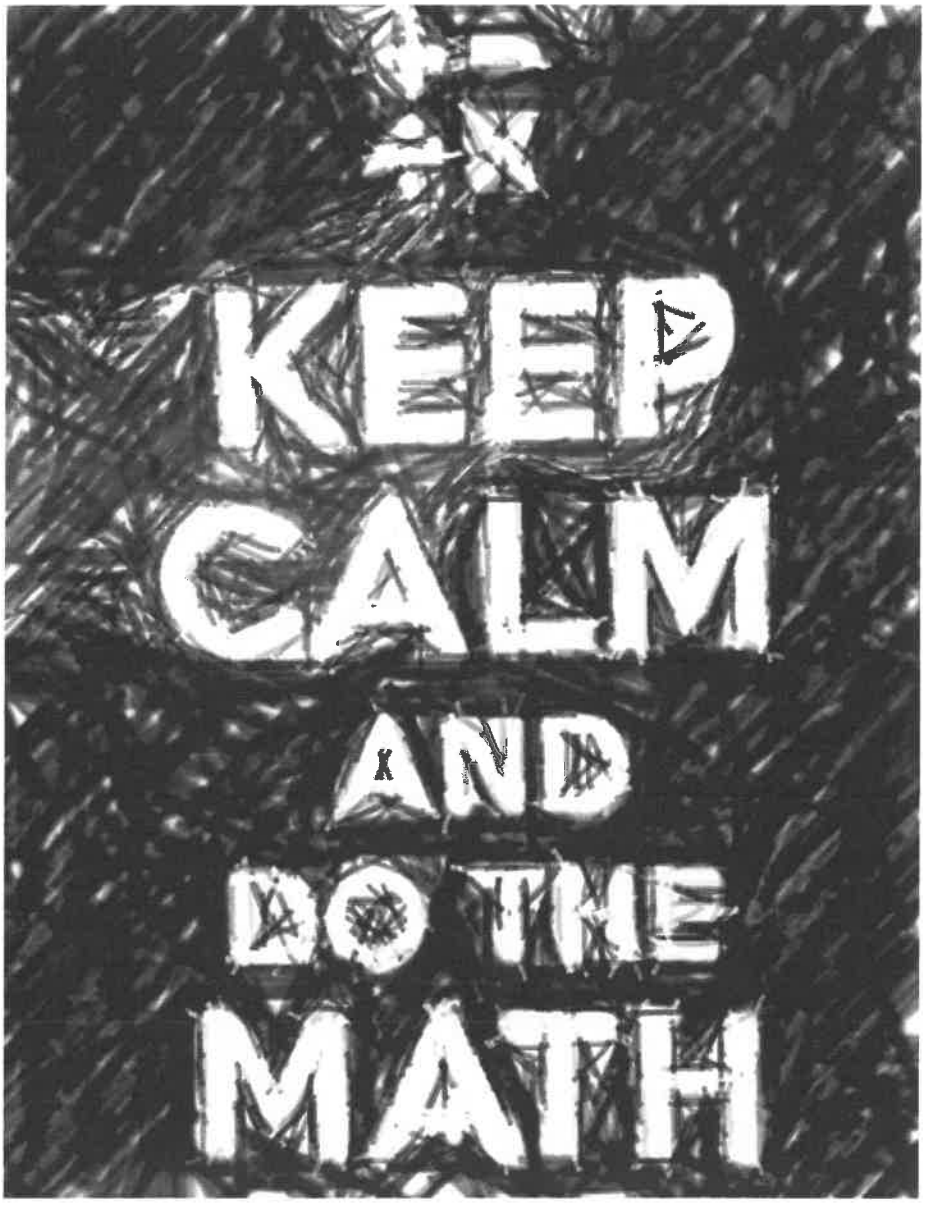
NAME: _____

Math P.A.T. Prep

Scale Factors / Similar Polygons
Similar Triangles - SOLUTIONS



St. Brendan School

Mr. Martínez

Scale Factor

Maps

- Be careful! Very possibly, you will have to change units so that the units are equal

  cm to m

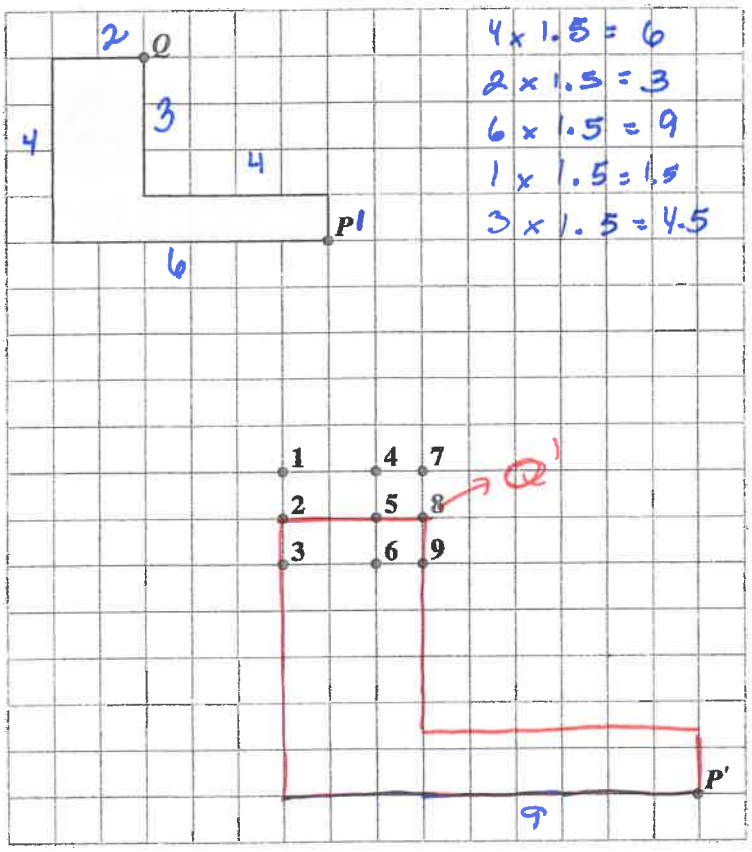
  m to Km ✓

Scale factor = New / old

- New dimensions ↓ Multiply or Divide all sides ↓ by S.F

Kate begins to create an image of the shaded 2-D shape shown below by applying a scale factor of $\frac{3}{2}$. The location of Point P' is given.

Scale Factor of $\frac{3}{2} = 1.5$



Numerical Response

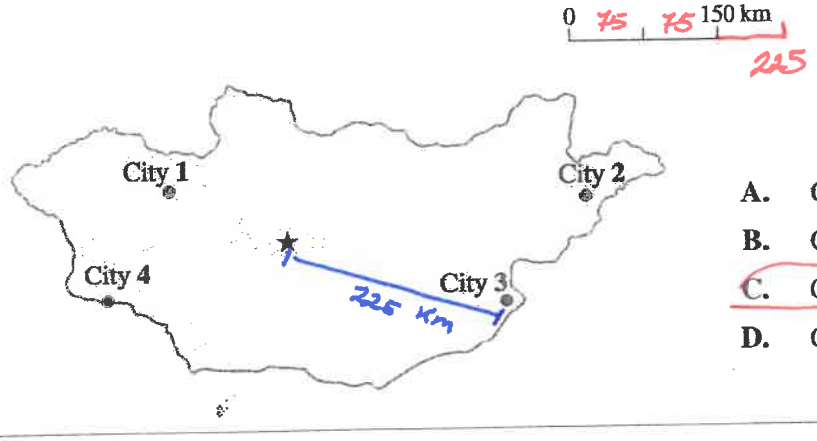
5. Which numbered point shown above represents the location of Point Q' in Kate's image?

Answer: Point 8

The star on the map below represents the capital city of a country. Maria uses the map to locate a city that is 225 km from the capital.

225 is = 75 + 75 + 75

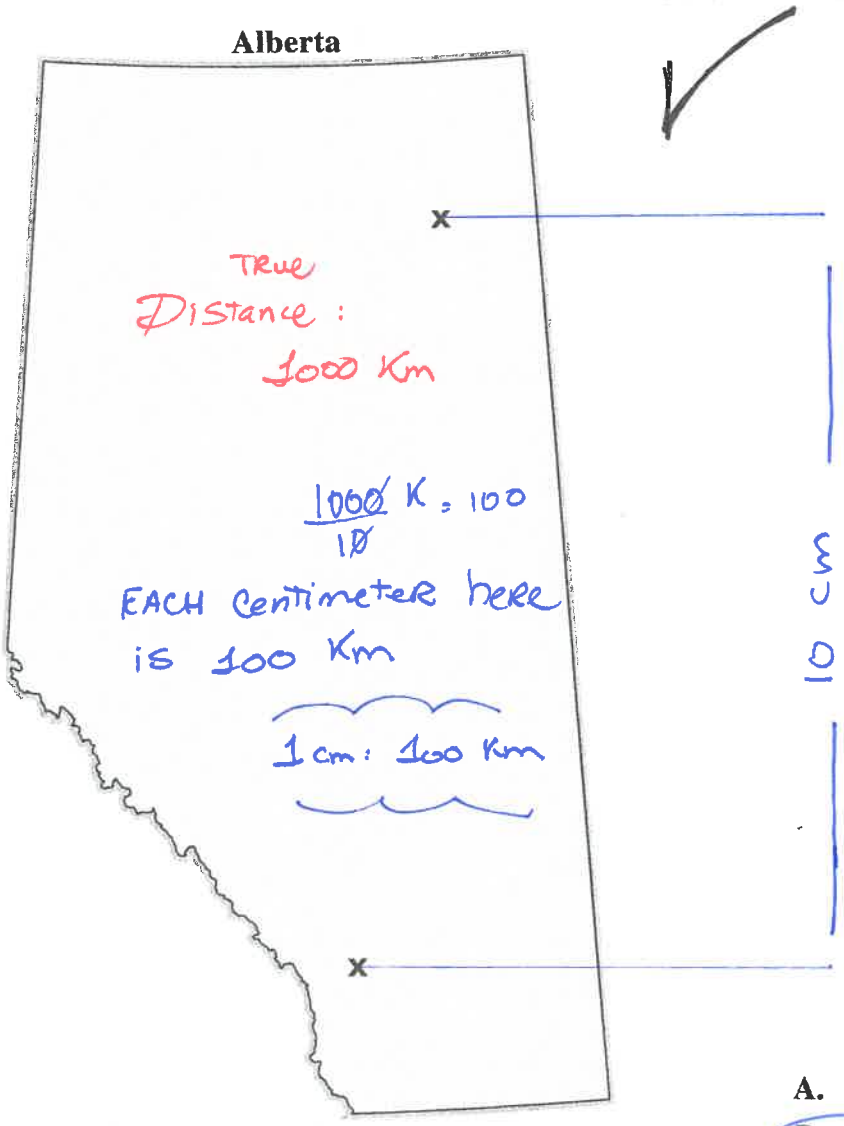
Use transparency or Ruler to determine the correct city



A. City 1
B. City 2
C. City 3
D. City 4

39. Which of the cities on the map above is the city located by Maria?

The two ×s shown on the map below represent the locations of two communities in Alberta. The distance between the two communities is 1 000 km.

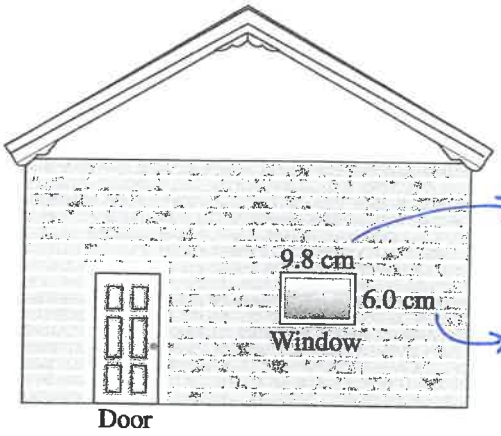


A. 1 cm:10 km
B. 1 cm:100 km
C. 1 cm:1 000 km
D. 1 cm:10 000 km

32. Which of the following ratios represents the scale used to create the map?

Remember

The diagram below shows the front elevation of a building on a blueprint.



≈ 1.8 m

9.8 × 18 = 176.4 cm

6 × 18 = 108 cm ≈ 1.1 m

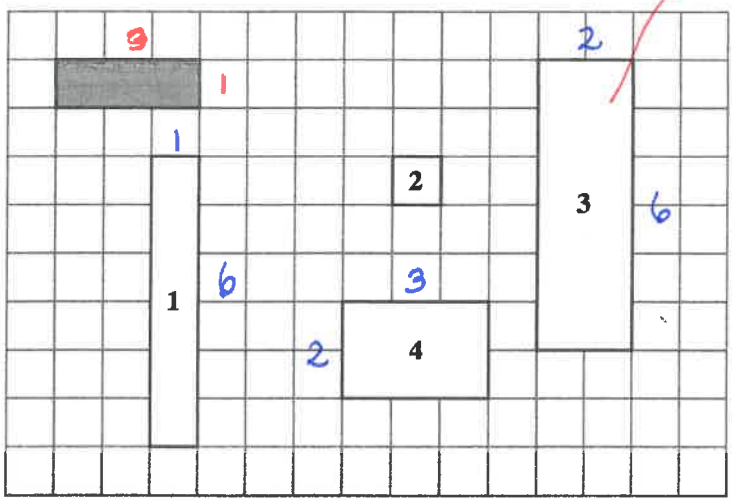
Blueprint scale 1:18 means each single unit × 18

25. Based on the dimensions shown on the blueprint, the actual dimensions of the window, to the nearest tenth of a metre, will be

A. 0.5 m × 0.3 m
B. 1.0 m × 0.6 m
C. 1.8 m × 1.1 m
D. 1.8 m × 3.0 m

Watch the units! cm must be converted to m

Four-sided Polygons



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

$\frac{1}{2}$

Proportional means
- Same angles
- Same scale factors for all sides

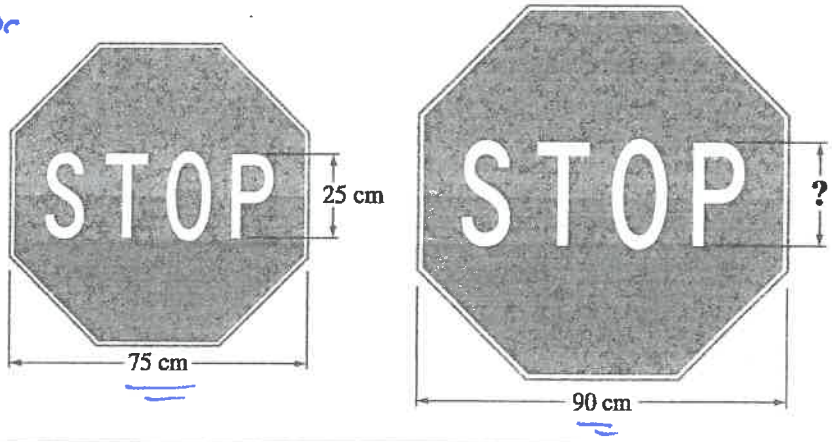
6. Which of the polygons above is proportional to the shaded rectangle?

A. 1
B. 2
C. 3
D. 4

1 - Can't be → one of the lengths did not change.
2 - Can't be → one of the lengths did not change
3 → SF of $\frac{1}{2}$ all around

• Find the scale factor with the 2 sides that you have

• Use S.F. to find the new length



$SF = \frac{90}{75} = 1.2$

$? = (25\text{ cm})(1.2) = 30$

40. If the two stop signs shown above are similar, what is the height of the letters in the larger stop sign?

A. 30 cm
B. 40 cm
C. 45 cm
D. 50 cm

Sam draws two polygons that are similar. The first polygon has a perimeter of 16 cm and the second polygon has a perimeter of 10 cm.

Numerical Response

Perimeter: 16 □ 4 Perimeter: 10 □

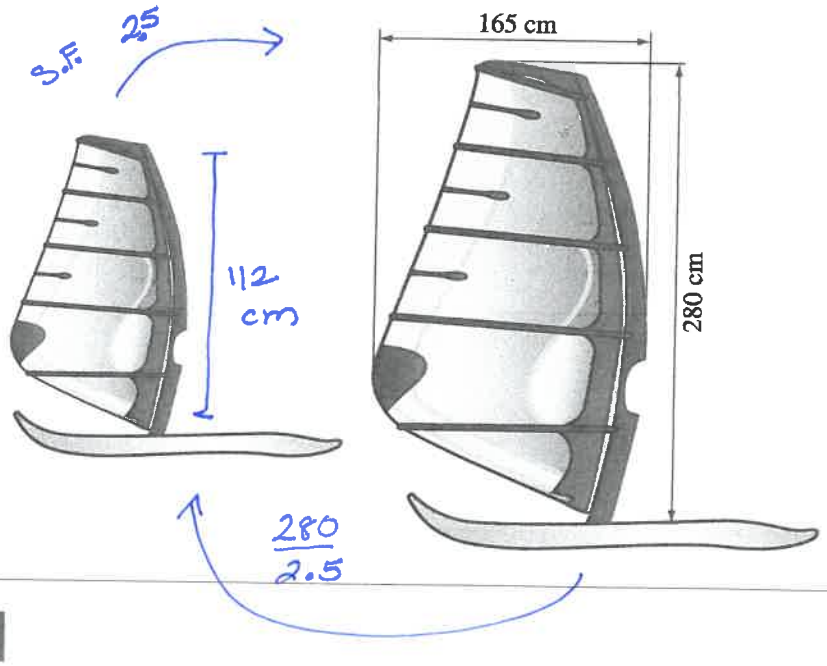
$4 \times 0.625 = 2.5$

$\frac{10}{16} = \frac{5}{8} = 0.625$ SF

3. If the shortest side of the first polygon has a length of 4 cm, then the corresponding side of the second polygon has a length of 2.5 cm.

et.)

The large sail shown below is an enlargement of the small sail.



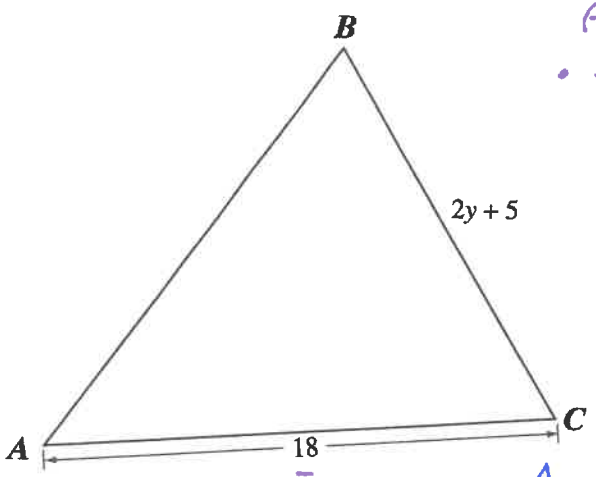
Numerical Response

9. What is the height of the small sail if the scale factor of the enlargement is 2.50?

Answer: 112 cm

(Record your answer in the numerical-response section on the answer sheet.) .

Triangle ABC is similar to triangle DEF.



- Recognize that this is a Reduction.
- Find the scale factor: $\frac{6}{18} = \frac{1}{3}$

Set-up equation

$3y = 2y + 5$

Solve the equation

$3y - 2y = 5$

$y = 5$

then

$BC = 2y + 5 = 2(5) + 5 = 15$

39. What is the length of side BC?

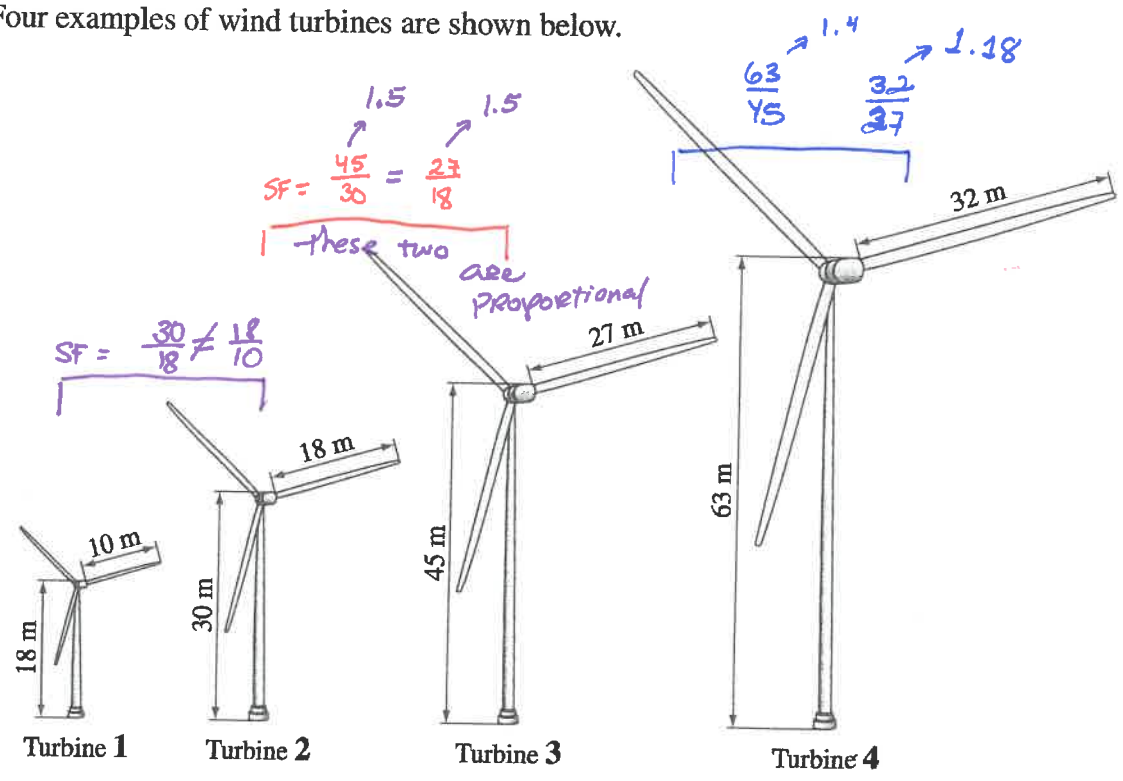
A. 11

B. 13

C. 15

D. 17

Four examples of wind turbines are shown below.



SF = $\frac{30}{18} \neq \frac{18}{10}$

1.5 1.5

SF = $\frac{45}{30} = \frac{27}{18}$

these two are proportional

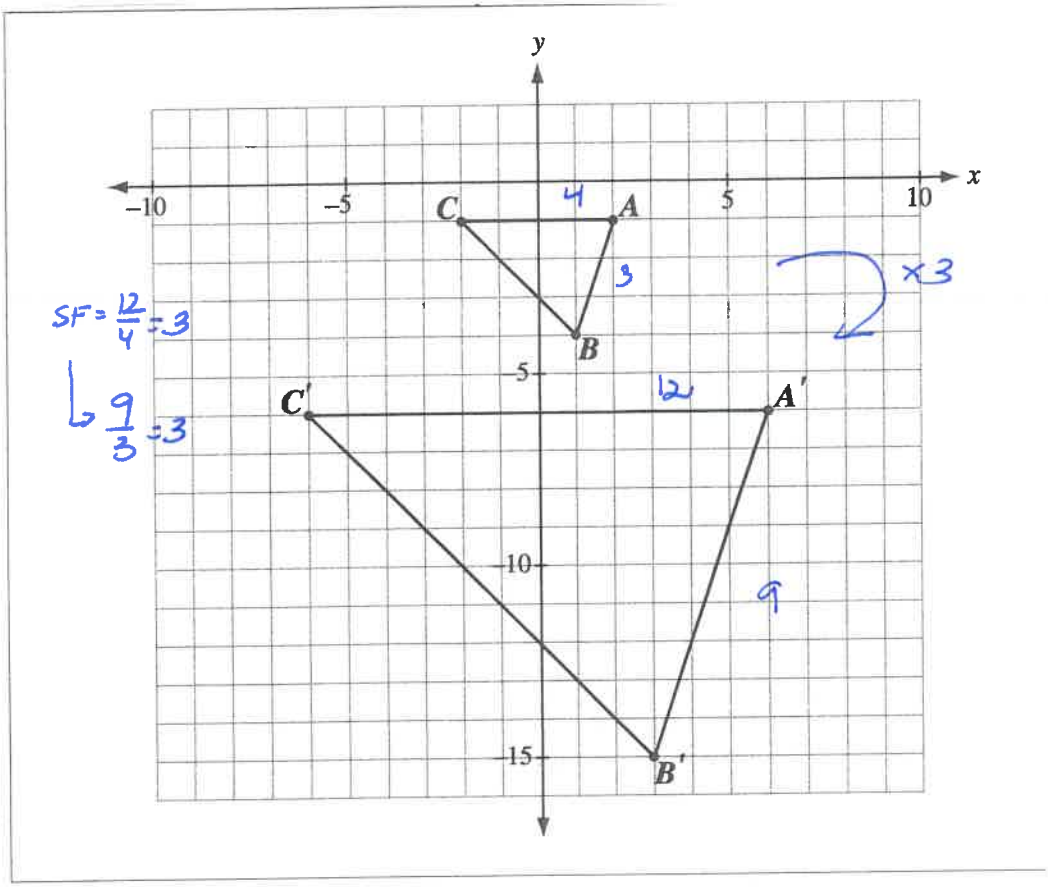
1.4 1.18

$\frac{63}{45}$ $\frac{32}{27}$

Numerical Response

3. Considering the blade length and the height of each wind turbine, the two turbines that are proportional to each other are turbines 2 and 3.

(Record **both digits** of your answer **in any order** in the numerical-response section on the answer sheet.)



Numerical Response

9. What is the scale factor of the enlargement?

Answer: 3

(Record your answer in the numerical-response section on the answer sheet.)

In the diagram below, x represents the approximate distance across a circular lake.

17.7

Strategy:
- Draw the two triangles separately
- Pay attention to the dimensions!

Area of circle

$A = r^2\pi$

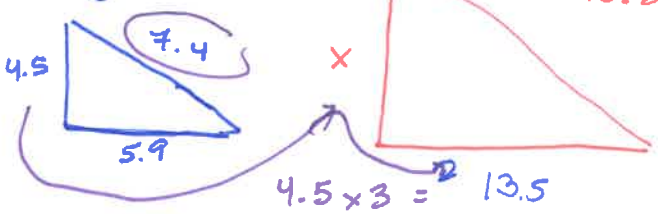
If $d = 13.5$ km then $r = 6.75$ km

$A = (6.75)^2\pi$ km^2

8. What is the approximate area of the lake, to the nearest square kilometre?

A. 599 km^2
B. 272 km^2
C. 150 km^2
D. 68 km^2

Triangle 1



SF: $\frac{22.4}{7.4} = 3$

3 enlargement