

ART OF PROBLEM SOLVING

Show your reasoning. Use graph paper for models and additional work.

1. Evaluate $-72 \div 8$, $-96 \div (-12)$, $0 \div (-15)$, and $45 \div 0$. State when a quotient is undefined.
2. Use the multiplication fact $(-7)(9) = -63$ to write two related division facts. Explain how the signs are determined.
3. Find the missing integer in each equation: $84 \div x = -7$ and $x \div (-6) = 11$.
4. Evaluate $96 \div (-4) \div (-3)$ from left to right. Compare it with $96 \div ((-4) \div (-3))$. What does this show about division?
5. For what integer values of n is $72 \div n$ an integer? List both the positive and negative possibilities.

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- A team loses 54 points evenly over 6 rounds. What is the mean change per round? Write and interpret an integer quotient.
- The quotient of two integers is -8, and their sum is 21. Find the two integers.
- Without calculating the exact quotients, order $-120 \div 3$, $120 \div (-5)$, and $-120 \div (-8)$ from least to greatest. Explain using signs and magnitude.
- Explain why division by zero is impossible by assuming $18 \div 0 = k$ and translating that statement into multiplication. Why does the same argument not prevent $0 \div 18$?