

BEAUTIFUL FACES

Performance Standard (7A/7B/7C/8B).I

Measure photographs of seven persons for particular aspects of beauty, calculate a set of ratios to compare them to a standard of beauty (the Golden Ratio of $(1 + \sqrt{5}) / 2$) accordingly:

- *Mathematical knowledge:* Measure distances and calculates ratios.
- *Strategic knowledge:* Solve problems involving scale and ratios.
- *Explanation:* Explain completely and clearly what was done and why it was done.

Procedures

1. *In order to measure and compare quantities using appropriate units, instruments, and methods (7A), estimate measurements and determine acceptable levels of accuracy (7B), select and use appropriate technology, instruments, and formulas to solve problems, interpret results, and communicate findings (7C), and interpret and describe numerical relationships using tables, graphs, and symbols (8B),* students should experience sufficient learning opportunities to develop the following skills:
 - Calculate by an appropriate method the length, width, height, perimeter, area, volume, surface area, angle measures or sums of angle measures of common geometric figures or combinations of common geometric figures.
 - Determine answers to an appropriate degree of accuracy using significant digits.
 - Solve problems involving scale drawings, models, maps or blueprints.
 - Approximate and interpret rates of change from graphical and numerical data.
2. Provide each student a copy of the "Beautiful Faces" task sheets and the rubric. Have students review and discuss the task to be completed and how the rubric will be used to evaluate it. If available, students should complete the task with Internet access in a classroom or outside of class to find "face shots" of 3 other famous persons on their own. If internet is not available, they can find pictures of famous persons' faces in magazines.
3. Ask students to solve the following problems:

In art, many sculptures and paintings of faces are considered to be beautiful. Photographs of famous people can also be categorized as "beautiful faces" and "not so beautiful" faces. Using a metric ruler, measure 4 pictures of faces to the nearest millimeter accordingly: a. top of head to chin; b. width of head at widest part; c. top of head to pupil of eye; d. pupil to where lips meet; e. length of lips (side to side, not smiling); and f. width of nose (widest part including nostrils). Calculate the following ratios: a/b, c/d, and e/f.

Then compare your results to $(1 + \sqrt{5}) / 2$, also known as the Golden Ratio. Download and print photographs of three famous people from the Internet, and make the same measurements. Choose one of the people as famous but not necessarily considered attractive. Write a comparison of the values you calculated for each of the pictures and the Golden Ratio and record any observations you have from this activity. What conditions might affect your results and their accuracy?

4. Evaluate each student's calculations and final narrative using all three dimensions of the rubric and its guide to determine the performance level. Measurements should be accurate to ± 1 mm for a 4 in mathematical knowledge. Score strategy on accuracy of the comparisons to an approximation of the Golden Ratio. A 4 in explanation must include reasonable sources of inaccuracy such as the quality of the photo and the direction the face is turned or tipped in the photo, not the state rubric of what and why.

Examples of Student Work follow

Time Requirements

- One class period

Resources

- Copies of the "Beautiful Faces" task sheets
- Metric ruler
- Access to Internet and printer (or to magazines)
- Mathematics Rubric

ASSESSMENT (7A/7B/7C/8B).I

NAME _____ DATE _____

BEAUTIFUL FACES

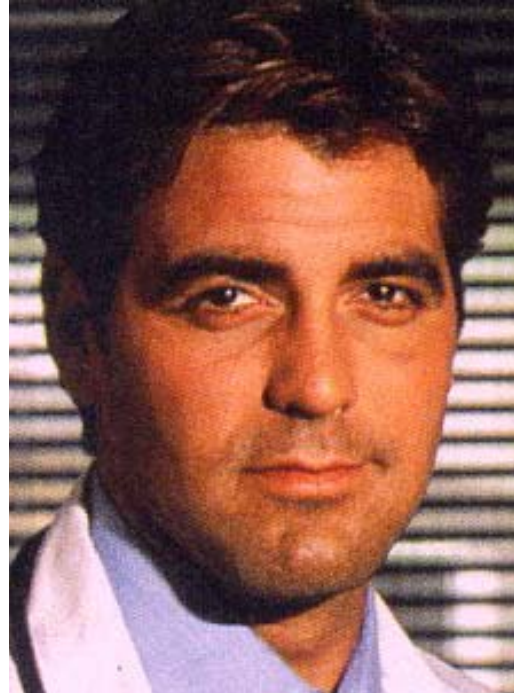
In art, many sculptures and paintings of faces are considered to be beautiful. Photographs of famous people can also be categorized as “beautiful faces” and “not so beautiful” faces. Using a metric ruler, measure the following faces to the nearest millimeter:



- a = top of head to chin _____
- b = width of head at widest part _____
- c = top of head to pupil of eye _____
- d = pupil to where lips meet _____
- e = length of lips _____
(side to side, not smiling)
- f = width of nose _____
(widest part including nostrils)

Calculate the following:

- a/b = _____
- c/d = _____
- e/f = _____



- a = top of head to chin _____
- b = width of head at widest part _____
- c = top of head to pupil of eye _____
- d = pupil to where lips meet _____
- e = length of lips _____
(side to side, not smiling)
- f = width of nose _____
(widest part including nostrils)

- a/b = _____
- c/d = _____
- e/f = _____



a = top of head to chin _____
 b = width of head at widest part _____
 c = top of head to pupil of eye _____
 d = pupil to where lips meet _____
 e = length of lips _____
 (side to side, not smiling)
 f = width of nose _____
 (widest part including nostrils)



a = top of head to chin _____
 b = width of head at widest part _____
 c = top of head to pupil of eye _____
 d = pupil to where lips meet _____
 e = length of lips _____
 (side to side, not smiling)
 f = width of nose _____
 (widest part including nostrils)

Calculate the following:

a/b = _____
 c/d = _____
 e/f = _____

a/b = _____
 c/d = _____
 e/f = _____

Then compare your results to $(1 + \sqrt{5}) / 2$, also known as the Golden Ratio. Download and print photographs of three famous people from the Internet, and make the same measurements. Choose one of the people as famous but not necessarily considered attractive. Write a comparison of the values you calculated for each of the pictures and the Golden Ratio and record any observations you have from this activity. What conditions might affect your results and the accuracy?

Adapted from ActiveMath 2000, "Golden Faces", pp. 1-4

APR 18 2001

Beautiful Faces

Name _____

Date 4/18/01

In art, many sculptures and paintings of faces are considered to be beautiful. Photographs of famous people can also be categorized as "beautiful faces" and "not so beautiful" faces. Using a metric ruler, measure the following faces to the nearest millimeter:



- a = top of head to chin 70 mm
- b = width of head at widest part 38 mm
- c = top of head to pupil of eye 30 mm
- d = pupil to where lips meet 23 mm
- e = length of lips (side to side, not smiling) 17 mm
- f = width of nose (widest part including nostrils) 15 mm



- a = top of head to chin 75 mm
- b = width of head at widest part 44 mm
- c = top of head to pupil of eye 32 mm
- d = pupil to where lips meet 24 mm
- e = length of lips (side to side, not smiling) 18 mm
- f = width of nose (widest part including nostrils) 12 mm

Calculate the following:

a/b = 1.8
 c/d = 1.3
 c/f = 1.13

a/b = 1.7 mm
 c/d = 1.3 mm
 c/f = 1.5



a = top of head to chin 41mm
 b = width of head at widest part 29mm
 c = top of head to pupil of eye 20mm
 d = pupil to where lips meet 12mm
 e = length of lips (side to side, not smiling) 10mm
 f = width of nose (widest part including nostrils) 16mm

a = top of head to chin 59mm
 b = width of head at widest part 34mm
 c = top of head to pupil of eye 29mm
 d = pupil to where lips meet 12mm
 e = length of lips (side to side, not smiling) 14mm
 f = width of nose (widest part including nostrils) 9mm

Calculate the following:

a/b = 1.4
 c/d = 1.7
 e/f = 1.7

a/b = 1.7
 c/d = 1.6
 e/f = 1.6

(Day 2) 1.61

Then compare your results to $(1 + \sqrt{5}) / 2$, also known as the Golden Ratio. Download and print photographs of three famous people from the Internet, and make the same measurements.

Choose one of the people as famous but not necessarily considered attractive.

Write a comparison of the values you calculated for each of the pictures and the Golden Ratio and record any observations you have from this activity.

Adapted from ActiveMath 2000, "Golden Faces", pp. 1-4

Your pictures data

A.

- a = top of head to chin 40mm
- b = width of head at widest part 22mm
- c = top of head to pupil of eye 17mm
- d = pupil to where lips meet 11mm
- e = length of lips
(side to side, not smiling) 9mm
- f = width of nose
(widest part including nostrils) 5mm

B.

- a = top of head to chin 75mm
- b = width of head at widest part 57mm
- c = top of head to pupil of eye 45mm
- d = pupil to where lips meet 29mm
- e = length of lips
(side to side, not smiling) 23mm
- f = width of nose
(widest part including nostrils) 17mm

Calculate the following:

a/b = 1.8mm
 c/d = 1.5mm
 e/f = 1.8mm

a/b = 1.3mm
 c/d = 1.6mm
 e/f = 1.4mm

C.

- a = top of head to chin 57mm
- b = width of head at widest part 34mm
- c = top of head to pupil of eye 26mm
- d = pupil to where lips meet 20mm
- e = length of lips
(side to side, not smiling) 15mm
- f = width of nose
(widest part including nostrils) 9mm

D.

- a = top of head to chin 60mm
- b = width of head at widest part 42mm
- c = top of head to pupil of eye 40mm
- d = pupil to where lips meet 22mm
- e = length of lips
(side to side, not smiling) ~~22mm~~ 20mm
- f = width of nose
(widest part including nostrils) 14mm

Calculate the following:

a/b = 1.7mm
 c/d = 1.3mm
 e/f = 1.7

a/b = 1.4mm
 c/d = 1.8mm
 e/f = 1.4

A.



Copyright Archive Photos

B.



Copyright Archive Photos



D.



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The most beautiful individual out of Fred Astaire, Rock Hudson, Judy Garland, or Cary Grant was Rock Hudson. This proof of beauty could be a result of his photograph. Judy Garland and Cary Grant's ~~pictures~~ faces are tilted to either the right or left. Fred Astaire's picture is smaller than the others causing the measurements to be harder to decipher.

Rock Hudson also has the biggest picture out of the fair, which made his face ~~more~~ easier to measure. When his "top of head to pupil of eye" was divided by "pupil to where lips meet" ($45/29$) 1.6 was the result.