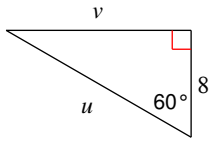
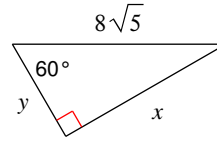


BOARD PROBLEMS - SOLVE FOR THE MISSING SIDES.

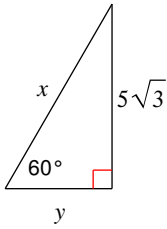
9)



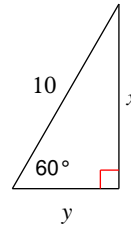
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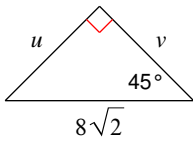
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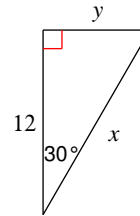
12)



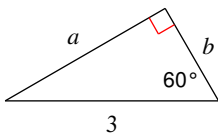
13)



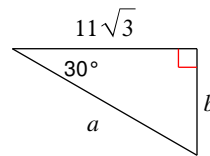
14)



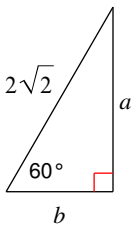
15)



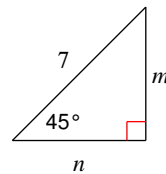
16)



17)



18)



LESSON 22

Axioms, Postulates, and Theorems

Axioms and *postulates* are observations that one assumes to be true, that make sense, are obvious, but not readily proven. They are defined as unproved assumptions or assertions.

Using axioms or postulates, we make other deductions, and use them to prove new statements true. The result is a *theorem*. Axioms and postulates are assumed, unproved, and obvious. They are used to validate and prove theorems true. Here is a list of observations that we have found to be true so far.

Postulates and Theorems

1. Vertical angles are congruent.
2. A bisector divides an angle into two congruent angles.
3. A midpoint divides a line segment into two congruent segments.
4. A rectangle has four right angles and two pairs of parallel sides.
5. A parallelogram has two pairs of parallel sides.
6. A square has four right angles, four congruent sides, and two pairs of parallel sides.
7. A rhombus has four congruent sides and two pairs of parallel sides.
8. A trapezoid has one pair of parallel sides.
9. If two parallel lines are cut by a transversal, corresponding angles are congruent.
10. If two parallel lines are cut by a transversal, alternate interior angles are congruent.
11. If two parallel lines are cut by a transversal, alternate exterior angles are congruent.
12. Two angles whose measures add up to 180° are supplementary.

13. Two angles whose measures add up to 90° are complementary.
14. If two angles have equal measures, they are congruent.
15. If two line segments have equal lengths, they are congruent.
16. The measures of the interior angles of a triangle add up to 180° .
17. If a triangle has sides A , B , and C , and $A \leq B \leq C$, then $A + B > C$.
18. A regular polygon has all sides congruent and all angles congruent.
19. The measures of the exterior angles of a regular polygon add up to 360° .
20. In a right triangle, leg squared plus leg squared equals hypotenuse squared.
21. An isosceles triangle has two congruent sides.
22. Two lines that intersect and form a right angle are perpendicular.
23. Two lines that are coplanar and do not intersect are parallel.
24. New: The property of symmetry: if $A = B$, then $B = A$.
25. New: The reflexive property: $A = A$.
26. New: The transitive property: if $A = B$ and $B = C$, then $A = C$.

These postulates and theorems are true as are their converses, or inverses.

POSTULATE

IF 2 PARALLEL LINES ARE CUT BY A TRANSVERSAL,
ALTERNATE INTERIOR ANGLES ARE CONGRUENT.

CONVERSE

Fill in the blanks.

1. An observation that one assumes to be true is called an _____ or a _____.
2. Statements that can be proven true are called _____.
3. All of the statements listed in this lesson also have _____ that are true.
4. Vertical angles are _____.
5. A _____ divides an angle into two congruent parts.
6. If two parallel lines are cut by a transversal, corresponding angles are _____.
7. If two angles have equal measures, they are _____.
8. The measures of the interior angles of a triangle add up to _____.
9. Two lines that are coplanar and don't intersect are _____.
10. The measures of the exterior angles of a regular polygon add up to _____.

Write the converses of the following:

11. If two parallel lines are cut by a transversal, alternate interior angles are congruent.

Converse:

12. A parallelogram has two pairs of parallel sides.

Converse:

13. If a figure is a right triangle, leg squared plus leg squared equals hypotenuse squared.

Converse:

14. Two lines that intersect and form a right angle are perpendicular.

Converse:

15. A trapezoid has only one pair of parallel sides.

Converse:

State the property being described.

16. If $A = B$, then $B = A$.

17. $A = A$.

18. If $A = B$ and $B = C$, then $A = C$.

LESSON PRACTICE

Find the factors and check by multiplying. (You will not have enough blocks to build some of these.)

1. $x^2 + 10x + 16$

2. $x^2 + 11x + 28$

3. $x^2 + 13x + 22$

4. $x^2 + 7x + 12$

5. $x^2 + 8x + 15$

6. $x^2 + 11x + 30$

7. $x^2 + 5x + 4$

8. $x^2 + 6x + 5$

9. $x^2 + 8x + 16$

10. $x^2 + 12x + 20$

11. $x^2 + 11x + 18$

12. $x^2 + 17x + 30$

13. $x^2 + 7x + 10$

14. $x^2 + 2x + 1$

15. $x^2 + 10x + 25$

16. $x^2 + 26x + 25$

SYSTEMATIC REVIEW

Build a rectangle and find the factors.

1. $X^2 + 7X + 12 = (\quad + \quad)(\quad + \quad)$

2. $X^2 + 10X + 16 = (\quad + \quad)(\quad + \quad)$

3. $X^2 + 11X + 24 = (\quad + \quad)(\quad + \quad)$

4. $X^2 + 8X + 12 = (\quad + \quad)(\quad + \quad)$

Build a rectangle and find the area (product).

5. $(X + 4)(X + 2) =$

6. $(X + 5)(X + 3) =$

7. Find the factors: $X^2 + 7X + 6$.

8. Check #7 by multiplying the factors to find the product.

9. Find the factors: $X^2 + 2X + 1$.

10. Check #9 by multiplying the factors to find the product.

Add.

$$\begin{array}{r} 11. \quad 2X^2 - 7X - 3 \\ \quad \quad + X^2 + 5X + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 12. \quad 6X^2 + 2X + 1 \\ \quad \quad + X^2 - 4X + 3 \\ \hline \end{array}$$

When simplifying expressions with exponents, write your answer on one line unless otherwise instructed.

13. Simplify: $(P^{-4})^2 P^3 P^1$

14. Simplify: $(R^{-2}S^3)^{-3}$

15. $15^2 =$

16. $\sqrt{16} =$

17. Find three consecutive odd integers such that eleven times the first, plus two times the second, equals six times the third, plus one.

18. Nine coins made up of dimes and nickels have a total value of \$.60. How many are there of each coin?

19. Express using the standard form of the equation of a line:
 $Y = 7X + 3.$

20. Graph: $4Y < 3X - 5.$

