Lesson 1-4: Formulas

Agenda

- Check and Review Homework 1-3
- Warm Up Quiz *Need Pouch
- Lesson 1-4 Notes

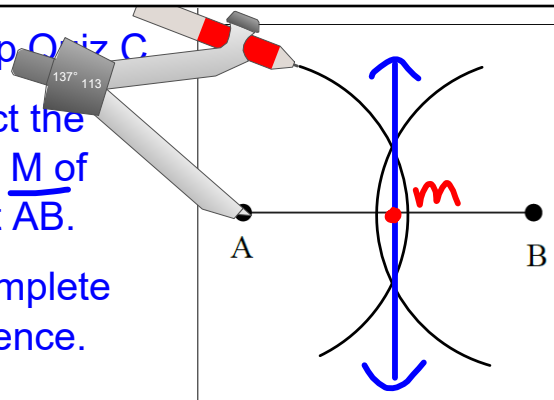
Homework

Worksheet 1-4

Warm Up Quiz C

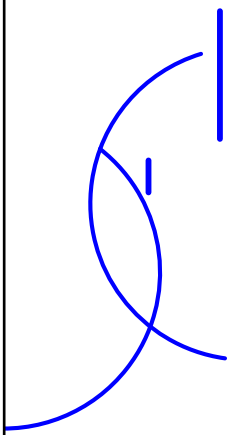
Construct the midpoint M of segment AB.

Then complete the sentence.



$\overline{AM} \cong \overline{MB}$ because

MIDPOINT → 2 ≅ SEGMENTS

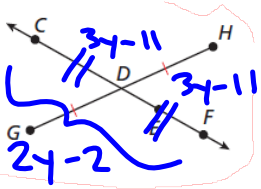


Lesson 1-3 Book Homework Answers
PP 17-18: #17,18, 23,25

17. **Multi-Step** E is the midpoint of $\overline{DF}$, $DE = 2x + 4$, and $EF = 3x - 1$. Find DE, EF, and DF. $DE = EF = 14$; $DF = 28$

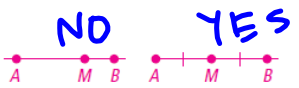
18. Q bisects $\overline{PR}$, $PQ = 3y$, and $PR = 42$. Find y and QR. $y = 7$; $QR = 21$

23. $\overline{GH}$ bisects $\overline{CF}$, $CF = 2y - 2$, and $CD = 3y - 11$. Find CD. 4



Tell whether each statement is sometimes, always, or never true. Support each of your answers with a sketch.

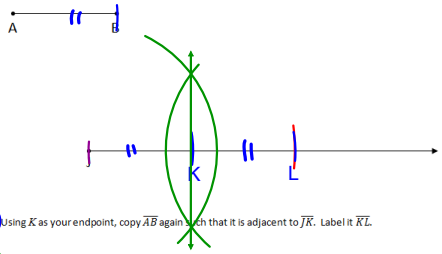
25. If M is between A and B, then M bisects $\overline{AB}$. S;



Lesson 1-3 Worksheet Answers

1. Follow the steps and answer the questions:

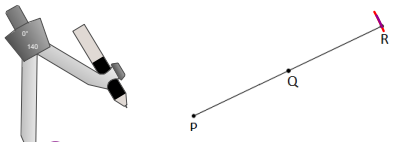
a. Using your compass and a straightedge, copy $\overline{AB}$ and label it $\overline{JK}$.



b. Using K as your endpoint, copy $\overline{AB}$ again such that it is adjacent to $\overline{JK}$. Label it $\overline{KL}$.

c. Verify that K is the midpoint of $\overline{JL}$ using a geometric construction.

d. Using your compass, compare the lengths of your constructed segment $\overline{JL}$ and the segment $\overline{PR}$ with midpoint Q below. What is their relationship? They are congruent since they have equal lengths

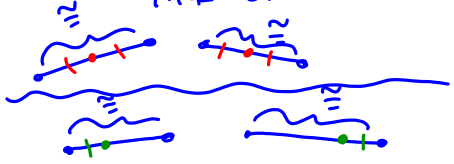


e. Using your compass, compare the lengths of your constructed segment $\overline{JK}$ and the segment $\overline{QR}$ below. What is their relationship? They are congruent since they have equal lengths

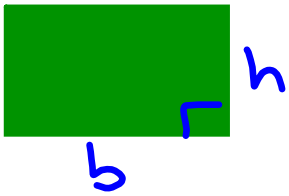
f. What do you predict is the relationship between $\overline{KL}$ and $\overline{PQ}$? Congruent

Why? They are congruent since halves of congruent segments would be congruent

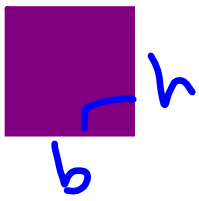
HALVES OF ≅ SEGMENTS ARE CONGRUENT



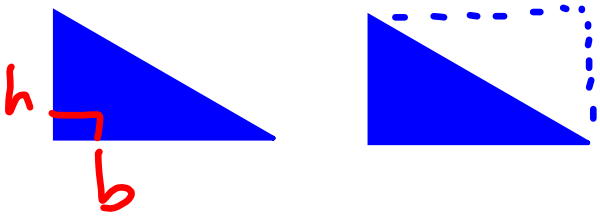
How do we find the area of a rectangle?



How does a square relate to a rectangle?

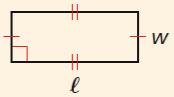
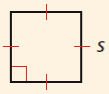
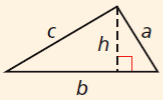


How does the area of a triangle relate to a rectangle?

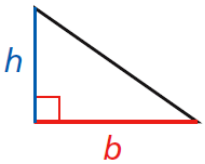


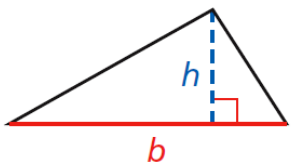
$\frac{1}{2}bh$ $\frac{bh}{2}$

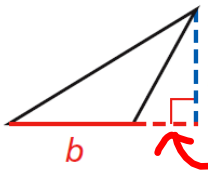
Perimeter and Area

RECTANGLE	SQUARE	TRIANGLE
		
$P = 2\ell + 2w$ or $2(\ell + w)$ $A = \ell w$	$P = 4s$ $A = s^2$	$P = a + b + c$ $A = \frac{1}{2}bh$ or $\frac{bh}{2}$

The base b can be any side of the triangle.
The height h is a segment from a vertex that forms a **right angle** with the base





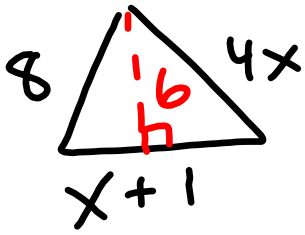


NOT PART OF b

Perimeter Units: LINEAR FT, CM, MI vs. Area Units: SQUARED FT^2, cm^2, mi^2

Finding Perimeter and Area:

1) Find the perimeter and area of a triangle with base = (x+1), height = 6, and sides of 8 and 4x.



$P = x+1 + 8 + 4x$

$P = 5x+9$ UNITS

$A = \frac{bh}{2} = \frac{(x+1)(6)}{2}$

$= 3(x+1) = 3x+3$ UNITS^2

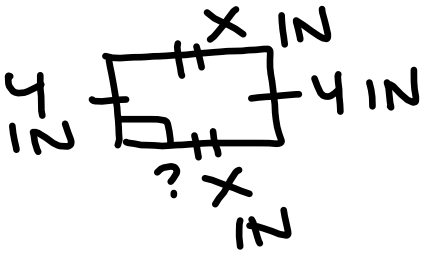
Finding Perimeter and Area:

1) Find the perimeter and area of a triangle with base = (x+1) meters, height = 6 meters, and sides of 8 meters and 4x meters.

Backsolving for a Missing Dimension:

2) A rectangle has a perimeter of 1 foot and a height of 4 in. Determine the width in inches.

$P = 1\,FT \cdot \frac{12\,IN}{1\,FT} = 12\,IN$?



LET = X

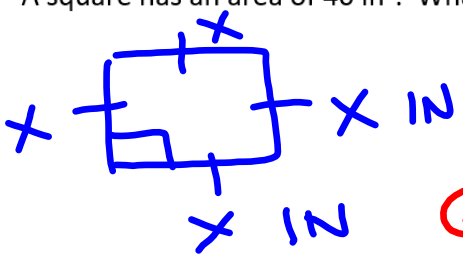
$P = x + 4 + x + 4$ IN

$12 = 2x + 8$

$4 = 2x \rightarrow x =$ 2 IN WIDTH

3) A square has an area of 40 in^2. What is the length of each side to the nearest tenth of an inch?

LET = X



$A = bh$

$40 = (x)(x)$

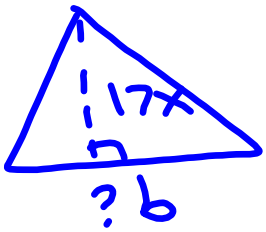
$\pm\sqrt{40} = \sqrt{x^2}$

≈ 6.3 IN SIDE

$6.3245\ldots = x$

4) A triangle has an area of $34x^2$ cm^2 and height of $17x$ cm. What is the length of the base in cm?

LET = b ✓



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

(2) $34x^2 = \frac{(b)(17x)}{2}$ (2) cm, cm^2

$68x^2 = (17x)b$ $x \neq 0$

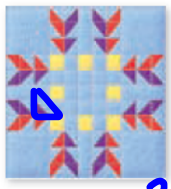
$\frac{68x^2}{17x} = b$

$4x = b$

4X cm BASE

Using Dimensional Analysis

5) The Texas Treasures quilt block consists of 24 purple triangles, each with a height and base of 3 in. Find the amount of fabric used to make the 24 triangles, to the nearest hundredth of a square foot.



$A_\Delta = \frac{bh}{2} = \frac{(3\text{IN})(3\text{IN})}{2} = \frac{9}{2}\text{ IN}^2$

24 Δ's: $24\left(\frac{9}{2}\text{IN}^2\right) = 108\text{ IN}^2$

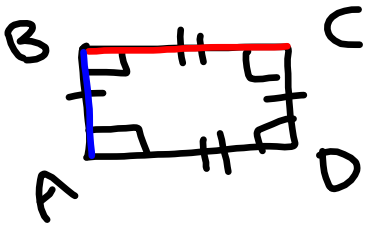
CONVERT: $108\ \text{IN}\cdot\text{IN} \cdot \frac{1\text{ FT}}{12\text{ IN}} \cdot \frac{1\text{ FT}}{12\text{ IN}}$

$108 \div (12 \times 12)$

0.75 FT^2

Using Letter Names as Segment Lengths

6) Given rectangle ABCD, determine the area in terms of AB and BC.



$A = bh$

$A = (BC)(AB)$

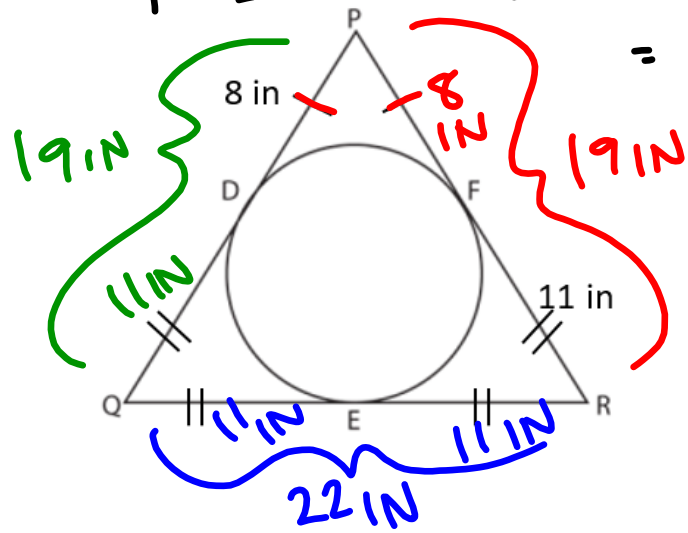
Incorporating Segment Addition/Subtraction to Find Missing Lengths

7) Determine the perimeter of triangle PQR in inches. ✓

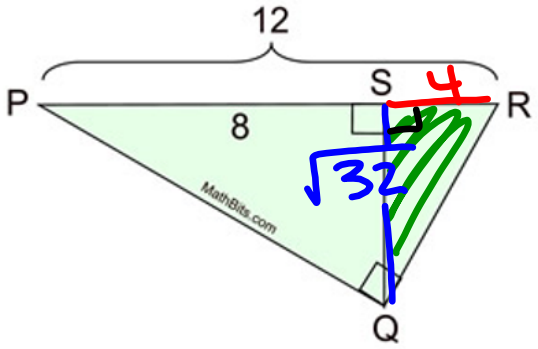
$P = PR + RQ + QP$

$= 19 + 22 + 19$ IN

$P = 60$ IN



8) When SQ=$\sqrt{32}$, determine the area of triangle SRQ to the nearest tenth.



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

$= \frac{4(\sqrt{32})}{2}$

$= 11.3137\ldots$

$= 11.3$ UNITS^2

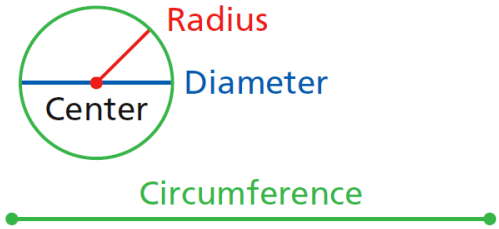
Circles:

Circumference: Distance around the circle.

Area: Enclosed space in the circle.

Radius: A segment whose endpoints are the center of the circle and a point on the circle. (Radius = ½diameter)

Diameter: a segment that passes through the center of the circle and whose endpoints are on the circle.



$C = 2\pi r$ OR πd

$A = \pi r^2$

$R = r$

$D = 2r$

Finding Area and Circumference

$(2y)^2 = (2y)(2y)$

9) Find the circumference and area of a circle with diameter of $4y$ cm.

$D = 4y$ cm

$R = 2y$ cm

$? \; A = \pi r^2 = \pi(2y)^2 = 4\pi y^2$ cm^2

$? \; C = 2\pi r = 2\pi(2y) = 4\pi y$ cm

Backsolving for a Missing Dimension

10) Find the radius of a circle whose area is 81π ft^2.

$A = 81\pi$ ft^2

$A = \pi r^2$

$81\pi = \pi r^2$

$\pm\sqrt{81} = \sqrt{r^2}$

$? \; R = 9$ ft

D

C

11) Determine the diameter of a circle whose circumference is 37 in, to the nearest hundredth of an inch.

$C = 37$ IN $= 2\pi r$

$\frac{37}{2\pi} = \frac{2\pi r}{2\pi}$

$R = 5.8887\ldots$ IN

$D = 2(5.8887\ldots)$

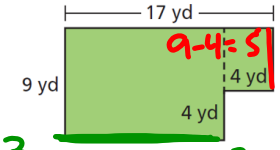
$= 11.7774\ldots$

≈ 11.78 IN

$\frac{37}{2\pi} = r$

Composite Shapes – Break into simple shapes for area and only walk around the perimeter.

12) A skate park consists of two adjacent rectangular regions. How much will it cost to redo the fencing will be needed in order to enclose the space if it costs \$153.47 for each 6-foot panel of eco-stone composite fence?



$9 - 4 = 5$

$17 - 4 = 13$

$P = 9 + 17 + 5 + 4 + 4 + 13$ YDS

$P = 52$ YDS $\cdot \frac{3\text{ FT}}{1\text{ YD}} = 156$ FT

PANELS: $156\text{ FT} \cdot \frac{1\text{ PANEL}}{6\text{ FT}} = 26$ PANELS

\$: $\frac{\$153.47}{1\text{ PANEL}} \cdot 26$ PANELS $= \$3990.22$