

14) FACTORING

Remember this backwards & forwards!

$$(x + y)^2 = x^2 + 2xy + y^2$$



$$x^2 + 2xy + y^2 = (x + y)^2$$



You will see this a lot & if you want to get into college you must know that $(x + y)^2$ is **NOT** equal to $x^2 + y^2$! You have to remember that when you multiply $(x + y)(x + y)$ you will get a middle term.

$$(x + y)(x + y) = x^2 + xy + xy + y^2 = x^2 + 2xy + y^2$$

Ex. 1) If $x^2 + y^2 = 137$ and $xy = 25$, what is the value of $(x + y)^2$?

- A) 112
- B) 137
- C) 145
- D) 167
- E) 187

Memorize these as well:

$$(x - y)^2 = x^2 - 2xy + y^2$$

$$(x + y)(x - y) = x^2 - y^2$$

Ex. 2) If $x^2 - y^2 = 154$ and $x - y = 14$, what is the value of y ?

- A) -12.5
- B) -1.5
- C) 0
- D) 12.5
- E) 14

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You will see this a lot & if you want to get into college you must know that $(x + y)^2$ is NOT equal to $x^2 + y^2$! You have to remember that when you multiply $(x + y)(x + y)$ you will get a middle term. $(x + y)(x + y) = x^2 + xy + xy + y^2 = x^2 + 2xy + y^2$

Ex. 1) If $x^2 + y^2 = 137$ and $xy = 25$, what is the value of $(x + y)^2$?

E) 187

$$\begin{aligned} (x + y)^2 &= x^2 + 2xy + y^2 \text{ or } x^2 + y^2 + 2xy \\ &= 137 + 2(25) \\ &= 137 + 50 = 187 \end{aligned}$$

Memorize these as well: $(x - y)^2 = x^2 - 2xy + y^2$
 $(x + y)(x - y) = x^2 - y^2$

Ex. 2) If $x^2 - y^2 = 154$ and $x - y = 14$, what is the value of y ?

B) -1.5

$$\begin{array}{l} x^2 - y^2 = 154 \\ (x - y)(x + y) = 154 \\ 14(x + y) = 154 \\ (x + y) = 11 \end{array} \quad \begin{array}{r} \nearrow \\ x + y = 11 \\ x - y = 14 \\ \hline 2x = 25 \\ x = 12.5 \end{array}$$

Substitute into: $x + y = 11$

$$12.5 + y = 11$$

$$y = -1.5$$

19) Geometry Problems

Remember:

An equilateral triangle is also _____ and each angle = _____°.

An isosceles triangle has two sides that are equal and the angles across from these sides are also equal.

The sum of the angles of a triangle is _____°.

In a 45° – 45° – 90° triangle the two legs are _____, and the hypotenuse is equal to the leg _____.

In a 30° – 60° – 90° triangle the hypotenuse is _____ the shorter leg and the longer leg is the shorter leg _____.

Parallel lines have _____ slope.

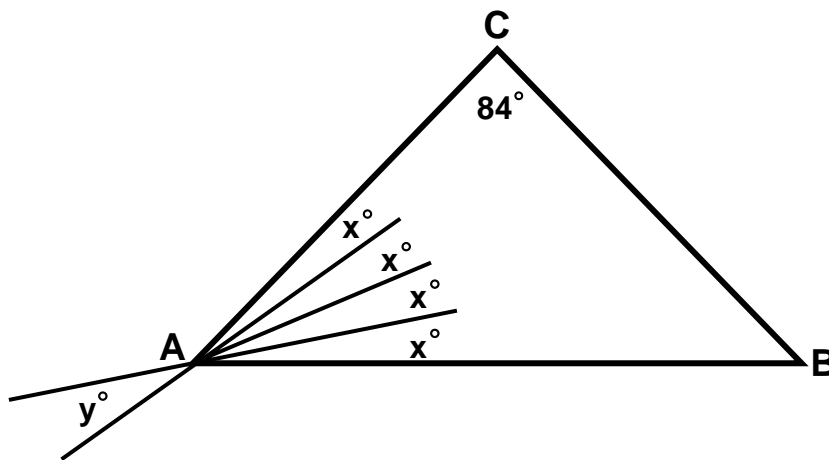
Perpendicular lines have slopes which are _____.

Circumference of a circle =

Length of an arc of a circle =

Area of a circle =

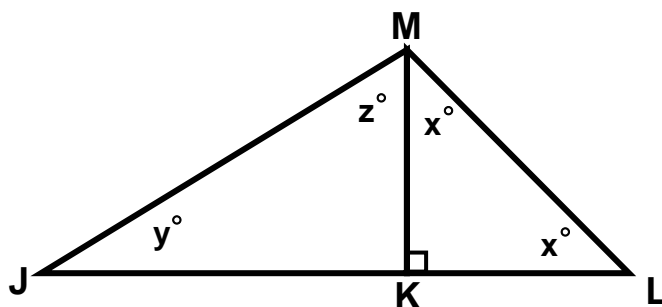
Area of a sector of a circle =



Ex. 1) Triangle ABC, above, is isosceles with $\overline{AC} \cong \overline{BC}$. If $\angle C = 84^\circ$, what is the value of y ?

1) _____

Use the following figure for problem #2 and #3.

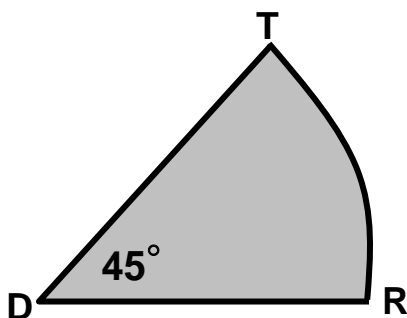


Ex. 2) In the figure above, $KL = 5$ and $JK = 5\sqrt{3}$. What is the value of z ?

2) _____

Ex. 3) What is the perimeter of triangle JML?

3) _____



Ex. 4) If the area of sector TDR above is 200π , what is the length of arc TR?

- A) 10
- B) 10π
- C) 40
- D) 40π
- E) 80π

19) Geometry Problems

Remember:

An equilateral triangle is also **EQUIANGULAR** and each angle = **60°**.

An isosceles triangle has two sides that are equal and the angles across from these sides are also equal.

The sum of the angles of a triangle is **180°**.

In a **45° – 45° – 90°** triangle the two legs are **EQUAL**, and the hypotenuse is equal to the leg **TIMES** $\sqrt{2}$.

In a **30° – 60° – 90°** triangle the hypotenuse is **TWICE** the shorter leg and the longer leg is the shorter leg **TIMES** $\sqrt{3}$.

Parallel lines have **EQUAL** slope.

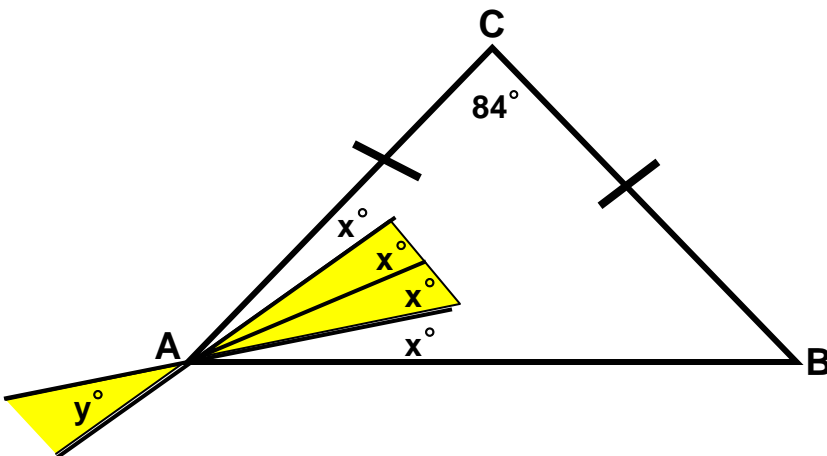
Perpendicular lines have slopes which are **OPPOSITE SIGNS & RECIPROCAL**s.

Circumference of a circle = πd

Length of an arc of a circle = $\frac{n^\circ}{360} \cdot \pi d$

Area of a circle = πr^2

Area of a sector of a circle = $\frac{n^\circ}{360} \cdot \pi r^2$



Ex. 1) Triangle ABC, above, is isosceles with $\overline{AC} \cong \overline{BC}$.
If $\angle C = 84^\circ$, what is the value of y ?

$$180 - 84 = 96$$

$$96 \div 2 = 48$$

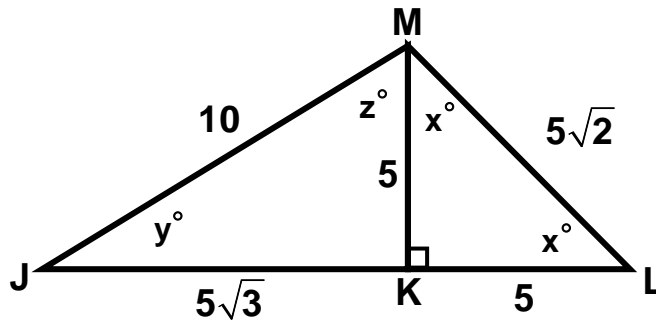
$$48 \div 4 = 12$$

$$\text{So } x = 12$$

y is vertical to $2x$ so

$$y = 2(12) = 24$$

Use the following figure for problem #2 and #3.



Ex. 2) In the figure above, $KL = 5$ and $JK = 5\sqrt{3}$. What is the value of z ?

We know that triangle MKL is isosceles since it has 2 congruent angles. Therefore, $MK = 5$. Then, since triangle JMK has sides of 5 and $5\sqrt{3}$, the triangle must be a 30-60-90 triangle and z must be the 60° angle.

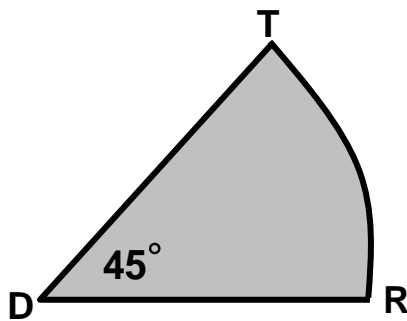
2) **60**

Ex. 3) What is the perimeter of triangle JML ?

$$10 + 5\sqrt{2} + 5 + 5\sqrt{3}$$

$$= 15 + 5\sqrt{2} + 5\sqrt{3}$$

3) **$15 + 5\sqrt{2} + 5\sqrt{3}$**



Ex. 4) If the area of sector TDR above is 200π , what is the length of arc TR ?

B) 10π

$$\text{area of sector} = \frac{n}{360} \cdot \pi r^2$$

$$200\pi = \frac{45}{360} \pi r^2$$

$$200 = \frac{1}{8} r^2$$

$$r^2 = 1600$$

$$r = \sqrt{1600} = 40, \text{ so } d = 80$$

$$\text{length of arc} = \frac{n}{360} \cdot \pi d$$

$$= \frac{1}{8} \pi (80) = 10\pi$$