14. What is the value of each of the acute angles in an isosceles triangle the vertex angle of which is 31°?

15. Find the angles of an isosceles triangle if a base angle is four times the vertex angle.

16. The bisector of the base angle in an isosceles triangle makes, with the opposite leg, the angle 42°. Find all the angles of the triangle.

17. In a right triangle one leg is equal to half the hypotenuse. Find the the acute angles.

18. Can a triangle be made having for sides 14 feet, 19 feet, and 29 feet? Why?

19. If one angle of a parallelogram is 62°, find the other angles.

20. The sum of two of the angles of a right triangle is 128°. Find each of the angles.

MECHANICS.

QUESTIONS AND EXERCISES.

1. Distinguish between motion of translation, rotation and vibration.

2. A body begins to move with a velocity of 100 feet per second, and at the end of 7 seconds its velocity is 65 feet. How much is the velocity retarded a second? *Ans.* 5 feet.

3. Explain why it is dangerous to jump out of a railway carriage when in motion.

4. If a ball be thrown out of the window of a railway carriage in motion, in what direction will it seem to fall, and in what direction will it really fall?

5. A body falls freely for 5 seconds; what is its velocity? *Ans.* 160 feet per second.

6. Explain what is meant by *momentum*, and how it differs from *velocity*.

7. A man weighing 140 lbs. forces up a weight of 80 lbs. by means of a fixed pulley under which he stands; find his pressure on the floor. *Ans.* 60 lbs.

8. Forces of 3, 4, 5, 6 lbs. act at distances of 3 ins., 4 ins., 5 ins., 6 ins. from the end of a rod. At what distance from the same end does the resultant act? *Ans.* 4⅞ ins.

9. Show that as the angle between two forces is increased their resultant is diminished.

10. A ladder 20 feet long weighs 60 lbs; its centre of gravity is 8 feet from the thicker end; it is carried by two men, one of whom supports the heavier end on his shoulder; where must the other stand that the weight may be equally divided? *Ans.* 4 feet from smaller end.

EXERCISES IN COMPOSITION.

A FACT or a truth, expressed in several short or detached sentences, is usually more easily understood than when expressed in one long, involved sentence. Short sentences also give sprightliness and animation to the style. On the other hand, too great a succession of short sentences becomes monotonous and tiresome. French writers generally are characterized by their fondness for short sentences, while Germans are equally remarkable for sentences which are long, involved and cumbersome. The practice of reconstructing sentences, combining short, independent sentences into long, connected ones, and resolving long, complex sentences into short ones, is a very useful exercise for the student. In making these changes a slight change of words is sometimes necessary. The object of the exercises is to learn how to vary the form of a sentence and yet express clearly the meaning.

EXERCISE.

NOTE.—Combine the short sentences into long ones.

1. I know that that prayer will be answered.
I know that that love will be shed abroad.
I know that it will swell all hearts.
I know that it will kindle every tongue.
I know that it will be in every hand more than a sword of fire.

2. I am satisfied.
The ship sails on.
We cannot see, but we can dream.
We have no work, no pain.
I like the ship.
I like the voyage.
I like the company.
I am content.

3. Novels, as a class, are injurious to young people.
They destroy the taste for more solid reading.
They cultivate the emotions to an undue extent.
They convey false impressions of life.

4. Antony has done his part.
He holds the gorgeous East in fee.
He has avenged Crassus.
He will make kings, though he be none.
He is amusing himself, and Rome must bear with him.
He has his griefs as well as Cæsar.
Let the sword settle their disputes.
But he is no longer the man to leave Cleopatra behind.
She sails with him, and his countrymen proclaim how low he has fallen.