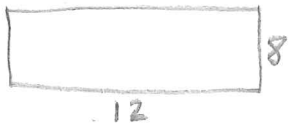
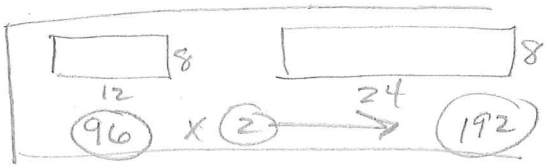
Name Key Date _____ Block ____ Log # ____

Changing Dimensions for Area & Volume

1. Draw a rectangle with a length of 12 cm and a width of 8 cm. Find the area. $96\ cm^2$

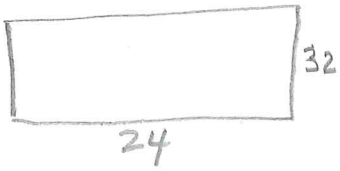


$A = bh$
$= 8 \cdot 12$
$= 96\ cm^2$



Apply a scale factor of 2 to the length and 4 to the width. Draw the new rectangle and find the area. $768\ cm^2$

$L = 12 \cdot 2 = 24$
$W = 8 \cdot 4 = 32$



$A = bh$
$= 24 \cdot 32$
$= 768\ cm^2$

The new rectangle has an area that is 8 times greater than the area of the original rectangle.

2. Draw a rectangle with a length of 18 in and a width of 13 in. Find the area. . $234\ in^2$

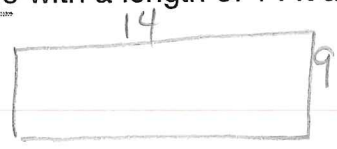
$A = bh$
$= 13 \cdot 18$
$A = 234\ in^2$

Apply a scale factor of 5 to the length and 3 to the width. Draw the new rectangle and find the area. $3510\ in^2$

$A = bh$
$= 90 \cdot 39$
$A = 3510\ in^2$

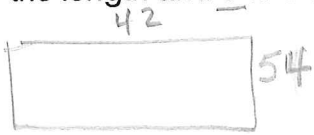
The new rectangle has an area that is 15 times greater than the area of the original rectangle.

3. Draw a rectangle with a length of 14 ft and a width of 9 ft. Find the area. . $126\ ft^2$



$A = bh$
$= 14 \cdot 9$
$A = 126\ ft^2$

Apply a scale factor of 3 to the length and 6 to the width. Draw the new rectangle and find the area. $2268\ ft^2$



$A = bh$
$= 42 \cdot 54$
$A = 2268\ ft^2$

The new rectangle has an area that is 18 times greater than the area of the original rectangle.

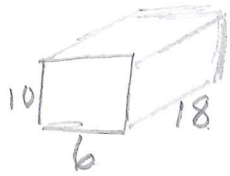
Describe the relationship that you see: Answers will vary: (Possible answer) A learned that multiplying the 2 scale factors together will give me the scale factor that was applied to the new figure.

4. Draw a rectangular prism with a length of 6 cm, a width of 3 cm, and a height of 2 cm. Find the volume. 36 cm³

Vol = Bh
= 18 · 2
Vol = 36

A = bh
= 3 · 6
A = 18 cm²
Area of the Base (B)

Apply a scale factor of 3 to the length, 2 to the width, and 5 to the height. Draw the new rectangular prism and find the volume. 1080 cm²

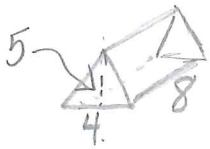


Vol = Bh
= 108 · 10
Vol = 1080

A = bh
= 6 · 18
= 108 cm²
Area of the Base (B)

The new rectangular prism has a volume that is 30 times greater than the volume of the original rectangular prism.

5. Draw a triangular prism with a base of 4 ft, a height of 5 ft, and a depth of 8 ft. Find the volume. 80 ft³



Vol = Bh
= 10 · 8
Vol = 80 ft³

Area of Δ
A = ½bh
= ½ 4 · 5
A = 10 ft² Area of the Base (B)

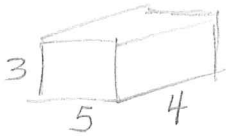
Apply a scale factor of 2 to base, 4 to the height, and 2 to the depth. Draw the new triangular prism and find the volume. 1280 ft³

Vol = Bh
= 80 · 16
Vol = 1280 ft³

A = ½bh
= ½ 8 · 20
A = 80 ft²
Area of the Base (B)

The new triangular prism has a volume that is 16 times greater than the volume of the original triangular prism.

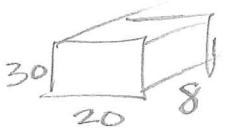
6. Draw a rectangular prism with a length of 4 in, a width of 5 in, and a height of 3 in. Find the volume. 60 in³



Vol = Bh
= 20.3
Vol = 60 in³

A = bh
= 5.4
A = 20 in²
Area of the Base (B)

Apply a scale factor of 2 to the length, 4 to the width and 10 to the height. Draw the new rectangular prism and find the volume. 4800 in³



Vol = Bh
= 160 · 30
Vol = 4800 in³

A = bh
= 20 · 8
A = 160 in²
Area of the Base (B)

The new rectangular prism has a volume that is 80 times greater than the volume of the original rectangular prism.

Describe the relationship that you see: Answers will vary

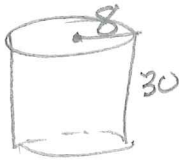
Possible answer:
I noticed that if I multiplied each scale factor that was applied to the original shape together it was equal to how many times greater the new shape was to the original shape.

7. Draw a cylinder with a radius of 4 in and a height of 10 in. Find the volume. 502.4 in³

Vol = Bh
= 50.24 · 10
Vol = 502.4 in³

A = πr²
= 3.14 · 4²
= 3.14 · 16
A = 50.24

Apply a scale factor of 2 to the radius and 3 to the height. Draw the new cylinder and find the volume. 6028.8 in³



Vol = Bh
= 200.96(30)
Vol = 6028.8 in³

A = πr²
= 3.14 · 8²
= 3.14 · 64
A = 200.96

The new cylinder has a volume that is 12 times greater than the volume of the original cylinder.

I noticed that the area of the base of the original cylinder was 50.24 in². The area of the base of the new cylinder was 200.96 in² which means the new area is 4 times the original base. Then 4 times the scale factor of 3 applied to the height is 12.

6028.8 ÷ 502.4 = 12
Vol. orig. Vol. new

8. Draw a cylinder with a radius of 3 ft and a height of 8 ft. Find the volume. 226.08ft³

Vol = Bh
= 28.26 · 8
Vol = 226.08ft³

A = πr²
= 3.14 · 3²
A = 28.26

Apply a scale factor of 3 to the radius and 5 to the height. Draw the new cylinder and find the volume. 10,173.6ft³

Vol = Bh
= 254.34 · 40
Vol = 10,173.6ft³

A = πr²
= 3.14 · 9²
A = 254.34

The new cylinder has a volume that is 45 times greater than the volume of the original cylinder.

10,173.6 ÷ 226.08 = 45

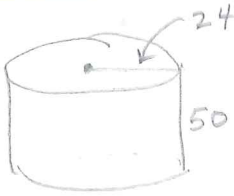
radius = 3 × scale factor of 3 = 9 × height of 5 = 45

9. Draw a cylinder with a radius of 6 cm and a height of 5 cm. Find the volume. 565.2 cm³

Vol = Bh
= (113.04)5
Vol = 565.2cm³

Area = πr²
= 3.14 · 6²
= 3.14 · 36
A = 113.04cm²

Apply a scale factor of 4 to the radius and 10 to the height. Draw the new cylinder and find the volume. 90432cm³



Vol = Bh
= (1808.64)50
Vol = 90432 cm³

Area = πr²
= (3.14)24²
= (3.14)576
A = 1808.64cm²

The new cylinder has a volume that is 160 times greater than the volume of the original cylinder.

90432 ÷ 565.2 = 160

r = 4 × scale factor of 4 = 16 × scale factor of 10 to height = 160

Describe the relationship that you see:

Answers will vary:

Since the radius is squared for B, then you square the scale factor applied to the radius ($4^2 = 16$) then multiply that by the scale factor applied to the height which is 10, therefore 16 × 10 = 160.

Since the radius is squared for B, then you square the scale factor applied to the radius ($3^2 = 9$) then multiply that by the scale factor applied to the height which is 5, therefore 9 × 5 = 45!