Factoring Word Problems

Solve each problem. Draw diagrams if/when necessary.

RECTANGLES

1. A rectangular garden is 12 m long and 10 m wide. Surrounding the garden is a paved walk of uniform width. The combined area of the garden and the walk is 168 m². Find the width of the walk.

2. A rectangular picture is 4 cm longer than it is wide. It is surrounded by a mat that is 2 cm wide. The combined area of the picture and the mat is 140 cm². Find the dimensions of the picture.

3. The width of a rectangle is 7 m less than twice the length. The area of the rectangle is 30 m². Find the length of the rectangle.

4. A certain rectangle is 3 cm longer than it is wide. The area of the rectangle is 550 cm². Find the dimensions of the rectangle.

5. Marie made a rectangular pen for her dog using a side of the barn for one side and 26 m of fencing for the remaining three sides. If the area enclosed was 72 m², find the dimensions of the pen.

INTEGERS

6. The sum of two integers is 20 and their product is 36. Find the integers.

7. Find two positive integers whose product is 240 and whose difference is 8.

VERTICAL MOTION

For problems 8 – 11, use the formula $h = -4.9t^2 + vt + s$

8. A ball is thrown upward with an initial speed of 24.5 m/s. When is the ball 29.4 m high?

9. A projectile is fired upward with an initial speed of 2940 m/s. After how many seconds does it hit the ground?

10. A signal flare is fired upward with an initial speed of 245 m/s. A helicopter pilot at a height of 1960 m sees the flare pass on its way upwards. Assuming the helicopter remains at the same height, how long will it be before the pilot sees the flare again, passing on its way down?

11. A ball is thrown upward (and slightly outward) from the top of a tower that is 98 m high with an initial speed of 39.2 m/s. When does it hit the ground?

TRIANGLES

12. The length of one leg of a right triangle is 2 cm less than three times the length of the other leg. The area of the triangle is 48 cm². Find the length of each leg.

13. The length of one side of a triangle is 2 cm less than twice the length of the altitude to that side. The area of the triangle is 30 cm². Find the length of the altitude.

14. A right triangle has one leg that is 3 inches longer than the other leg. The length of the hypotenuse is 15 inches. Find the unknown lengths.

15. A right triangle has one leg that is 1 foot longer than the other leg. The hypotenuse is $\sqrt{13}$ feet. Find the unknown lengths.

16. A right triangle has one leg that is 2 inches longer than the other leg. The length of the hypotenuse is $\sqrt{130}$ inches. Find the lengths of the legs.

17. A right triangle has one leg that is 3 times as long as the other leg. The length of the hypotenuse is $\sqrt{40}$ inches. Find the lengths of the legs.

18. A right triangle has one leg that is ½ of the length of the other leg. The length of the hypotenuse is $6\sqrt{5}$ inches. Find the lengths of the other legs.