



Math Olympiad and Problem Solving Programs
E120 - Honors Algebra Problem Solving
Problem Set 18.2 - Quadratic Word Problems

Name:

Date:

1. $\boxed{3}$

2. $\boxed{2}$

3. Letting the two numbers be $x, (x + 1)$, then the information gives us the following:

$$\begin{aligned}x^2 + (x + 1)^2 &= 113 \\x^2 + x^2 + 2x + 1 &= 113 \\2x^2 + 2x - 112 &= 0 \\x^2 + x - 56 &= 0 \\(x + 8)(x - 7) &= 0 \\x &= -8, 7\end{aligned}$$

We are looking for two **positive** numbers so they must be $\boxed{7, 8}$.

4. $\boxed{5, 7}$

5. $\boxed{4 \text{ m}}$

6. There was a typo in this problem.

7. $\boxed{34 \text{ cm}}$

8. Let the two numbers be $x, (x + 5)$. Then we get the following equation:

$$\begin{aligned}(x + x + 5)^2 &= 169 \\x + x + 5 &= \pm 13 \\2x + 5 &= \pm 13 \\x &= \frac{-5 \pm 13}{2}\end{aligned}$$

Since x must be positive, $x = \frac{-5+13}{2} = 4$ so our numbers are $\boxed{4, 9}$.



Math Olympiad and Problem Solving Programs

E120 - Honors Algebra Problem Solving

Problem Set 18.2 - Quadratic Word Problems

Name:

Date:

9. The easiest way to do this is to figure out how much food a single cow consumes in 1 day. Since 40 cattle consume 35 kg of food in 25 days, one cow consumes $35 \div 40 \div 25 = \frac{7}{200}$ kg of food in one day.

To answer the first question, we now need to find out how much food $40 + 10 = 50$ cattle consume in one day and then divide this into 35 kg. 50 cattle consume $\frac{7}{200} \times 50 = \frac{7}{4}$ kg of food in one day and so the food will last $35 \div \frac{7}{4} = \boxed{20 \text{ days}}$.

To answer the second question, we need to find out how much food 40 cattle consume in one day and divide that into $35 + 14 = 49$ kg of food. 40 cattle consume $\frac{7}{200} \times 40 = \frac{7}{5}$ kg of food in one day. The food will last $49 \div \frac{7}{5} = 35$ days. This is $35 - 25 = \boxed{10 \text{ days longer}}$.

10. This problem may have been graded incorrectly.

The grandchildren share the smallest portion of the money in a ratio of $4 : 5 : 7$. Since the eldest grandchild gets \$975 more than the youngest, this gives us the following equation:

$$7x = 975 + 4x$$

$$3x = 975$$

$$x = 325$$

Total, the grandchildren get $4x + 5x + 7x = 16x = 16 \times 325 = \5200 . Since the ratio of the portions of the total money is $6 : 3 : 2$, this means that there is a total of $(6 + 3 + 2)5200 = \boxed{\$57,200}$