Warmup

① Simplify

$$-3x\sqrt{4x^2} - 9\sqrt{81x^4}$$

$\underset{2\ 2}{\wedge}$ xx $\boxed{\begin{matrix}9 & 9\end{matrix}}$ $xxxx$

$-3x \cdot 2 \cdot x \quad -9 \cdot 9 \cdot x \cdot x$

$$-6x^2 - 81x^2$$

$$\boxed{-87x^2}$$

$x^2 \cdot x^2 = x^4$

$\dfrac{cm}{sec}$

② Simplify (show work)

$$-3\sqrt{2} + 9\sqrt{8} - 6\sqrt{8}$$

$\underset{2}{\wedge}\ \underset{2\ 2}{\wedge}\quad \underset{2}{\wedge}\ \underset{3\ 3}{\wedge}$

$$9 \cdot 2\sqrt{2} - 6 \cdot 3\sqrt{2}$$

$$-3\sqrt{2} + 18\sqrt{2} - 18\sqrt{2}$$

$$\boxed{-3\sqrt{2}}$$

③ Convert

450 km per day to cm per sec.

$$\frac{450\,km}{1\,day} \cdot \frac{1\,day}{24\,hr} \cdot \frac{1\,hr}{60\,mins} \cdot \frac{1\,min}{60\,sec}$$

$$= 0.00521 \cdot \frac{km}{sec}$$

move decimal 5 right

$$\boxed{521\ cm/sec}$$

Module 0.10

Relationships Between Quantities & Expressions

Name:

How would you define perimeter?

4 times side length

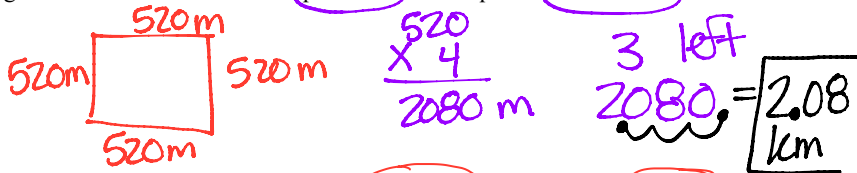How would you calculate the perimeter of a square?

Add all sides

Add all sides together *equal sides* *4*

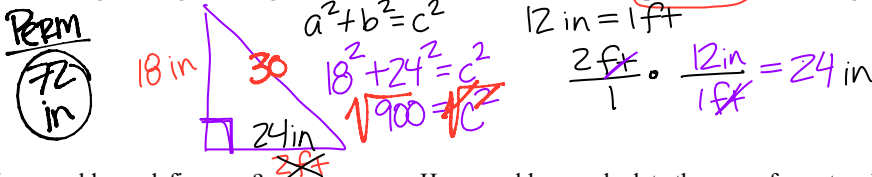1. A rectangle has a length of 30 cm and height of 53 mm. What is the perimeter of this rectangle in centimeters?

30cm

5.3 cm

53mm ~~5.3 cm~~

30cm

53. left 1

$5.3+53+30+30=\boxed{70.6 \text{ cm}}$
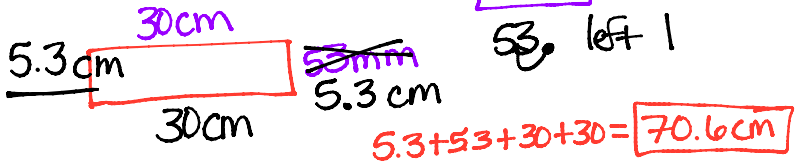
2. A rectangle has a length of 45 feet and height of 20 yards. What is the perimeter of this rectangle in feet?

45 ft

60 ft $\boxed{\bigcirc\!\!210 \text{ ft}}$ ~~20 yds~~ 60 ft

45 ft

1 yd = 3 ft

$\dfrac{20 \text{ yds}}{1} \cdot \dfrac{3 \text{ ft}}{1 \text{ yds}} = 60$ ft

3. A square has a side length of 520 meters. What is the perimeter of the square in kilometers?

520 m

520m $\square$ 520 m

520m

$\begin{array}{r} 520 \\ \times\ 4 \\ \hline 2080 \text{ m} \end{array}$

3 left

$2080. = \boxed{2.08 \text{ km}}$

4. A right triangle has legs of 2 feet and 18 inches. What is the perimeter of the triangle in inches?

Perm

$\boxed{72}$ in

18 in 30 24 in

$a^2 + b^2 = c^2$

$18^2 + 24^2 = c^2$

$\sqrt{900} = \sqrt{c^2}$

12 in = 1 ft

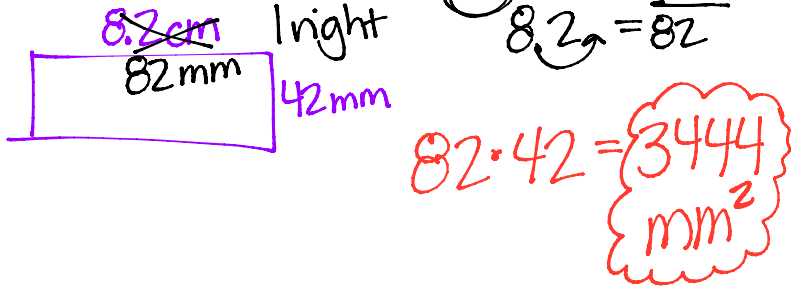$\dfrac{2 \text{ ft}}{1} \cdot \dfrac{12 \text{ in}}{1 \text{ ft}} = 24$ in

How would you define area?

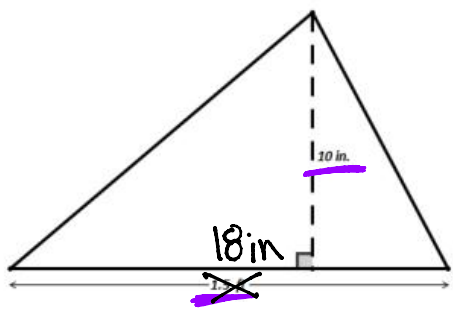Multiply → $\ell \cdot w$ > square rectangle

bh

How would you calculate the area of a rectangle? A triangle?

Area triangle $= \dfrac{1}{2} \cdot b \cdot h$

5. A rectangle has a length of 8.2 cm and a height of 42 mm. What is the area of the square in square millimeters?

8.2 cm

82 mm 1 right 42 mm

$8.2 = 82$

$82 \cdot 42 = \boxed{3444 \text{ mm}^2}$

6. Find the area of the triangle shown below in square inches.

$\frac{1}{2}bh$

$\frac{1.5\,ft}{1} \cdot \frac{12\,in}{1\,ft} = 18\,in$

$\frac{1}{2} \cdot 18 \cdot 10 = 90\,in^2$

10 in.

18 in

7. A square has a side of length 1.6 yards. What is the area of the square in square inches?
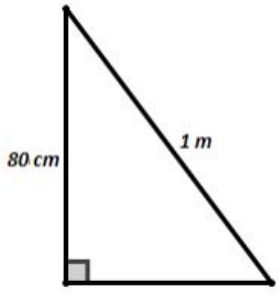
$1\,yd = 3ft$
$1ft = 12in$

57.6 in²

1.6 yd
57.6 in

$\frac{1.6\,yd}{1} \cdot \frac{3\,ft}{1\,yd} \cdot \frac{12\,in}{1\,ft}$

$57.6(57.6) = 3317.76\,in^2$

8. Find the area of the triangle shown below in square centimeters.
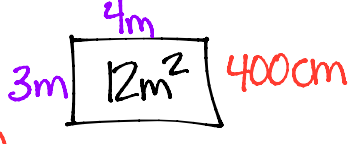

80 cm   1 m

9. A rectangle has an area of 12m² and a length of 400 cm. What is the width of the rectangle?
   a. 3 cm   b. 30 cm   c. 300 cm   d. 3000 cm

2 right
$\frac{400}{3.w}$

$3.w = 300\,cm$

4m
3m 12m² 400cm

10. The length of a football field is 100 yards. Which of the following would be equivalent (the same) to the length of a football field?
    a. 300 feet   b. 100 meters   c. 9,144 cm   d. 914.4 cm   e. 10,000 cm

100 yds

$1\,yd = 3ft$

$1m = 39.37\,in$
$1ft = 12\,in$

$\frac{100\,yds}{1} \cdot \frac{3\,ft}{1\,yd} = 300\,ft \cdot \frac{12\,in}{1} \cdot \frac{1\,m}{39.37\,in} = 91.44\,m$

$91.44 \rightarrow 9144\,cm$