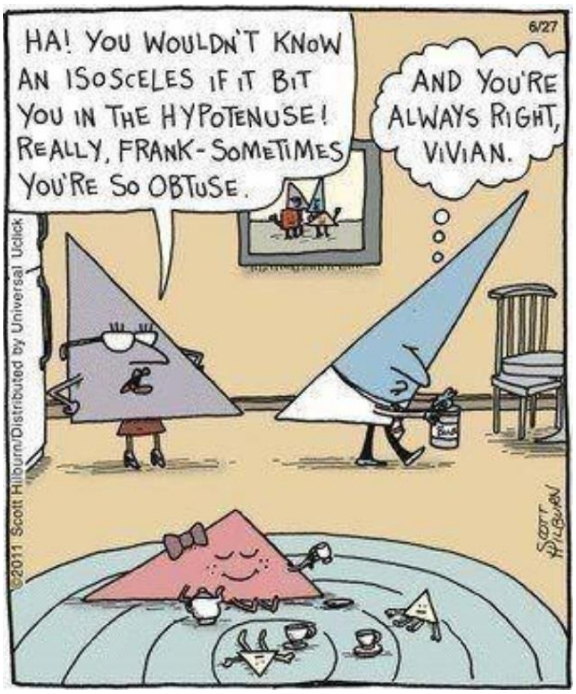
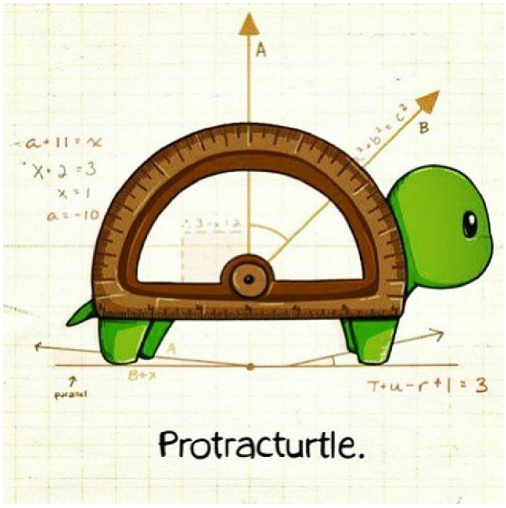
"Pi what squared? Long John, you should be able to get this."





MPM1DI

Unit 8: Geometry

Name: _____

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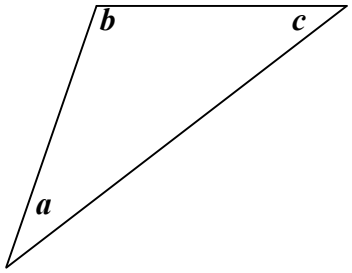
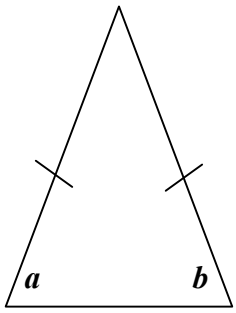
 Date: _____

Angle Properties – Part I

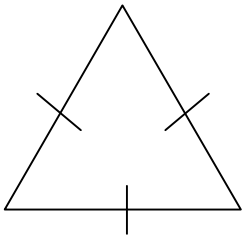
1. The **sum** of the **interior angles** of a **triangle** is _____.



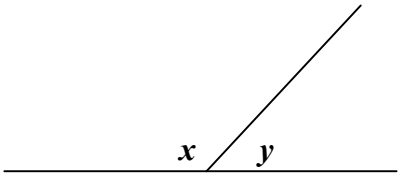
2. In an **isosceles** triangle the two equal angles are opposite the two equal sides.



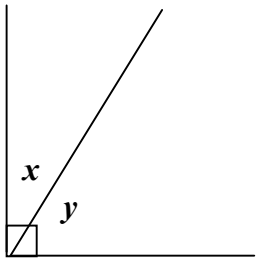
3. In an **equilateral** triangle all side lengths are equal and all angles are equal.
Each angle measures _____.



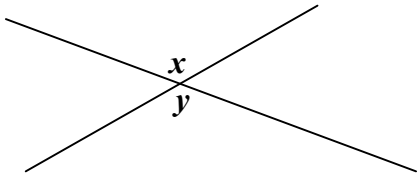
4. Supplementary angles add up to _____.



5. Complementary angles add up to _____.

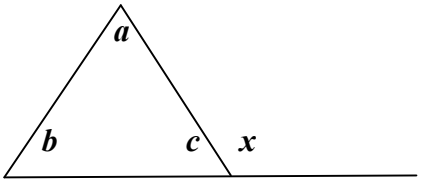


6. Opposite angles are _____.

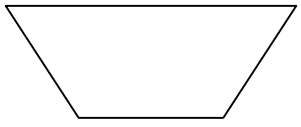


7. The **exterior angle of a triangle** is the sum of the two non-adjacent interior angles.

The **exterior angle** of a polygon and the **adjacent interior angle** are **supplementary**.



8. The **sum** of the **interior angles** of a **quadrilateral** is **_____**

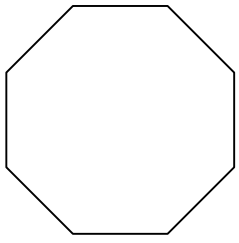


The **sum** of the **interior angles** of a **polygon** with ***n*** **sides is**

_____

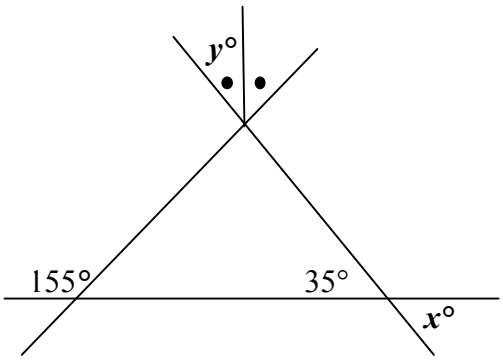
The **sum** of the **exterior angles** of an ***n*-gon** is _____ .

9. In a **regular polygon** or ***n*-gon**, all **interior angles** are equal and all **exterior angles** are equal.

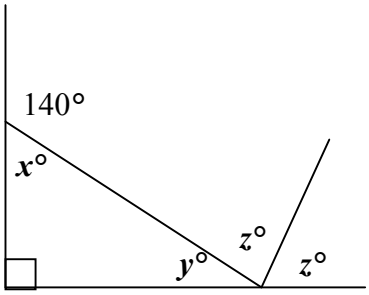


Examples: Determine the value of each unknown.

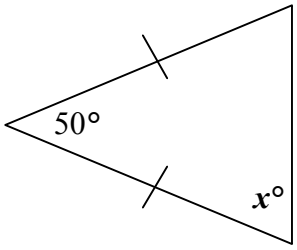
a)



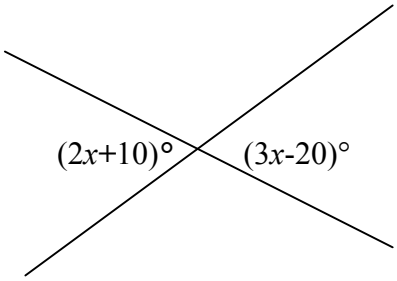
b)



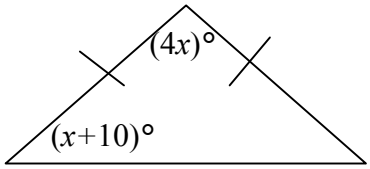
c)



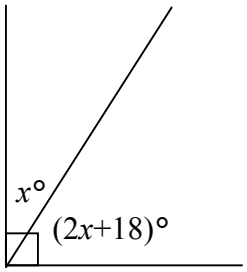
d)



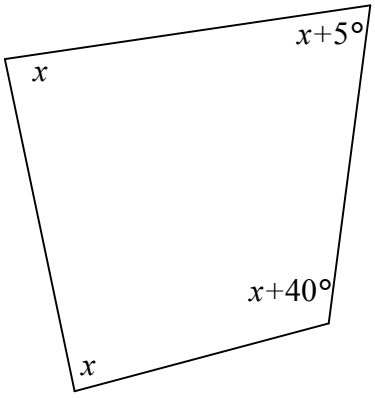
e)



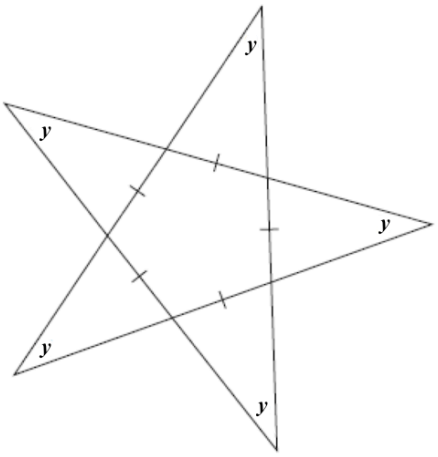
f)



g)



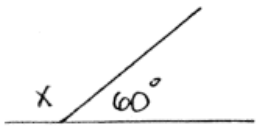
h)



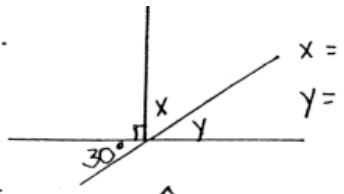
HW: Angles Worksheet - WS #1; p. 394 #1, 2 ***Reminder: Bring a scientific calculator to class for lesson 5!***

Worksheet #1

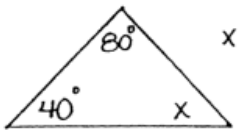
Date:_____

1. 

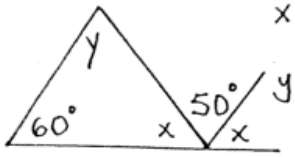
x =

2. 

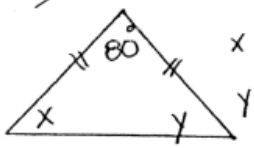
x =
y =

3. 

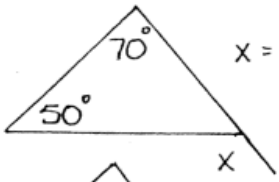
x =

4. 

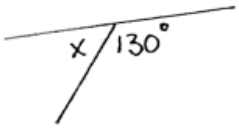
x =
y =

5. 

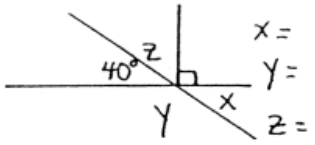
x =
y =

6. 

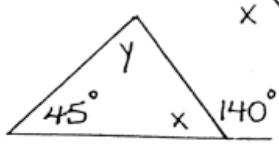
x =

7. 

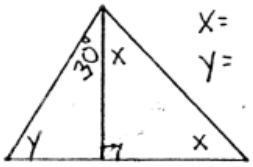
x =

8. 

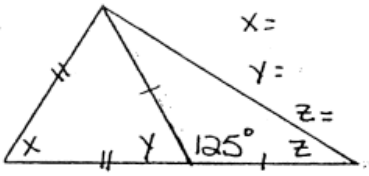
x =
y =
z =

9. 

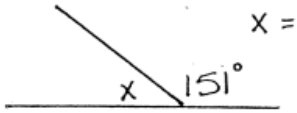
x =
y =

10. 

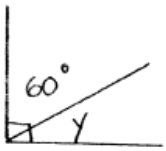
x =
y =

11. 

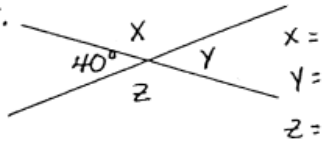
x =
y =
z =

12. 

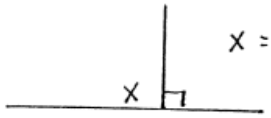
x =

13. 

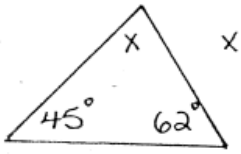
y =

14. 

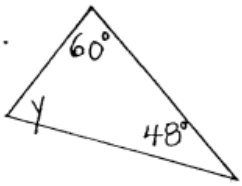
x =
y =
z =

15. 

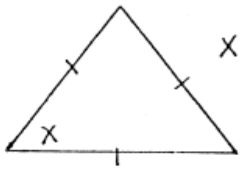
x =

16. 

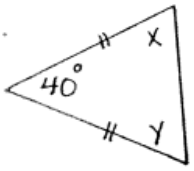
x =

17. 

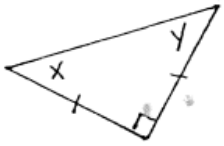
y =

18. 

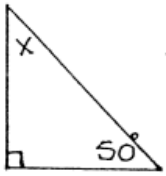
x =

19. 

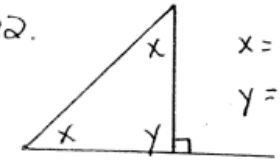
x =
y =

20. 

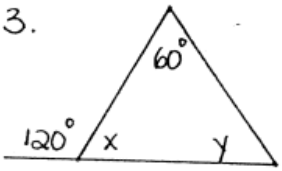
x =
y =

21. 

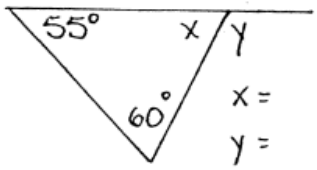
x =

22. 

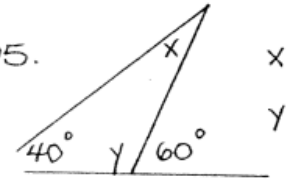
x =
y =

23. 

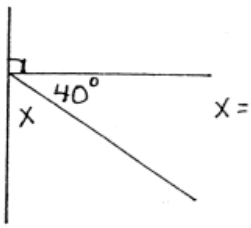
x =
y =

24. 

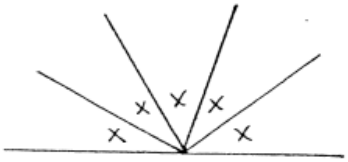
x =
y =

25. 

x =
y =

26. 

x =

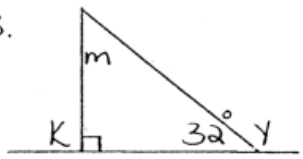
27. 

x =

1. *x=120°* **2.** *x=60°, y=30°* **3.** *x=60°* **4.** *x=65°, y=55°* **5.** *x=50°, y=50°* **6.** *x=120°* **7.** *x=50°* **8.** *x=40°, y=140°, z=50°* **9.** *x=40°, y=95°* **10.** *x=45°, y=60°* **11.** *x=70°, y=55°, z=27.5°* **12.** *x=29°* ***13.*** *y=30°* ***14.*** *x=140°, y=40°, z=140°* ***15.*** *x=90°* ***16.*** *x=73°* ***17.*** *y=72°* ***18.*** *x=60°* **19.** *x=70°, y=70°* **20.** *x=45°, y=45°* **21.** *x=40°* ***22.*** *x=45°, y=90°* ***23.*** *x=60°, y=60°* ***24.*** *x=65°, y=115°* ***25.*** *x=20°, y=120°* ***26.*** *x=50°* ***27.*** *x=36°*

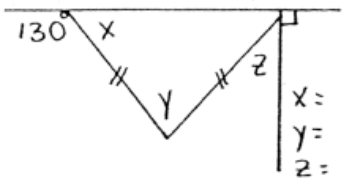
*** For all circled questions, set up an equation and solve on lined paper, showing all work. State each angle property used in your solution.**

28.



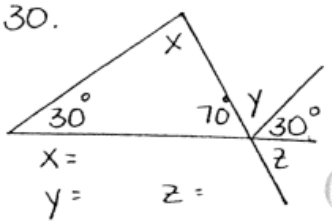
m=
K=
y=

29.



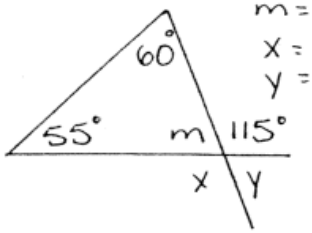
x=
y=
z=

30.



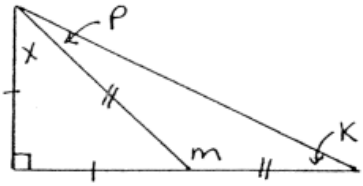
x=
y= z=

31.



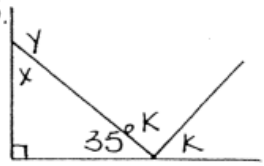
m=
x=
y=

32.



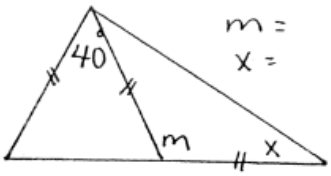
x= m= p=

33.



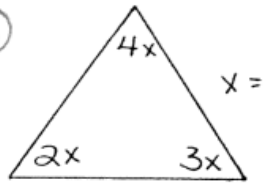
x=
y=
K=

34.



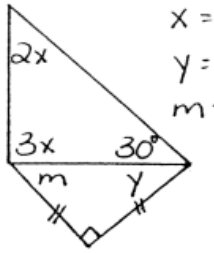
m=
x=

35.



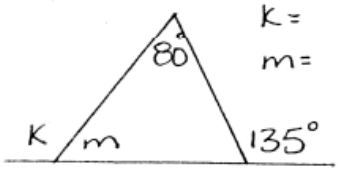
x=

36.



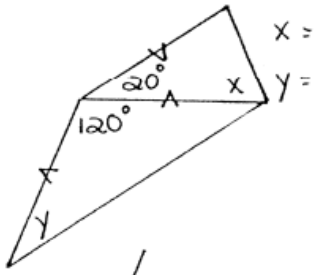
x=
y=
m=

37.



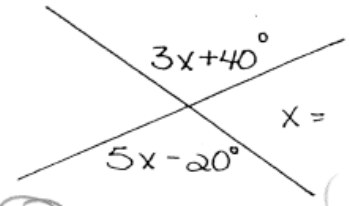
K=
m=

38.



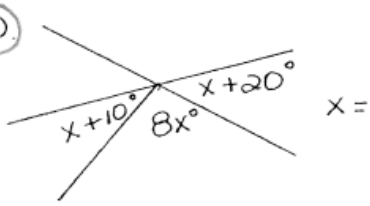
x=
y=

39.



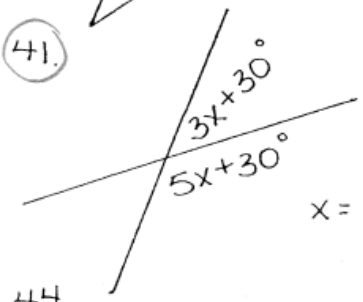
x=

40.



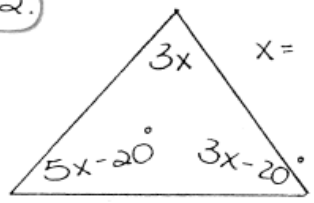
x=

41.



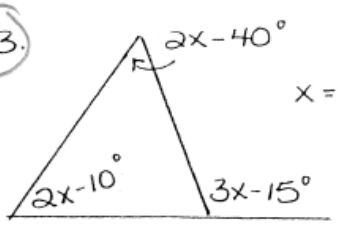
x=

42.



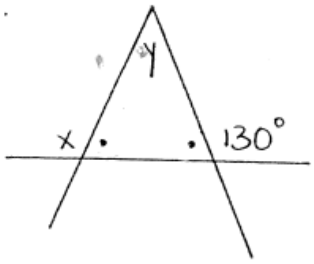
x=

43.



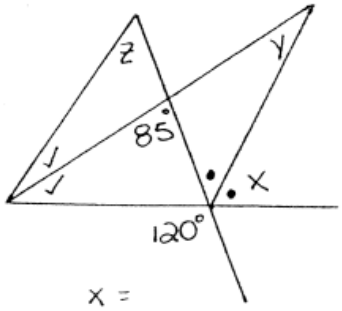
x=

44.



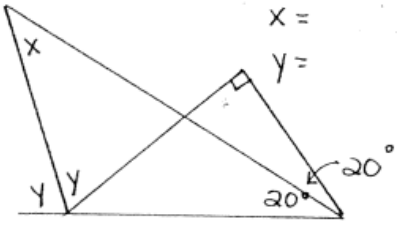
x=
y=

45.



x=
y=
z=

46.



x=
y=

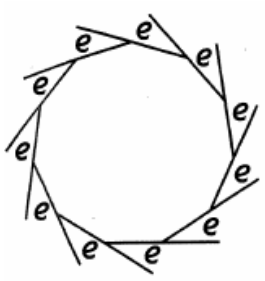
28. *m=70°, k=90°, y=148°* **29.** *x=50°, y=80°, z=40°* **30.** *x=80°, y=80°, z=70°* **31.** *m=65°, x=115°, y=65°* **32.** *x=45°, m=135°, p=22.5°* **33.** *x=55°, y=125°, k=72.5°* **34.** *m=110°, x=35°* **35.** *x=20°* **36.** *x=30°, y=45°, m=45°* **37.** *k=125°, m=55°* **38.** *x=80°, y=30°* **39.** *x=30°* **40.** *x=15°* **41.** *x=15°* **42.** *x=20°* **43.** *x=35°* **44.** *x=130°, y=80°* **45.** *x=60°, y=25°, z=50°* **46.** *x=45°, y=65°*

Angle Properties – Part II

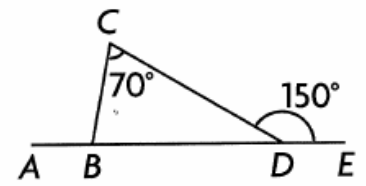
Warm-up:

1. In a regular 11-gon determine the measure of each:

a) exterior angle **b)** interior angle



2. Determine the measure of $\angle CBA$ and explain your reasoning.

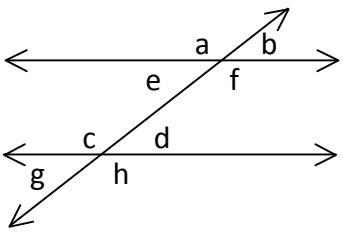


Parallel Lines:

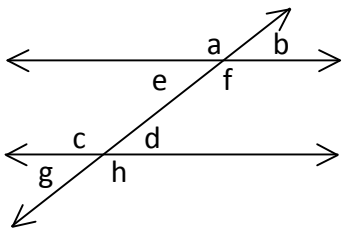
When a **transversal** crosses **parallel lines**, three new classifications of angles are created, aside from *opposite angles* and *supplementary angles*.

1. Alternate angles are _____ . **2. Corresponding angles** are _____. **3. Interior angles** add to _____

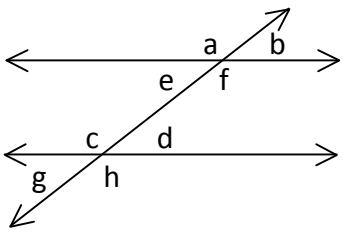
" Z "-pattern



" F "-pattern

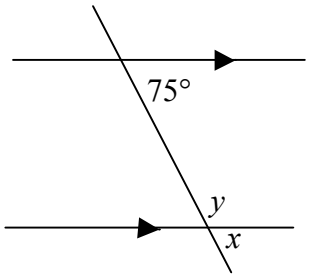


" C "-pattern

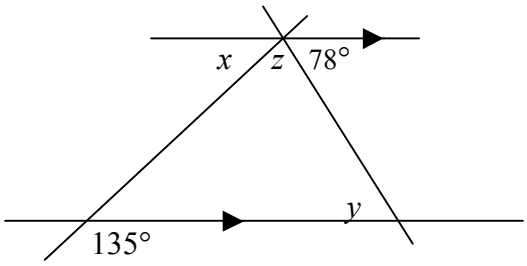


Examples: Determine the value of the unknown variable.

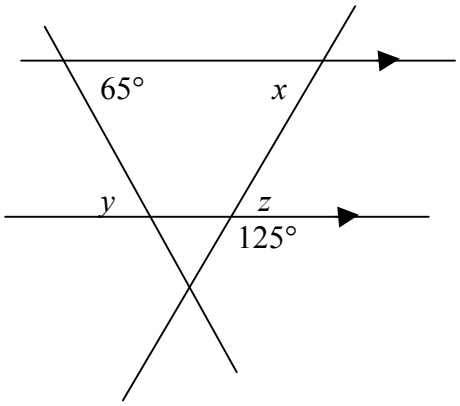
a)



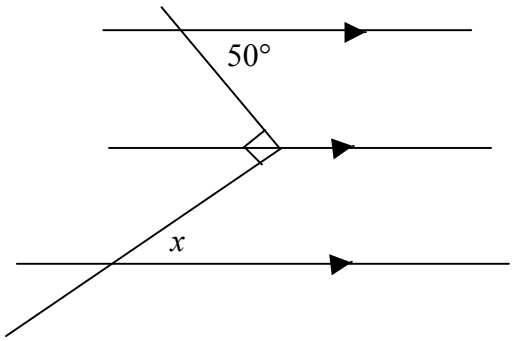
b)



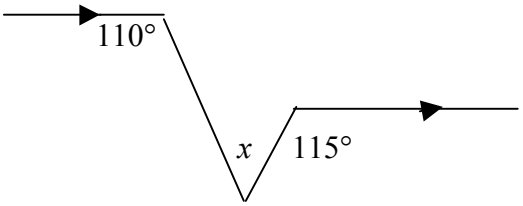
c)



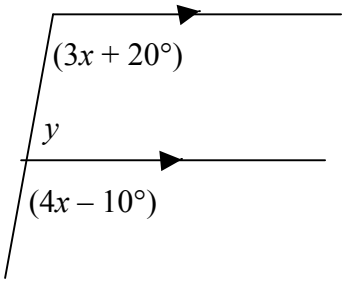
d)



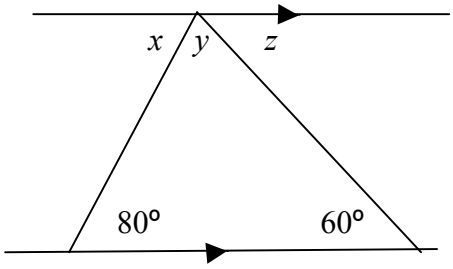
e)



f)



g)



HW: p. 508 #1, 2; p. 385 #4; p. 395 # 5, 7, 8; p. 223 #21 ***Reminder: Bring a scientific calculator to class for lesson 5!***

The Pythagorean Theorem

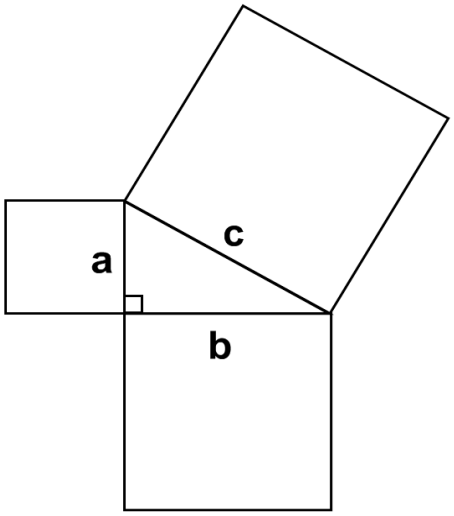
The Pythagorean theorem describes both a **geometric** relationship and **numerical** relationship between the three sides of a right triangle.

i) Geometric relationship:

The square on the hypotenuse is the sum of the squares on the other two sides.

ii) Numerical relationship:

$c^2 = a^2 + b^2$, where *c,* is *the hypotenuse* and a and b are the *legs* of the right triangle.



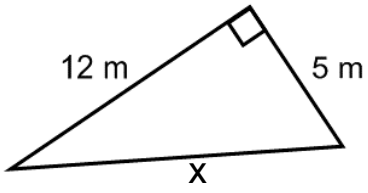
When given two sides of a right triangle, the third side can be found using the Pythagorean theorem.

Ex. 1. Find the measure of the hypotenuse, c, given a= 4 cm and b = 3 cm.

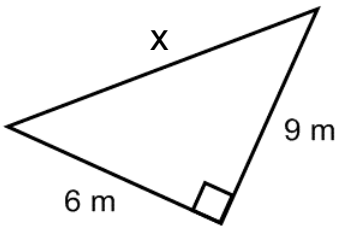
1^2=1, 2^2=4, 3^2=9, 4^2=16, 5^2=25, 6^2=36, 7^2=49, 8^2=64, 9^2=81, 10^2=100, 11^2=121, 12^2=144, 13^2=169, 14^2=196, 15^2=225, 16^2=256, 17^2=289, 18^2=324, 19^2=361, 20^2=400

Ex. 2. Find x in each of the following. Round to the nearest unit if necessary.

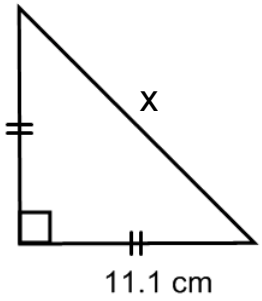
a)



b)

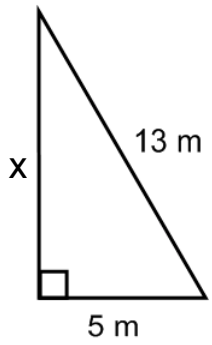


c)

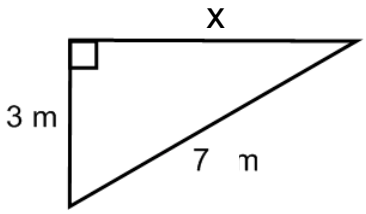


Ex. 3. Find x in each of the following. Round to the nearest unit if necessary.

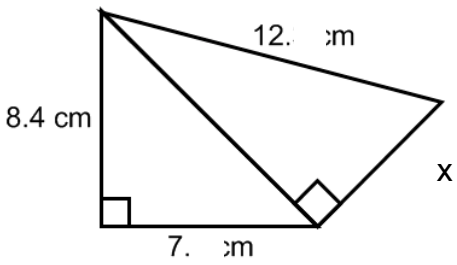
a)



b)



c)



Ex. 4. Determine the length of the diagonal of a 15 m by 8 m rectangle.

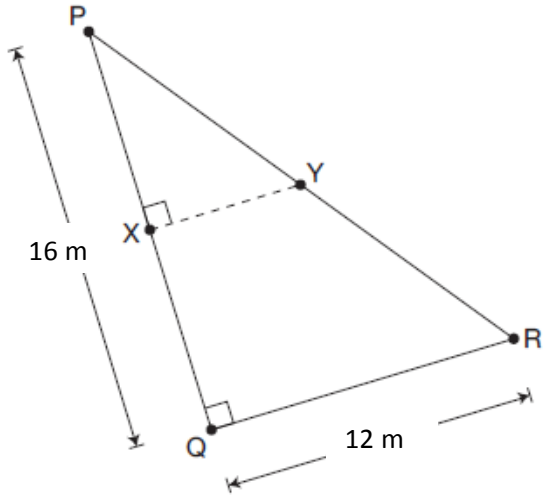
Diagrams are required for each question!!!! (Where rounding is necessary, round to the nearest unit.)

HW: p. 513 #2, 4abc [answers p. 615]; p. 425 #4, 8 [answers p. 607]; p. 445 #1 [answers p. 609]

Reminder: Bring a scientific calculator to class for lesson 5!

Applications of the Pythagorean Theorem

Ex. 1. Consider the right triangle below. Line segment **XY** connects the midpoint of **PQ** to the midpoint of **PR**. What is the length of **XY**?



Ex. 2. (② from Worksheet #2)

The bases on a baseball diamond are 90 feet apart. How far is it from home plate to second base?

Ex. 3. (⑤ from Worksheet #3)

A 20-foot ladder is leaned against a wall. If the base of the ladder is 8 feet from the base of the wall, how high up on the wall will the ladder reach?

HW: Worksheets #2 and #3 ***(Complete solutions with clearly labelled diagrams are required for each question.)***
Reminder: Bring a scientific calculator to class for lesson 5!

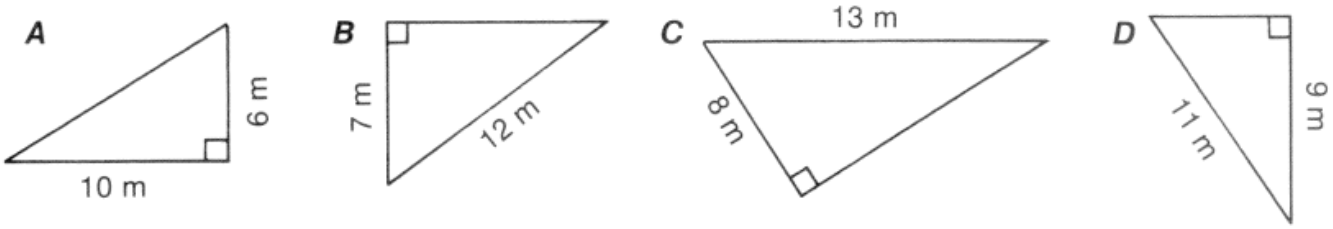
Worksheet #2

What Did Lancelot Say To The Beautiful Ellen?

TO ANSWER THIS QUESTION:

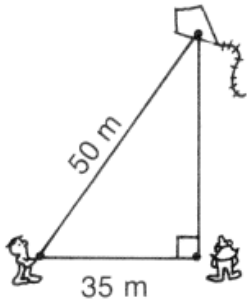
Cross out the box containing the answer to each problem. When you finish, write the letters from the boxes that are not crossed out in the boxes at the bottom of the page.

① For each right triangle, find the length of the side that is not given:



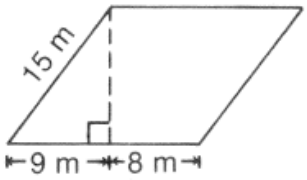
② The bases on a baseball diamond are 90 feet apart. How far is it from home plate to second base?

③ Orgo has let out 50 meters of kite string when he observes that his kite is directly above Zorna. If Orgo is 35 meters from Zorna, how high is the kite?



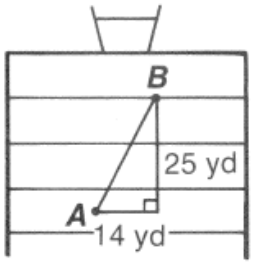
④ A What is the height of this parallelogram?

B What is the area of the parallelogram?

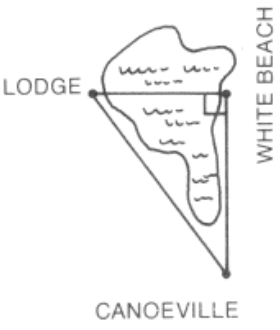


⑤ An 18-foot ladder is leaned against a wall. If the base of the ladder is 8 feet from the wall, how high up on the wall will the ladder reach?

⑥ A quarterback at point A throws the football to a receiver who catches it at point B. How long was the pass?



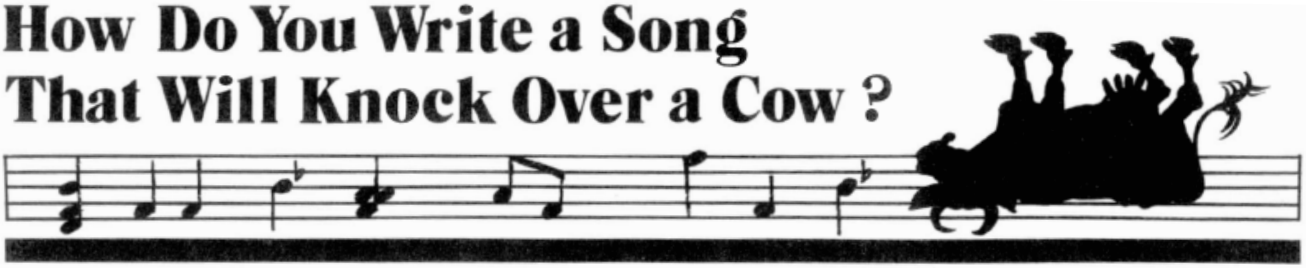
⑦ From Canoeville it is 2.4 kilometers to White Beach and 3.0 kilometers to the Lodge. How far is it from White Beach across the lake to the Lodge?



ST $\sqrt{821}$ yd ≐ 28.7 yd	IC $\sqrt{3.16}$ km ≐ 1.78 km	KW $\sqrt{144}$ m = 12 m	QU $\sqrt{136}$ m ≐ 11.7 m	IT $\sqrt{3.24}$ km ≐ 1.8 km	UR $\sqrt{842}$ yd ≐ 29.0 yd	AT $\sqrt{16200'}$ ≐ 127′	GR $\sqrt{95}$ m ≐ 9.75 m
AB 234 m²	EA $\sqrt{105}$ m ≐ 10.2 m	TC $\sqrt{260'}$ ≐ 16.1′	UT $\sqrt{275'}$ ≐ 16.6′	ER 204 m²	EA $\sqrt{1275}$ m ≐ 35.7 m	LN $\sqrt{1325}$ m ≐ 36.4 m	GT $\sqrt{40}$ ≐ 6.32 m

Worksheet #3

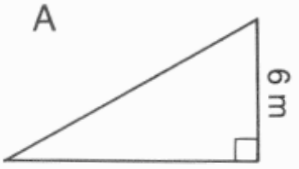
How Do You Write a Song That Will Knock Over a Cow ?



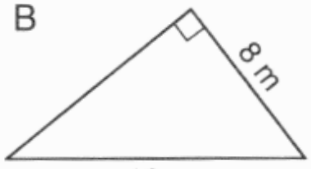
Solve each problem below. Cross out the box that contains your answer. When you finish, print the letters from the remaining boxes in the spaces at the bottom of the page.

(1) For each right triangle, find the length of the side that is not given:

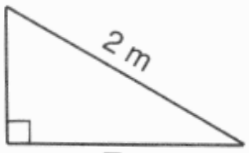
A



B

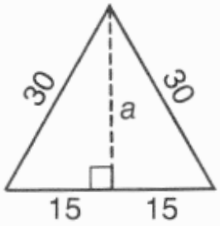


C



(2) A rectangle is 7 cm wide and 10 cm long. Find the length of a diagonal of the rectangle.

(3) Each side of an equilateral triangle measures 30 cm. Find the length of an altitude, *a*, of the triangle.

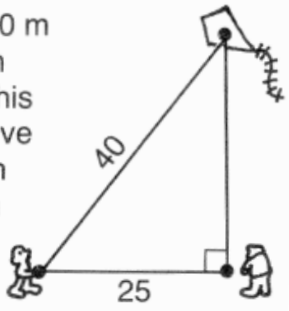


(4) A television set may be described in terms of the diagonal measure of its screen. If a TV screen is 16 inches by 12 inches, what is the length of its diagonal?

(5) A 20-foot ladder is leaned against a wall. If the base of the ladder is 8 feet from the wall, how high up on the wall will the ladder reach?

(6) The bases of a softball diamond are 60 feet apart. How far is it from home plate to second base?

(7) Jack has let out 40 m of kite string when he observes that his kite is directly above Jill. If Jack is 25 m from Jill, how high is the kite?



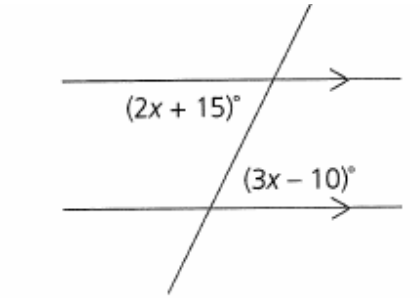
BY	IN	SO	TH	BE	AT	ER
$\sqrt{7200}$ ft	$\sqrt{123}$ m	$\sqrt{105}$ m	$\sqrt{675}$ cm	$\sqrt{6400}$ ft	$\sqrt{975}$ m	$\sqrt{149}$ cm
$\doteq$84.9 ft	$\doteq$11.1 m	$\doteq$10.2 m	$\doteq$26.0 cm	=80 ft	$\doteq$31.2 m	$\doteq$12.2 cm
EF	OR	NG	FL	IT	BE	AT
$\sqrt{850}$ m	$\sqrt{336}$ ft	$\sqrt{157}$ m	$\sqrt{425}$ cm	$\sqrt{1}$ m	$\sqrt{400}$ in.	$\sqrt{380}$ in.
$\doteq$29.2 m	$\doteq$18.3 ft	$\doteq$12.5 m	$\doteq$20.6 cm	=1 m	=20 in.	$\doteq$19.5 in.

Review: Angle Properties and The Pythagorean Theorem

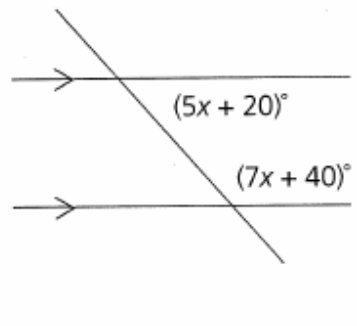
Warm-up:

1. Determine the value of *x* for each of the following and state each angle property used.

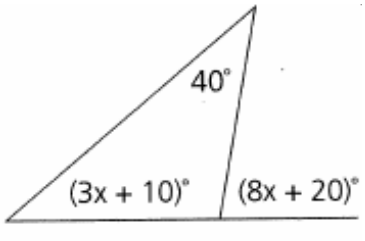
a)



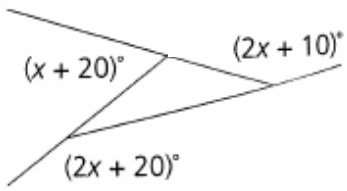
b)



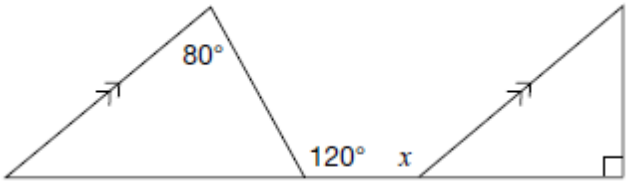
c)



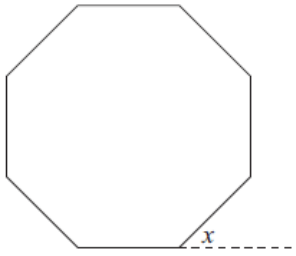
d)



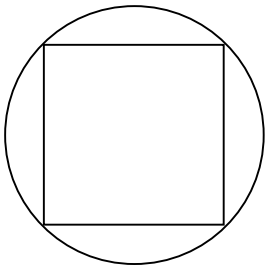
e)



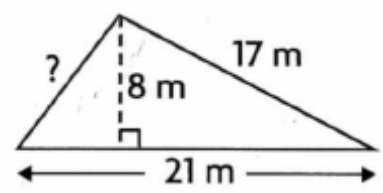
f)



2. Determine the dimensions of the largest square peg that can be made from a round peg of diameter $6\sqrt{2}$ cm.



3. Determine the approximate value of the unknown side.



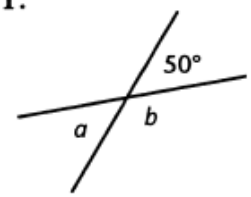
HW: Worksheets #4, 5 and 6 ***Reminder: Bring a scientific calculator to class for lesson 5!***

Worksheet #4

Geometry

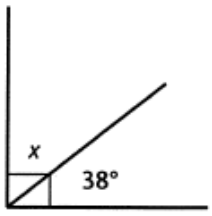
Calculate the measure of each of the unknowns.

1.



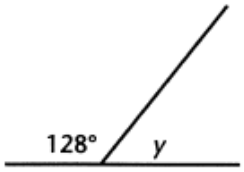
a _____ b _____

2.



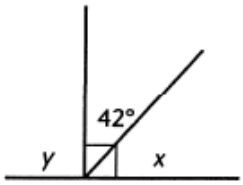
x _____

3.



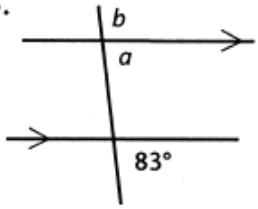
y _____

4.



x _____ y _____

5.

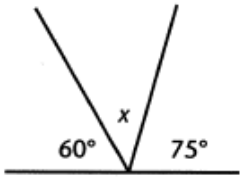


a _____ b _____

6.

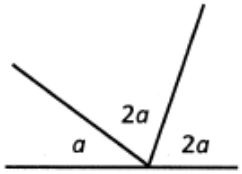
x _____

7.



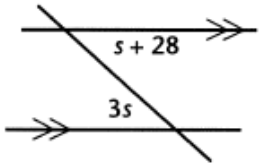
x _____

8.



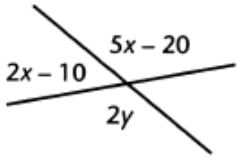
a _____

9.



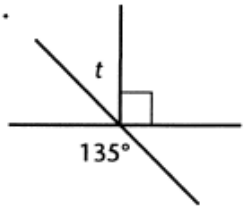
s _____

10.



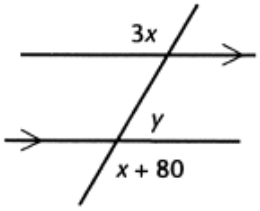
x _____ y _____

11.



t _____

12.



x _____ y _____

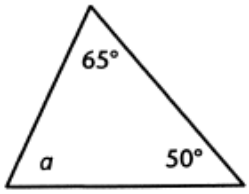
1. *a=50°, b=130°* **2.** *x=52°* **3.** *y=52°* **4.** *x=48°, y=90°* **5.** *a=83°, b=97°* **6.** *x=15°* **7.** *x=45°* **8.** *a=36°* **9.** *s=14°* **10.** *x=30°, y=65°* **11.** *x=45°* **12.** *x=40°, y=60°*

Worksheet #5

Geometry

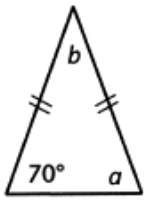
Calculate the measure of each of the unknowns.

1.



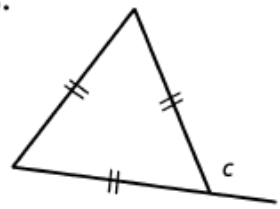
a _____

2.



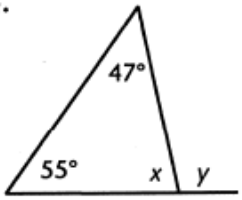
a _____ b _____

3.



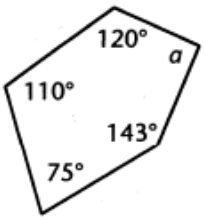
c _____

4.



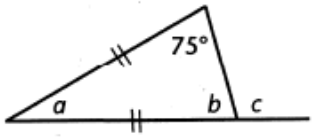
x _____ y _____

5.



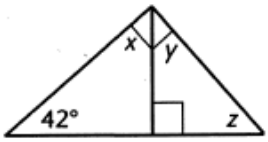
a _____

6.



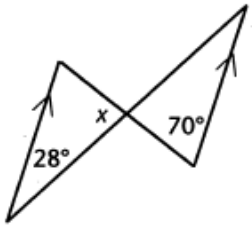
a _____ b _____ c _____

7.



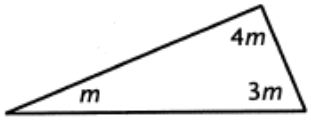
x _____ y _____ z _____

8.



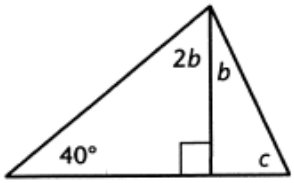
x _____

9.



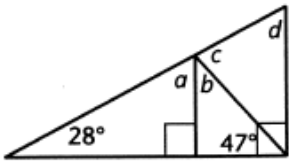
m _____

10.



b _____ c _____

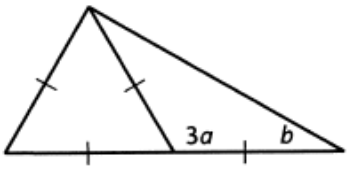
11.



a _____ b _____

c _____ d _____

12.



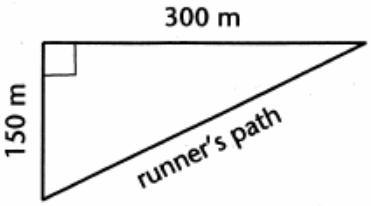
a _____ b _____

1. *a=65°* **2.** *a=70°, b=40°* **3.** *c=120°* **4.** *x=78°, y=102°* **5.** *a=92°* **6.** *a=30°, b=75°, c=105°* **7.** *x=48°, y=42°, z=48°*
8. *x=82°* **9.** *m=22.5°* **10.** *b=25°, c=65°* **11.** *a=62°, b=43°, c=75°, d=62°* **12.** *a=40°, b=30°*
11. *x=45°* **12.** *x=40°, y=60°*

Worksheet #6

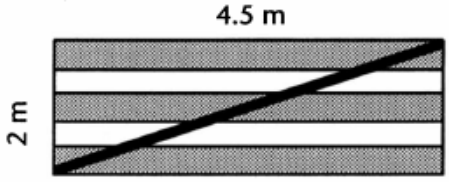
Applications of the Pythagorean relationship

1. A cross- country runner takes a short cut across a field as shown. What distance (to the nearest metre) does the runner save?

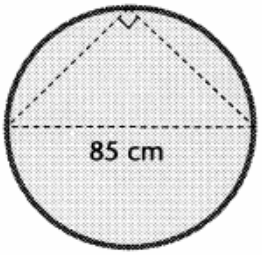


2. A 6 m ladder is leaning against a wall. The base of the ladder is 3.2 m from the wall. How far up the wall does the ladder reach?

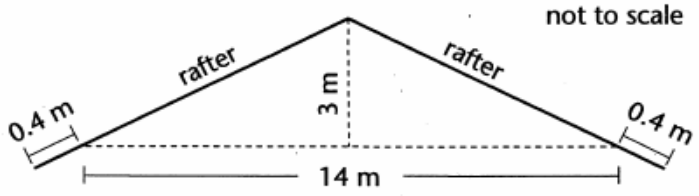
3. A fence gate is 4.5 m wide and 2 m high. Find the length of a diagonal support brace, correct to one decimal place.



4. A pine log has a circular cross-section with a diameter of 85 cm. What are the face dimensions of the largest square beam that can be cut from the log? Write your answer correct to the nearest centimetre.



5. A carpenter has to cut rafters for a house. The width of the house is 14 m and the height of the roof is 3 m higher in the centre than on the sides. The overhang is 0.4 m. Find the length of each rafter, correct to the nearest metre.



Answers

1. $\sqrt{112\,500} \cong 335\ m$ **2.** $\sqrt{25.76} \cong 5.1\ m$ **3.** $\sqrt{24.25} \cong 4.9\ m$ **4.** $\sqrt{3612.5} \cong 60\ cm$ **5.** $0.4 + \sqrt{58} \cong 8\ m$