Quarter 3 Review Chapters 7, 8, 9, +Area Name Key Hour___

CHAPTER 7

Simplifying Radicals

1. Simplify. (Recall—this does NOT involve "rounding".)

a. $\sqrt{90}$ → $\sqrt{9}\cdot\sqrt{10}$ → $3\sqrt{10}$

b. $5\sqrt{50}$ → $5\cdot\sqrt{25}\cdot\sqrt{2}$ → $5\cdot5\cdot\sqrt{2}$ → $25\sqrt{2}$

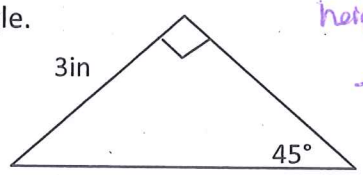
c. $\frac{12}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{2}}{4} = \frac{12\sqrt{2}}{2}$ → $6\sqrt{2}$

d. $\frac{10}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{10\sqrt{3}}{3}$

Area of a Triangle

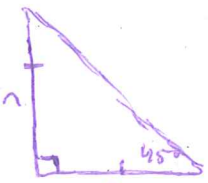
Remember the formula: $\frac{1}{2}b\cdot h$

2. Find the area of the triangle.



$A = \frac{1}{2}b\cdot h$
$= \frac{1}{2}\cdot3\cdot3$
$= 4.5\ in^2$

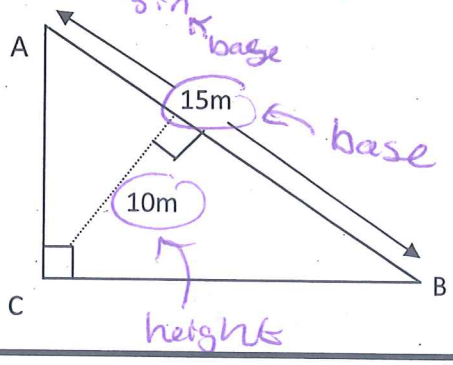
height → 3in



3in ← base

isosceles right Triangle
45-45-90
1 : 1 : $\sqrt{2}$
3 : 3 : $3\sqrt{2}$

3. Find the area of ΔABC.

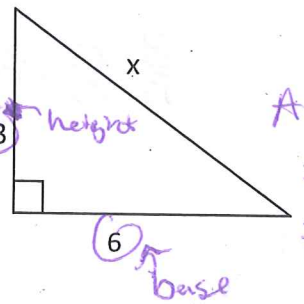


$A = \frac{1}{2}b\cdot h$
$= \frac{1}{2}\cdot10\cdot15$
$= 5\cdot15$
$= 75\ m^2$

Pythagorean Theorem

Remember the formula: $a^2+b^2=c^2$ (hypotenuse; leg; leg)

1. a)

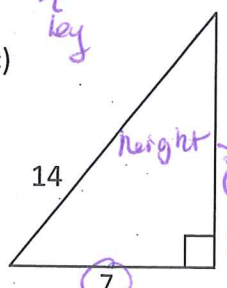


$a^2+b^2=c^2$
$3^2+6^2=x^2$
$9+36=x^2$
$\sqrt{45}=\sqrt{x^2}$
$\sqrt{9}\cdot\sqrt{5}$
$3\sqrt{5}=x$

b) Find the area of the triangle in part a)

$A = \frac{1}{2}\cdot b\cdot h$
$= \frac{1}{2}\cdot6\cdot3$
$= 3\cdot3$
$= 9\ units^2$

c)



$A = \frac{1}{2}\cdot7\cdot7\sqrt{3}$
$A = 24.5\sqrt{3}$
$\approx 42.4\ units^2$

Find x. *Give answer as a simplified radical.*

$a^2+b^2=c^2$
$7^2+b^2=14^2$
$49+b^2=196$
$-49\quad -49$
$\sqrt{b^2}=\sqrt{147}$
$b=\sqrt{3}\cdot\sqrt{49}$
$b=7\sqrt{3}$
$\approx 12.1\ units$

Find y. *Round answer to the tenths place.*

2. Do the following triangle side lengths form a right triangle? Why or why not?

a) 8, 10, 6 (c because it's the biggest)
$6^2+8^2=10^2$
$36+64=100$
$100=100$ ✓

b) $\sqrt{2}$, $\sqrt{7}$, 3 (c because it's the biggest)
$\sqrt{2}^2+\sqrt{7}^2=3^2$
$2+7=9$
$9=9$ ✓

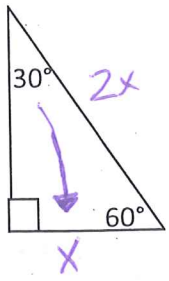
c) 15, 11, 8 (c because it's the biggest)
$8^2+11^2=15^2$
$64+121=225$
$185\neq225$
* NOT RIGHT

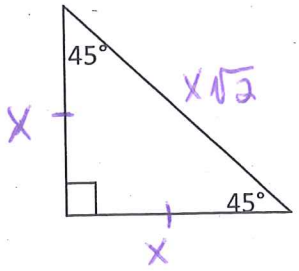
3. Which of 2(a-c) form Pythagorean triples? Explain.

(a) all whole numbers and Pythagorean Theorem checks out.

Special Triangles

Remember the patterns: $x\sqrt{3}$

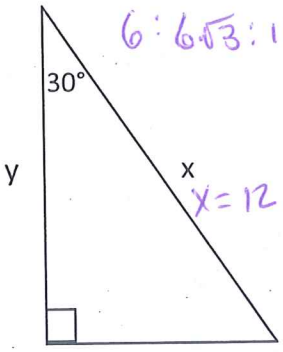




$1 : \sqrt{3} : 2$

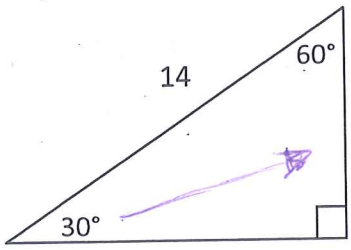
Find x, y, and z.

1. a) $1 : \sqrt{3} : 2$ $\quad 6 : 6\sqrt{3} : 12$



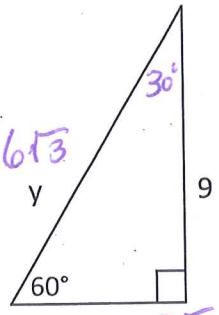
$y = 6\sqrt{3}$ $\quad x = 12$

b)



$x = 7$ $\quad y = 7\sqrt{3}$

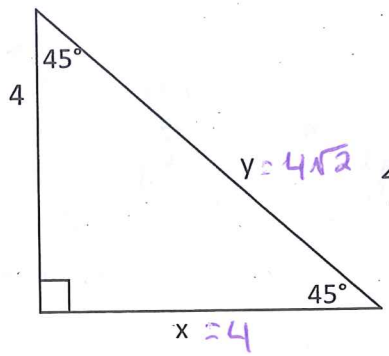
c)



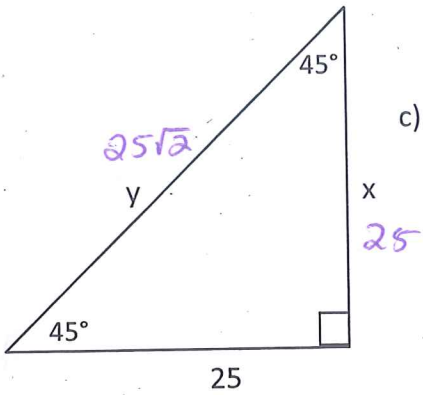
$x = 3\sqrt{3}$

$X = \frac{9}{\sqrt{3}} \rightarrow \frac{9\sqrt{3}}{\sqrt{3}\sqrt{3}} = \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

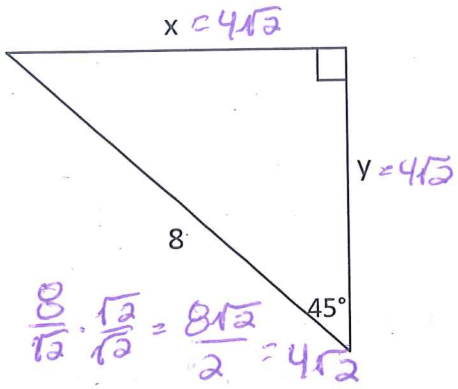
2. a) $1 : 1 : \sqrt{2}$



b)

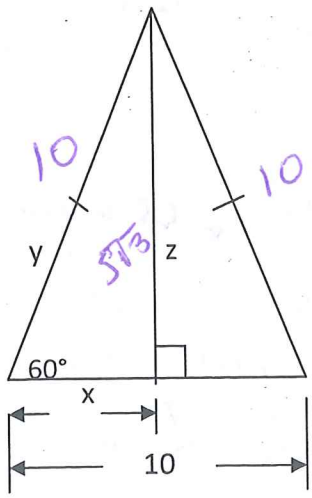


c)

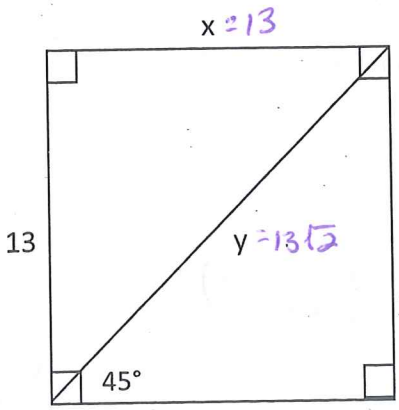


$\frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

3. a)

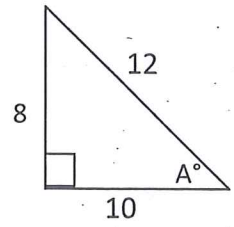


b)



Opposite Adjacent Hypotenuse

Trigonometry – Right Triangles *Remember the trig ratios:* S O H C A H T O A

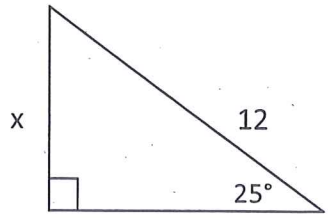


$\frac{O}{H} = \frac{8}{12}$ $\frac{A}{H} = \frac{10}{12}$ $\frac{O}{H} = \frac{8}{10} = 4/5$

sin A = 2/3 cos A = 5/6 tan A = 4/5

Find x. Round sides to the tenths place and angles to the nearest degree.

1. a)



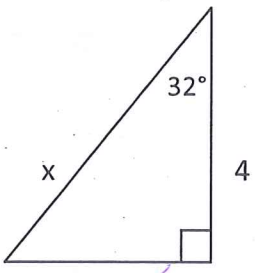
O/H

$\sin(25°) = \frac{x}{12}$

$12\sin(25°) = \frac{x}{12} \cdot 12$

5.1 = x

b)

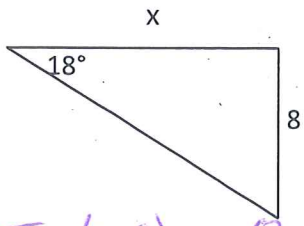


A/H

$\frac{x\cos(32°)}{\cos(32°)} = \frac{4}{\cos(32°)}$

$x = \frac{4}{\cos(32°)} = 4.7$

c)



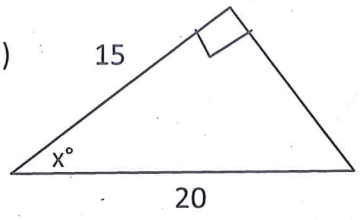
$\tan(18°) = \frac{8}{x}$

$x = \frac{\tan(18°)}{\tan(18°)} = \frac{8}{\tan(18°)}$

$x = \frac{8}{\tan(18°)}$

x = 24.6

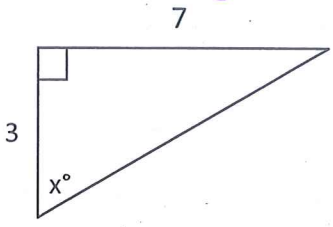
d)



$\cos(x) = \frac{15}{20}$

$\cos^{-1}\left(\frac{15}{20}\right) = 41°$

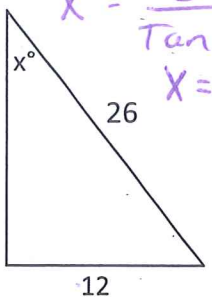
e)



$\tan(x) = \frac{7}{3}$

$\tan^{-1}\left(\frac{7}{3}\right) = 67°$

f)

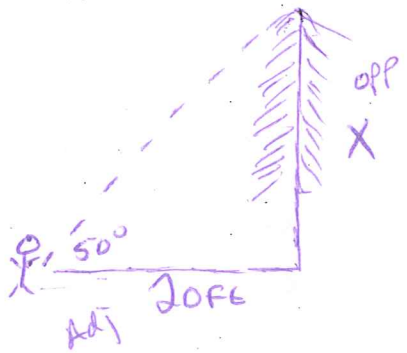


$\sin(x) = \frac{12}{26}$

$\sin^{-1}\left(\frac{12}{26}\right) = 27°$

Angles of Elevation and Depression Round to the nearest tenth.

1. The angle of elevation from a person standing on the ground to the top of a pine tree is 50°. If the person is standing 20 feet from the tree, how tall is the tree?

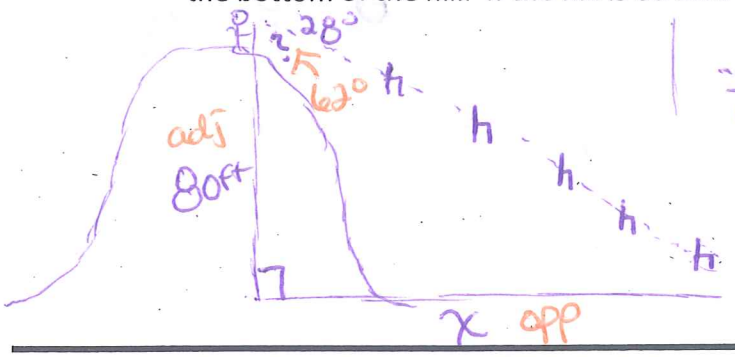


$20 \cdot \tan(50°) = \frac{x}{20} \cdot 20$

$20 \cdot \tan(50°) = x$

23.8 Ft = x

2. The angle of depression of a person standing at the top of a ski hill is 28° down to the chair lift at the bottom of the hill. If the hill is 80 feet tall, how far is the chair lift from the base of the hill?



$90 - 28 = 62°$

$80 \cdot \tan(62°) = \frac{x}{80ft} \cdot 80$

$80 \cdot \tan(62) = x$

$150.5\,ft = x$

CHAPTER 8

Polygons *Remember:* *Sum of Interior Angles* $(n-2)\cdot 180$ (# of sides)

Sum of Exterior Angles _____

1. a) Find the sum of the interior angles of a regular dodecagon.

$(12-2)\,180$

$(12-2)\cdot 180$

$10 \cdot 180 = 1{,}800°$

(12 sides)

b) Find the measure of one interior angle of a regular heptagon.

$\frac{(n-2)\cdot 180}{7} = \frac{(7-2)\cdot 180}{7} = \frac{900}{7} = 128.6°$

(7 sides)

c) If an interior angle of a regular polygon is 120°, how many sides does the polygon have?

$\frac{(n-2)\cdot 180}{n} = 120$

$(n-2)\cdot 180 = 120n$

$180n - 360 = 120n$

$60n = 360$

$n = 6$

2. a) What is the sum of the measures of the exterior angles of a regular convex decagon?

$\frac{360}{n} = \frac{360}{10} = 36°$

Always 360°

b) If a regular convex polygon has 10 sides, what is the measure of an exterior angle?

$\frac{360}{10} = 36°$

c) If the measure of an exterior angle of a regular convex polygon is 30°, how many sides does the polygon have?

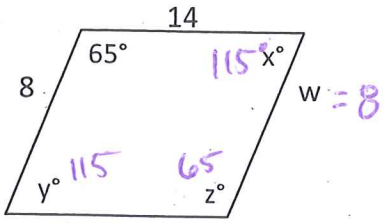
$n \cdot \frac{360}{n} = 30 \cdot n$

$360 = 30n$

$12 = n$

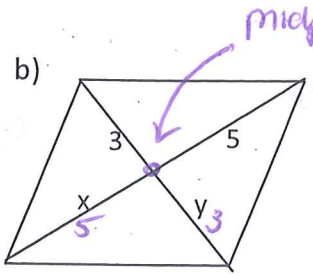
Parallelograms Find the value of the variables.

1. a)



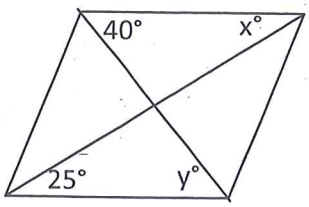
v = 14
w = 8
x = 115°
y = 115°
z = 65°

b)



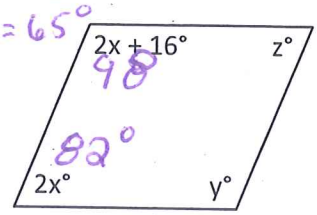
x = 5
y = 3

c)



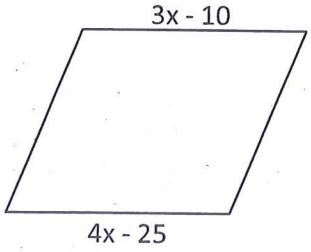
x = 25°
y = 40°

2. a)



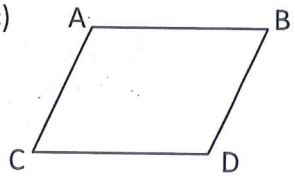
2x + 16 + 2x = 180
4x + 16 = 180
4x = 164
x = 41 y = 98° z = 82°

b)



3x - 10 = 4x - 25
15 = x

c)

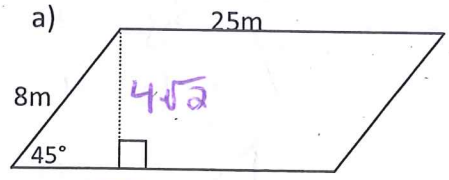


slope $\overline{AB}$ = 1 slope $\overline{CD}$ = 1

slope $\overline{AC}$ = $\frac{5}{3}$ slope $\overline{BD}$ = $\frac{5}{3}$

3. Find the area of the parallelograms.

a)

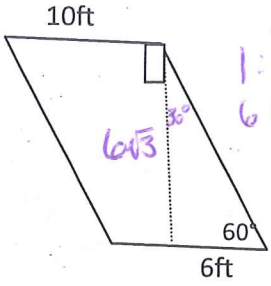


A = B · h
= 4√2 · 25
141.4 m² or 100√2 m²

1 : 1 : √2
8

$\frac{8}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{8\sqrt{2}}{2} = 4\sqrt{2}$

b)



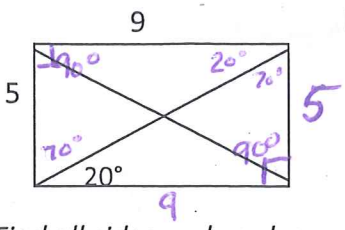
1 : √3 : 2
6 : 6√3 : 12

B · h
10 · 6√3
60√3
or
103.9 ft²

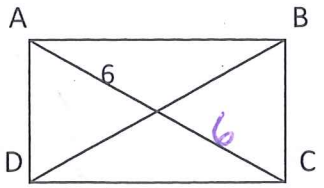
4. Name the tests to prove a quadrilateral is a parallelogram. Also list which formula you would use for that specific test if you have the coordinates of the quadrilateral.

1. **Both** pairs of opposite sides are Congruent; formula: Distance
2. **Both** pairs of opposite sides are Parallel; formula: Slope
3. **Both** pairs of opposite angles are Congruent
4. Diagonals Bisect; formula: Mid point
5. A pair of opposite sides is both Congruent and parallel;
   Formulas: distance, Slope

Rectangles

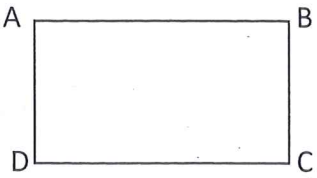
1. a) 

Find all sides and angles

b) 

Find all diagonal segments

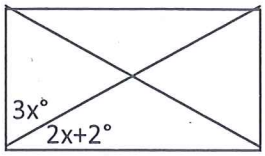
AC = 12 BD = 12

c) 

slope $\overline{AB}$ = 2 slope $\overline{CD}$ = 2

slope $\overline{AD}$ = $-\frac{1}{2}$ slope $\overline{CB}$ = $-\frac{1}{2}$

Find x:

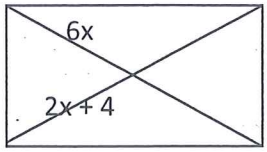
2. a) 

$3x + 2x + 2 = 90$

$5x + 2 = 90$

$5x = 88$

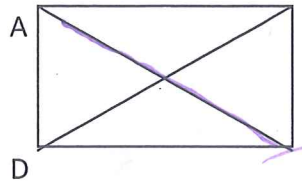
$x = 17.6$

b) 

$6x = 2x + 4$

$4x = 4$

$x = 1$

c) 

$5x + 7 = 8x - 2$

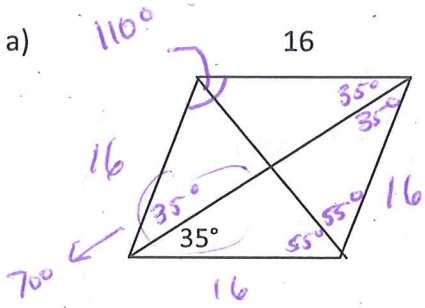
$9 = 3x$

$3 = x$

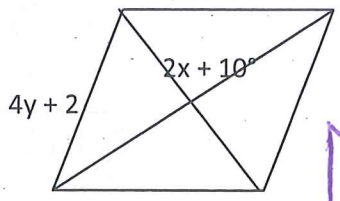
AC = 5x + 7 BD = 8x − 2 $x = 3$

3. Name the tests to prove a parallelogram is a rectangle, and the formula you would use.
   1. The diagonals are Congruent; formula: distance
   2. All angles are 90° (perpendicular) (slopes of adjacent sides are perpendicular)
      formula: slope

Rhombi

1. a) 

Find all sides and angles

b) Find x and y. 

$4y + 2 = y + 14$

$3y = 12$

$y = 4$

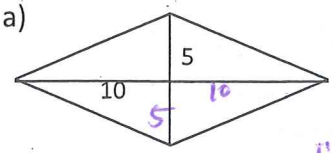
$2x + 10 = 90°$

$2x = 80$

$x = 40°$

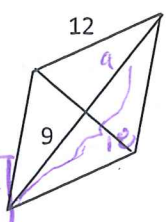
2. Name the tests to prove a parallelogram is a rhombus, and the formula you would use.
   1. The diagonals are perpendicular; formula: Slope
   2. All sides are Congruent; formula: distance

3. Find the area of the rhombi:

a) 

$\frac{d_1 \cdot d_2}{2}$

$\frac{10 \cdot 20}{2} = \frac{200}{2} = 100 \text{ units}^2$

b) 

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

$81 + b^2 = 144$

$b^2 = 63$

$b = \sqrt{63}$

$\sqrt{9} \cdot \sqrt{7}$

$3\sqrt{7}$

$\frac{d_1 \cdot d_2}{2}$

$\frac{18 \cdot 3\sqrt{7}}{2}$

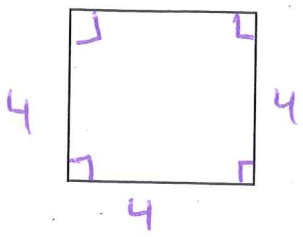
$\frac{54\sqrt{7}}{2}$

$= 27\sqrt{7}$

≈ 71.4

Squares

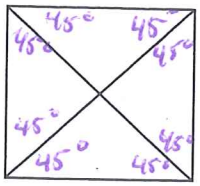
1. a)



Find all angles and sides and area.

4

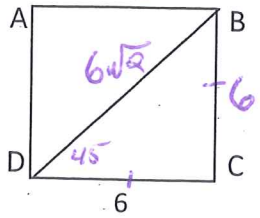
b)



Find all angles.

45°

c)



Find BD and AC.

6√2

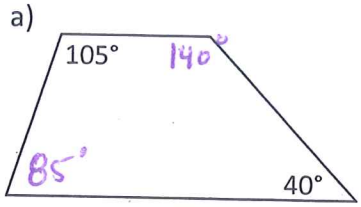
1 : 1 : √2

6 : 6 : 6√2

2. Name the tests to prove a parallelogram is a square.
   1. Must pass the Slope test
   2. Must pass the distance test

Trapezoids

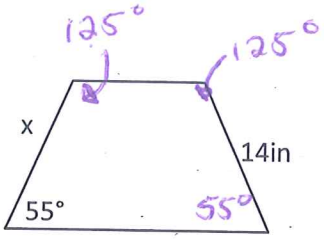
1. a)



Find all angles

Isosceles Trapezoids

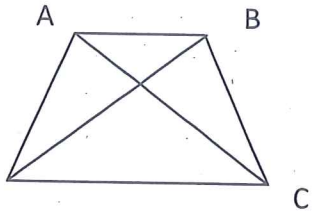
2. a)



Find all angles and x.

X = 14

b)

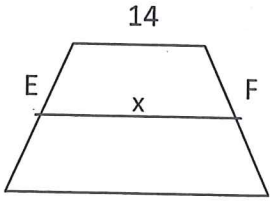


Find AC if BD = 19

AC = 19

3. EF is a median.

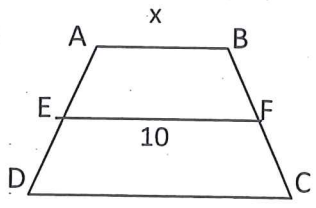
a)



Find x

$\frac{14+20}{2} = \frac{34}{2} = 17$

b)

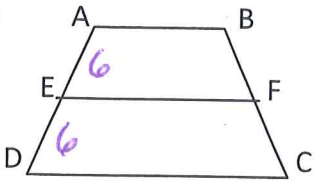


$\frac{x+16}{2} = 10$

$x + 16 = 20$

$x = 4$

c)

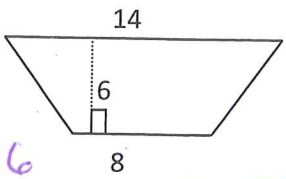


Find ED if AE = 6

ED = 6

4. Find the area

a)

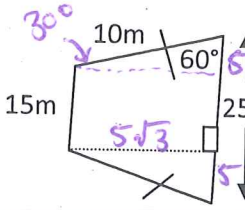


$\frac{b_1 + b_2}{2} \cdot h$

$\frac{8+14}{2} \cdot 6$

$\frac{22}{2} \cdot 6 = 11 \cdot 6 =$ 66 units²

b)



$\frac{15+25}{2} \cdot 5\sqrt{3}$

$20 \cdot 5\sqrt{3}$

$100\sqrt{3}$ or

A = 173.2 units² P 7