

## Curriculum Outcome

(N5) Determine the square root of positive rational numbers that are perfect squares.

(N6) Determine an approximate square root of positive rational numbers that are non-perfect squares.

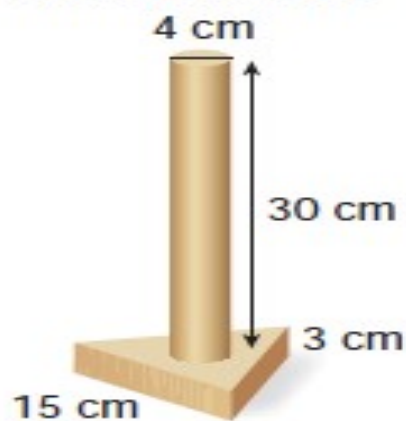
(SS2) Determine the surface area of composite 3-D objects to solve problems

(N4) \*\*Explain and apply the order of operations, including exponents, with and without technology.\*\*

# Warm Up

## Apply

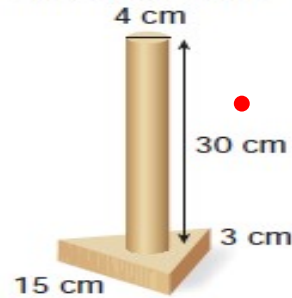
6. Here is the lamp stand from the top of page 33. The base of the lamp is a triangular prism with an equilateral triangle base. The surface of the stand is to be painted. What is the area that will be painted? Give the answer to the nearest whole number.



# Warm Up

## Apply

6. Here is the lamp stand from the top of page 33. The base of the lamp is a triangular prism with an equilateral triangle base. The surface of the stand is to be painted. What is the area that will be painted? Give the answer to the nearest whole number.



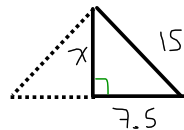
Cylinder:  $r = \underline{\quad}$ ,  $h = \underline{\quad}$

$$SA = 2\pi r^2 + 2\pi r h$$

$$SA = 2(3.14)(2)^2 + 2(3.14)(2)(30)$$

$$SA = 25.12 + 376.8$$

$$SA = 401.92$$



$$a^2 = c^2 - b^2$$

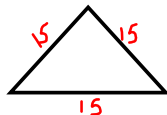
$$a^2 = 15^2 - 7.5^2$$

$$a^2 = 225 - 56.25$$

$$a^2 = 168.75$$

$$a = 13$$

-triangular prism

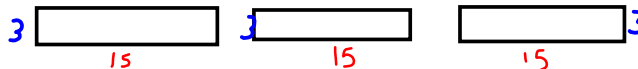


$$A = \frac{b \times h}{2}$$

$$= \frac{15 \times 13}{2}$$

$$= 97.5$$

$$2A = 195$$



$$A = b \times h$$

$$= 45$$

$$A = b \times h$$

$$= 45$$

$$A = b \times h$$

$$= 45$$

$$SA = 195 + 45 + 45 + 45$$

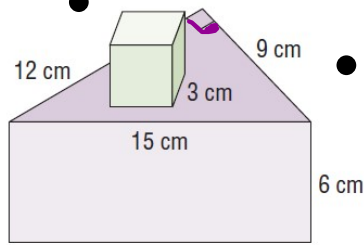
$$= 330 \text{ cm}^2$$

$$TSA = \text{cyl} + \text{prism} - \text{overlap}$$

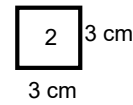
$$= 401.92 + 330 - 25.12$$

$$= 706.8 \text{ cm}^2$$

d) cube on a triangular prism



Overlap



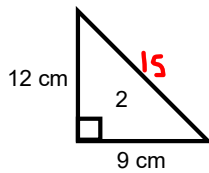
$$A = b \times h$$

$$A = 3 \times 3$$

$$A = 9 \text{ cm}^2$$

$$2A = 18 \text{ cm}^2$$

Triangular Prism



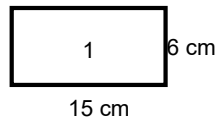
$$A = \frac{b \times h}{2}$$

$$A = \frac{9 \times 12}{2}$$

$$A = \frac{108}{2}$$

$$A = 54$$

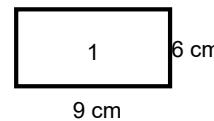
$$2A = 108 \text{ cm}^2$$



$$A = b \times h$$

$$A = 15 \times 6$$

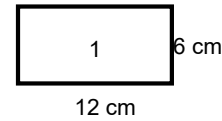
$$A = 90 \text{ cm}^2$$



$$A = b \times h$$

$$A = 9 \times 6$$

$$A = 54 \text{ cm}^2$$



$$A = b \times h$$

$$A = 12 \times 6$$

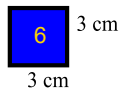
$$A = 72 \text{ cm}^2$$

$$\text{Total SA Large} = 2 \text{ Triangles} + \text{Side} + \text{Side} + \text{Side}$$

$$= 108 + 90 + 54 + 72$$

$$= 324 \text{ cm}^2$$

Cube



$$A = b \times h$$

$$A = 3 \times 3$$

$$A = 9 \text{ cm}^2$$

$$\text{Area} = 6 \text{ faces} \times (\text{area of one face})$$

$$= 6 \times (9 \text{ cm}^2)$$

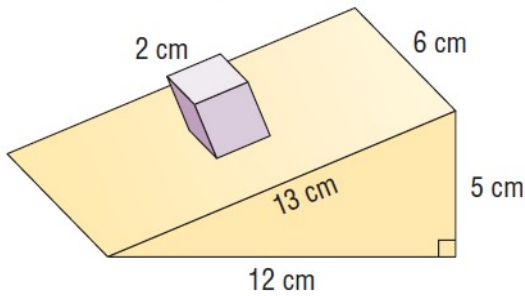
$$= 54 \text{ cm}^2$$

$$\text{Total SA} = \text{Triangular Prism} + \text{Cube} - \text{Overlap}$$

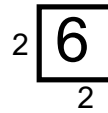
$$= 324 \text{ cm}^2 + 54 \text{ cm}^2 - 18 \text{ cm}^2$$

$$= 360 \text{ cm}^2$$

3) e) cube on a triangular prism



Cube (2,2,2)



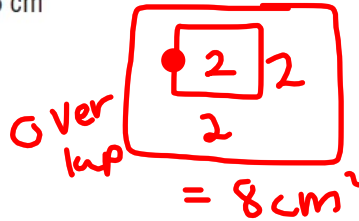
$$A = b \times h$$

$$A = 2\text{ cm} \times 2\text{ cm}$$

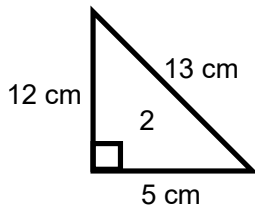
$$A = 4\text{ cm}^2$$

$$\times 6$$

$$= 24\text{ cm}^2$$



Triangular Prism



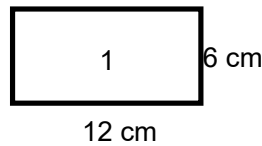
$$A = \frac{b \times h}{2}$$

$$A = \frac{5 \times 12}{2}$$

$$A = \frac{60}{2}$$

$$A = 30$$

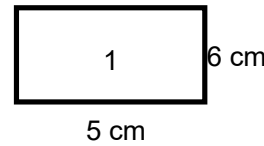
$$2A = 60\text{ cm}^2$$



$$A = b \times h$$

$$A = 12 \times 6$$

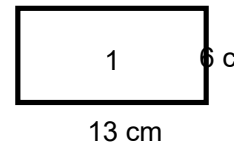
$$A = 72\text{ cm}^2$$



$$A = b \times h$$

$$A = 5 \times 6$$

$$A = 30\text{ cm}^2$$



$$A = b \times h$$

$$A = 13 \times 6$$

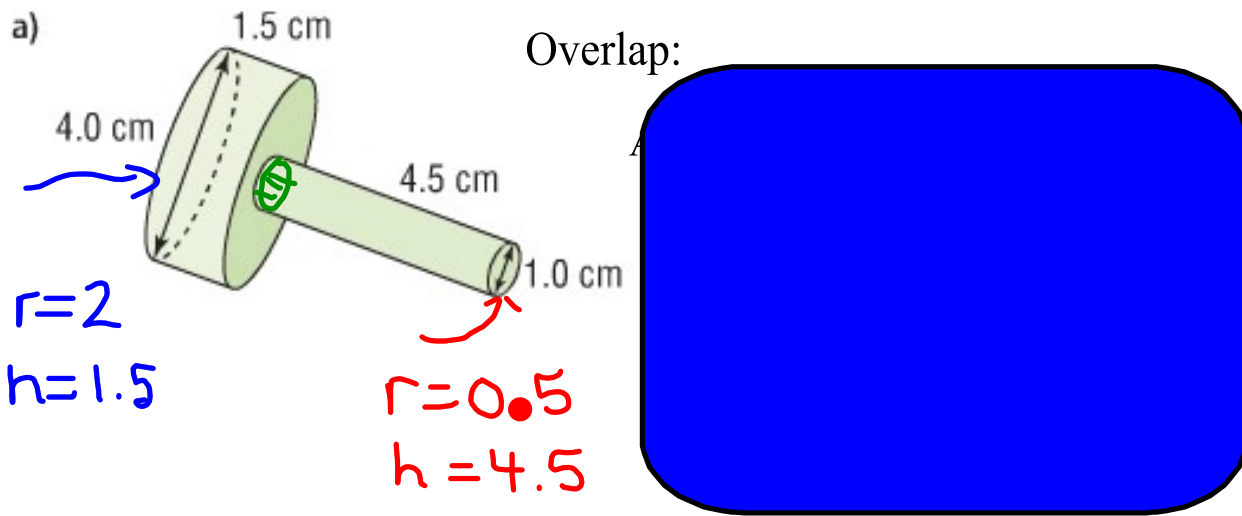
$$A = 78\text{ cm}^2$$

$$SA_{\text{Large}} = 60 + 72 + 30 + 78$$

$$= 240\text{ cm}^2$$

$$\begin{aligned} \text{Total SA} &= \text{Triangular Prism} + \text{Cube} - \text{Overlap} \\ &= 240\text{ cm}^2 + 24\text{ cm}^2 - 8\text{ cm}^2 \\ &= 256\text{ cm}^2 \end{aligned}$$

4



Top

$$\begin{aligned} \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\ &= 2(3.14)(2\text{cm})^2 + 2(3.14)(2\text{cm})(1.5\text{cm}) \\ &= 2(3.14)(4\text{cm}) + 2(3.14)(2\text{cm})(1.5\text{cm}) \\ &= 25.12 \text{ cm}^2 + 18.84 \text{ cm}^2 \\ &= 43.96 \text{ cm}^2 \end{aligned}$$

Long

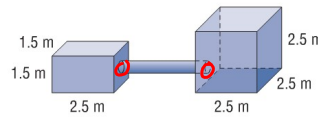
Overlap

$$\begin{aligned} \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\ &= 2(3.14)(0.5\text{cm})^2 + 2(3.14)(0.5\text{cm})(4.5\text{cm}) \\ &= 2(3.14)(0.25\text{cm}) + 2(3.14)(0.5\text{cm})(4.5\text{cm}) \\ &= 1.57 \text{ cm}^2 + 14.13 \text{ cm}^2 \\ &= 15.7 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Total SA} &= \text{Cylinder} + \text{Cylinder} - \text{Overlap} \\ &= 43.96 \text{ cm}^2 + 15.7 \text{ cm}^2 - 1.57 \text{ cm}^2 \\ &= 58.09 \text{ cm}^2 \\ &= 58.1 \text{ cm}^2 \end{aligned}$$

Solutions Homework solutions

- 4 b) The cylinder is 3.5 m long with diameter 0.5 m.



overlap 1

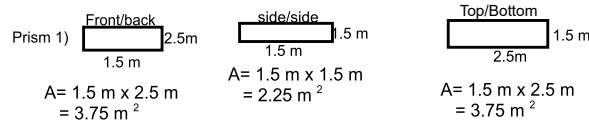
$$\begin{aligned}
 A &= \pi r^2 \\
 &= (3.14) (0.25\text{m})^2 \\
 &= (3.14) (0.0625\text{m}) \\
 &= 0.19625\text{m}^2 \\
 &\quad \underline{\times 2 \text{ for face involved}} \\
 &= 0.3925\text{m}^2
 \end{aligned}$$

Overlap 2

$$\begin{aligned}
 A &= \pi r^2 \\
 &= (3.14) (0.25\text{m})^2 \\
 &= (3.14) (0.0625\text{m}) \\
 &= 0.19625\text{m}^2 \\
 &\quad \underline{\times 2 \text{ for face involved}} \\
 &= 0.3925\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{total overlap} &= \text{overlap 1} + \text{overlap 2} \\
 &= 0.3925\text{m}^2 + 0.3925\text{m}^2 \\
 &= 0.785\text{m}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\
 &= 2(3.14)(0.25\text{m})^2 + 2(3.14)(0.25\text{m})(3.5\text{m}) \\
 &= 2(3.14)(0.0625\text{m}^2) + 2(3.14)(0.25\text{m})(3.5\text{m}) \\
 &= 0.3925\text{m}^2 + 5.495\text{m}^2 \\
 &= 5.8875\text{m}^2
 \end{aligned}$$



$$\begin{aligned}
 \text{SA Prism 1} &= 2(3.75\text{m}^2) + 2(2.25\text{m}^2) + 2(3.75\text{m}^2) \\
 &= 7.5\text{m}^2 + 4.5\text{m}^2 + 7.5\text{m}^2 \\
 &= 19.5\text{m}^2
 \end{aligned}$$

Cube)

$$\begin{aligned}
 \text{Surface area of 1 face} &= 2.5\text{m} \times 2.5\text{m} \\
 &= 6.25\text{m}^2 \\
 &\quad \underline{\times 6 \leftarrow 6 \text{ equal faces}} \\
 &= 37.5\text{m}^2
 \end{aligned}$$

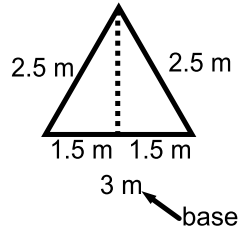
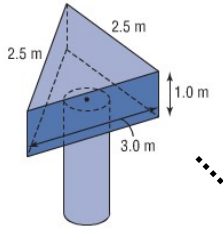
$$\begin{aligned}
 \text{Total SA} &= \text{Rectangular Prism} + \text{Cube} + \text{Cylinder} - \text{Total Overlap} \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.8875\text{m}^2 - 0.785\text{m}^2 \\
 &= 61.6025\text{m}^2
 \end{aligned}$$

Or if you rounded to the nearest tenth

$$\begin{aligned}
 \text{Total SA} &= \text{Rectangular Prism} + \text{Cube} + \text{Cylinder} - \text{Total Overlap} \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.8875\text{m}^2 - 0.785\text{m}^2 \\
 &= 19.5\text{m}^2 + 37.5\text{m}^2 + 5.9\text{m}^2 - 0.8\text{m}^2 \\
 &= 62.1\text{m}^2
 \end{aligned}$$

5. Determine the surface area of each composite object.

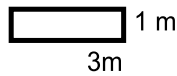
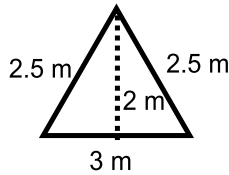
a) The cylinder is 2.5 m long with radius 0.5 m.



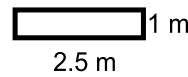
$$\begin{aligned} \text{height}^2 &= c^2 - b^2 \\ &= (2.5 \text{ m})^2 - (1.5 \text{ m})^2 \\ &= 6.25 \text{ m}^2 - 2.25 \text{ m}^2 \\ &= 4 \text{ m}^2 \\ \text{height} &= \sqrt{4 \text{ m}^2} \\ \text{height} &= 2 \text{ m} \end{aligned}$$

**Triangular prism**

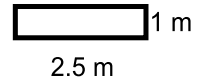
$$\begin{aligned} A &= \frac{b \times h}{2} \\ A &= \frac{3 \text{ m} \times 2 \text{ m}}{2} \\ A &= \frac{6 \text{ m}^2}{2} \\ A &= 3 \text{ m}^2 \end{aligned}$$



$$\begin{aligned} A &= b \times h \\ &= 3 \text{ m} \times 1 \text{ m} \\ &= 3 \text{ m}^2 \end{aligned}$$



$$\begin{aligned} A &= b \times h \\ &= 2.5 \text{ m} \times 1 \text{ m} \\ &= 2.5 \text{ m}^2 \end{aligned}$$



$$\begin{aligned} A &= b \times h \\ &= 2.5 \text{ m} \times 1 \text{ m} \\ &= 2.5 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Total SA Triangular Prism} &= 2 \text{ triangles} + \text{rectangle} + \text{rectangle} + \text{rectangle} \\ &= 2 (3 \text{ m}^2) + 3 \text{ m}^2 + 2.5 \text{ m}^2 + 2.5 \text{ m}^2 \\ &= 6 \text{ m}^2 + 3 \text{ m}^2 + 2.5 \text{ m}^2 + 2.5 \text{ m}^2 \\ &= 14 \text{ m}^2 \end{aligned}$$

**Cylinder**

$$\begin{aligned} \text{Area of cylinder} &= 2\pi r^2 + 2\pi rh \\ &= 2(3.14)(0.5)^2 + 2(3.14)(0.5)(2.5) \\ &= 2(3.14)(0.25) + 2(3.14)(0.5)(2.5) \\ &= 1.57 \text{ m}^2 + 7.85 \text{ m}^2 \\ &= 9.42 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Total Surface} &= \text{Triangular Prism} + \text{Cylinder} - \text{total overlap} \\ &= 14 \text{ m}^2 + 9.42 \text{ m}^2 - 1.57 \text{ m}^2 \\ &= 21.85 \text{ m}^2 \end{aligned}$$



Test  
Friday Nov 29



Multiple choice and Square roots  
and perfect squares questions

Surface area of composite objects

## Test

### Square roots and perfect squares

$$\text{Area of a square} = (\text{side})^2$$

$$\text{Side of square} = \sqrt{\text{area of square}}$$

- square root is 2.4 means find the perfect square # so multiply by itself

- is it a perfect square

take the square root and if the decimal stops or repeats then the number was perfect

- square root of fraction take square root of top and bottom

or check top and bottom of a fraction

- bench marks find the perfect square that the number falls between

Perfect Squares: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

section 1.1 to 1.2

### Surface area of composite objects

section 1.3 & 1.4

## Perfect Squares

$$(1)^2 = 1 \times 1 = 1$$

$$(2)^2 = 2 \times 2 = 4$$

$$(3)^2 = 3 \times 3 = 9$$

$$(4)^2 = 4 \times 4 = 16$$

$$(5)^2 = 5 \times 5 = 25$$

$$(6)^2 = 6 \times 6 = 36$$

$$(7)^2 = 7 \times 7 = 49$$

$$(8)^2 = 8 \times 8 = 64$$

$$(9)^2 = 9 \times 9 = 81$$

$$(10)^2 = 10 \times 10 = 100$$

$$(11)^2 = 11 \times 11 = 121$$

$$(12)^2 = 12 \times 12 = 144$$

$$(13)^2 = 13 \times 13 = 169$$

$$(14)^2 = 14 \times 14 = 196$$

$$(15)^2 = 15 \times 15 = 225$$

$$(16)^2 = 16 \times 16 = 256$$

$$(17)^2 = 17 \times 17 = 289$$

$$(18)^2 = 18 \times 18 = 324$$

$$(19)^2 = 19 \times 19 = 361$$

$$(20)^2 = 20 \times 20 = 400$$

$$(21)^2 = 21 \times 21 = 441$$

$$(22)^2 = 22 \times 22 = 484$$

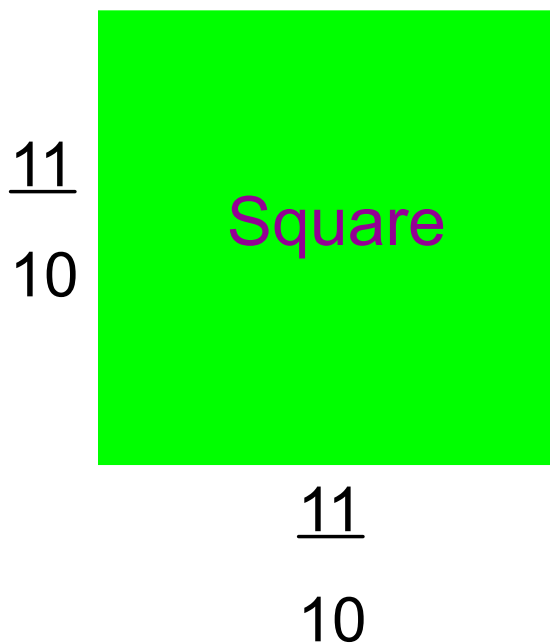
$$(23)^2 = 23 \times 23 = 529$$

$$(24)^2 = 24 \times 24 = 576$$

$$(25)^2 = 25 \times 25 = 625$$

What is the area of the following

What is the area?



$$A = b \times b$$

$$A = b^2$$

$$A = \left(\frac{11}{10}\right)^2$$

$$A = \frac{121}{100}$$

What is the perimeter?

$$P = 4 (\text{side})$$

$$= 4 \left(\frac{11}{10}\right)$$

$$= \frac{44}{10}$$

$$\text{Area of square} = \frac{49}{81} \text{ cm}^2$$

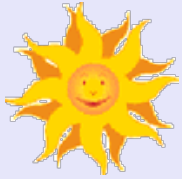
What is the length of the sides?

$$x = \frac{7}{9}$$

What is the perimeter of the square

$$P = \frac{28}{9}$$

$$\begin{aligned} P &= \frac{7}{9} + \frac{7}{9} + \frac{7}{9} + \frac{7}{9} \\ &= \frac{28}{9} \end{aligned}$$



Warm Up Math 9

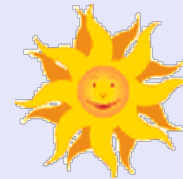
$$(\sqrt{x})^2 = (0.6)^2$$

1) Find the perfect square whose square root is

a) 0.6

$$\sqrt{x} = 0.6$$

•  $x = 0.36$



b)  $\frac{3}{5}$

$$\sqrt{y} = \frac{3}{5}$$

$$y = \frac{9}{25}$$

2) Is the following fractions or decimals perfect squares? Explain

a) 0.64

P.S

$$\sqrt{\frac{64}{100}} = \frac{8}{10}$$

b) 62.5

N.P.S

$$\sqrt{\frac{625}{10}} = \frac{25}{\text{?}}$$

c)  $\frac{49}{144}$

P.S

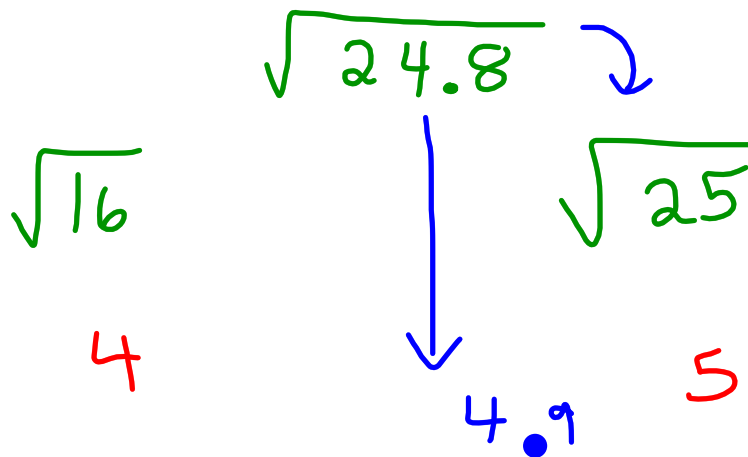
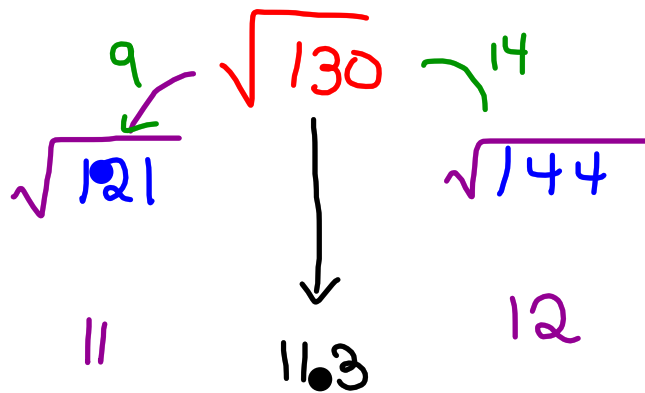
d)  $\frac{13}{25}$

N.P.S

$$\frac{72}{50} = \frac{36}{25}$$

P.S

Estimate the square root of 130



$$\sqrt{0.34}$$

$$\sqrt{\frac{25}{100}}$$

$$\frac{5}{10}$$

$$\frac{34}{100}$$



$$\frac{5.8}{10}$$

$$\boxed{0.58}$$

$$\sqrt{\frac{36}{100}}$$

$$\frac{6}{10}$$



### To Determine if a Fraction is a Perfect Square

**BOTH Numerator and Denominator MUST be Perfect Square Numbers**

\*\*\*Simplify fractions first \*\*\*

$$\frac{27 \div 9}{45 \div 9} = \frac{3}{5}$$

Is each fraction a perfect square? Explain

a)  $\frac{18 \div 2}{32 \div 2} = \frac{9}{16}$   
 $\sqrt{\frac{9}{16}}$   
 P.S.

b)  $\sqrt{\frac{4}{3}}$   
 N.P.S.

c)  $\sqrt{\frac{9}{25}}$   
 P.S.

## Identifying Decimals that are Perfect Squares

1.44

### Method 1

Write the decimal as a fraction

$$\frac{144}{100}$$

Simplify the fraction. Divide the numerator and denominator by 4.

$$\begin{aligned} 1.44 &= \frac{36}{25} \\ &= \frac{6}{5} \times \frac{6}{5} \end{aligned}$$

THUS 1.44 is a perfect square

### Method 2

Use a Calculator.

Use the square root button  $\sqrt{\quad}$

$$\sqrt{1.44} = 1.2$$

Since the square root is a terminating decimal then 1.44 is a perfect square.

Without a calculator

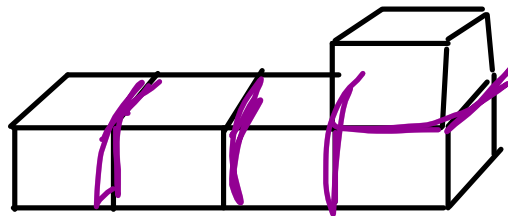
Determine if the decimal is a perfect square?

$$1.69$$
$$\sqrt{\frac{169}{100}}$$
$$\frac{13}{10}$$

perfect  
square

$$0.016$$
$$\sqrt{\frac{16}{1000}}$$
$$\frac{4}{?}$$

not perfect



$$1 \times 1 \times 1$$

$$A = b \times h$$

$$1 \times 1$$

$$1 \text{ cm}^2$$

$$5 \times 6 = 30 \text{ Faces} - \underline{4} \text{ overlap}$$

$$= 30 \text{ faces} - \underline{8} \text{ faces}$$

$$= 22 \text{ faces}$$

$$\times 1 \text{ cm}^2$$

---

$$22 \text{ cm}^2$$

Extra Practice Worksheets  
-all 4 sheets