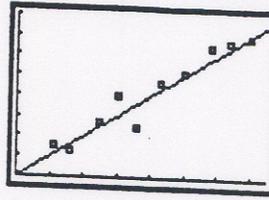
2. Have students create a scatter plot (guess, actual).

Sample graph:



3. Sample answer: The variable x stands for the guessed age so x min is 0 years and x max is 100 years. The variable y stands for the actual age so y min is 0 years and y max is 100 years.

4.

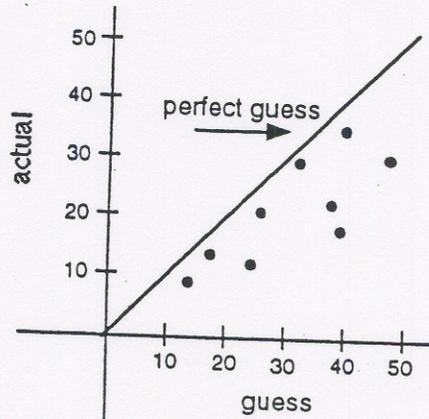
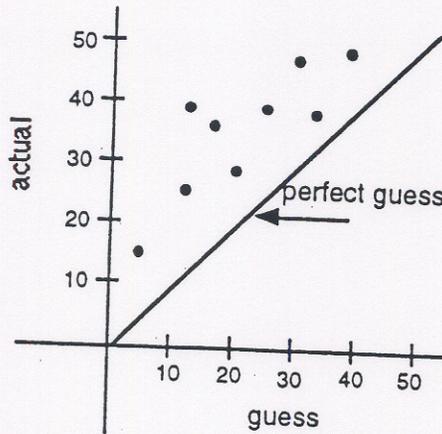


5. If the student's points lie mostly above the line, they are an under-guesser. If the student's points lie mostly below the line, they are an over-guesser.

Over or Under

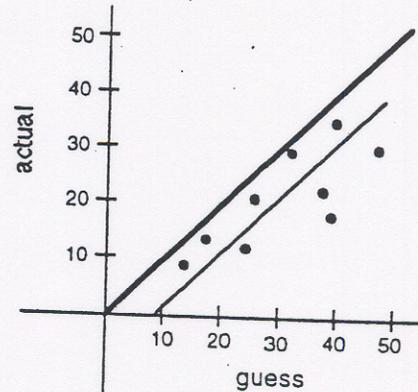
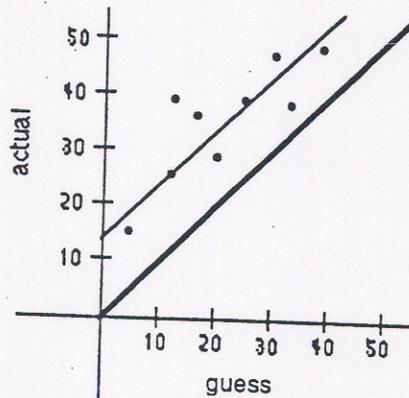
Have students complete the activity and then discuss as a group.

1.



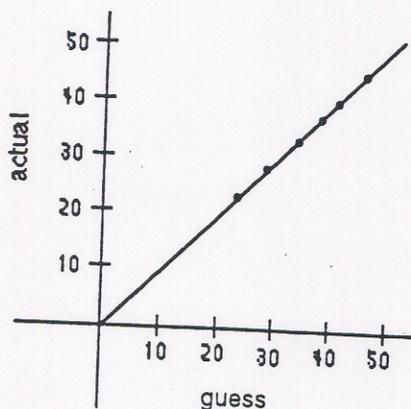
2. Underguess because all of the guesses are smaller when the actual ages are larger.
 3. Overguess because all of the guesses are larger when the actual ages are smaller.

4.



5. Accept answers between 30 and 40 years old.
 6. Accept answers between 50 and 60 years old.

7.

**Sample Assessment:**

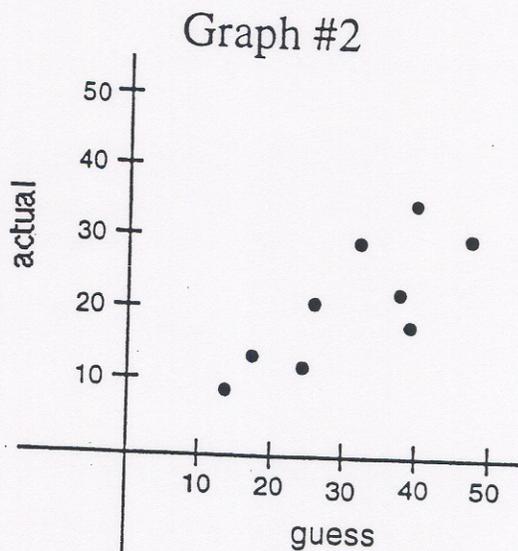
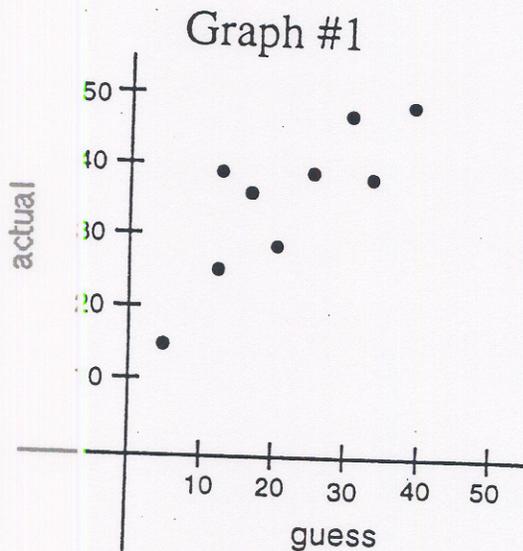
1. You guessed B's age better.
2. You overguessed C's age.
3. $y = x$.
4. $[0, 55]$, $[0, 45]$
5. The variable x stands for my partner's guesses of people's ages, so $[0, 40]$ shows all of the guesses listed. The variable y stands for the actual ages of the people listed, so $[0, 45]$ is a reasonable choice for those ages. This choice allows one to see the origin, which may be helpful in orienting the reader to whether the student is a good age estimator.

Note: In this activity students draw trend lines and a "perfect guess" line. The trend lines are approximations or estimates of their guessing, showing the general trend of how they guessed. Refrain from calling trend lines "lines of best fit." The "perfect guess" line is the line $y = x$.

Summary:

The line $y = x$ is the parent function for the linear function family. In this activity intuition for the line $y = x$ is developed as an important starting point for work with linear functions.

Over or Under?

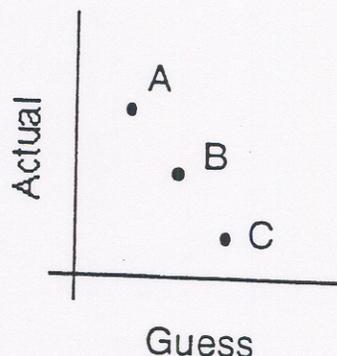


1. For each graph above, sketch in the “perfect-guess” line, $actual = guess$, and label it.
2. For graph #1, did the person over-guess or under-guess? Explain.
3. For graph #2, did the person over-guess or under-guess? Explain.
4. For each graph above, sketch a trend line for the data and label it “my trend”.
5. Use your trend line on graph #1. If I guessed an age of 24, what is the actual age of the person?
(24, _____)
6. Use your trend line on graph #1. If the person really was 46 years old, what did I probably guess? (_____, 46)
7. On the back, create a scatter plot of a person who guessed really well. Label the axes.

Sample Assessment

1. Consider A and B. Whose age did you guess better? Why?

2. Did you overestimate or underestimate C's age?



3. How do you tell your graphing calculator to graph the best guess line, guess = actual?

Your partner had the following guesses.

Name	Guess	Actual
Mr. Jackson	50	42
Ms. Chi	42	37
Mr. Beyer	45	40
Ms. Harris	40	28

4. Which would be a good viewing window for a scatter plot of the above data?

```

WINDOW
Xmin=-55
Xmax=55
Xscl=10
Ymin=-45
Ymax=45
Yscl=10
Xres=
    
```

```

WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=
    
```

```

WINDOW
Xmin=0
Xmax=55
Xscl=10
Ymin=0
Ymax=45
Yscl=10
Xres=
    
```

```

WINDOW
Xmin=-4.7
Xmax=4.7
Xscl=1
Ymin=-3.1
Ymax=3.1
Yscl=1
Xres=
    
```

Your partner had the following guesses.

Name	Guess	Actual
Mr. King	37	42
Ms. Alcini	30	37
Mr. Golm	35	42
Ms. Cline	25	30

5. What would be a good viewing window for a scatter plot?
Explain each choice.

X_{\min} :

X_{\max} :

Y_{\min} :

Y_{\max} :