

2010 James S. Rickards Fall Invitational
FOURTH GRADE TEAM ROUND

1. (2 Points) Let

$$\begin{aligned} A &= 10 + 10 + 12 - 4. \\ B &= 3 \times 6 \div 2 + 4. \\ C &= 1 + 4 + 5 \times 6. \\ D &= \frac{2 + 3 + 5}{10}. \end{aligned}$$

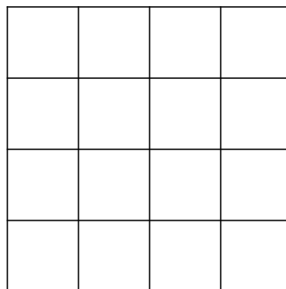
Compute the value of $B + C - A \times D$.

2. (2 Points) A circle has a radius of 10. Using the approximation $\pi \approx 3$, compute the area of this circle.
3. (2 Points) Two numbers x and y have a sum of 102 and a difference of 68. Compute the value of $x \times y$.
4. (2 Points) Fernando Muslera, the Uruguayan goalkeeper, saved the following number of goals in the first 9 games of the season: 5, 4, 2, 1, 3, 2, 4, 3, 3. Let

$$\begin{aligned} A &= \text{the mean (average) number of goals saved.} \\ B &= \text{the median (middle) number of goals saved.} \\ C &= \text{the mode (most common) of goals saved.} \end{aligned}$$

Compute the value of $A + B + C$.

5. (3 Points) How many squares are in the following figure? Consider squares of all sizes!



6. (3 Points) The Cupcakes Dance Troupe decides to go to the movies one day. There are 15 people, and the vans that they must travel in carry a maximum of 7 people. Find the minimum number of vans needed to carry the Cupcakes Dance Troupe to the movies.
7. (3 Points) In the 2010 Vancouver Winter Olympics, the moguls score was determined by the sum of the turns, air, and time scores.

Champion Alexandre Bilodeau's scores were as follows: Turns: 14.2, Air: 5.44, Time: 7.21. Let A equal his moguls score.

The silver medal scores were as follows: Turns: 14.2, Air: 5.43, Time: 6.95. Let B equal the moguls score.

Compute the value of $A + B$.

8. (3 Points) David the merchant buys pillows at \$5 each and then sells them at \$13 dollars each. How much profit, in dollars, does David make if he buys 20 pillows but only manages to sell 10 of them?
9. (4 Points) On the day before the Rickards Invitational, Sally tries to count sheep to help herself fall asleep. She counts the sheep in groups. She counts 1 sheep in the first group, 3 sheep in the second group, 5 sheep in the third group, and so on. How many sheep does she count in the tenth group?

10. (4 Points) Winda the Snowman has volume 36in^2 . Unfortunately, Winda is melting at 6in^2 per hour. In an effort to save her, a group of kids continually add snow at a rate of 3in^2 per hour. While this slows her melting, it is not enough to completely rebuild Winda. How many hours will it take for Winda to completely melt?
11. (4 Points) Lalitha wants to buy a ninja suit for her sister. Ninja Suits sell for \$110 dollars, but Lalitha has a coupon for a 14% discount. If there is a 5% sales tax after the discount, what is the final price, in dollars, for the Ninja Suit?
12. (4 Points) Pamela is at the bottom of a 30 mile hill. She can walk $5\frac{1}{2}$ miles a day up the hill, but at night, when she sleeps, evil squirrels push her down $3\frac{1}{2}$ miles. How many days will it take Pamela to reach the top of the hill?
13. (5 Points) Dobby is attempting to complete the Ultimate Challenge of Doom. He must swim, run, and hop.

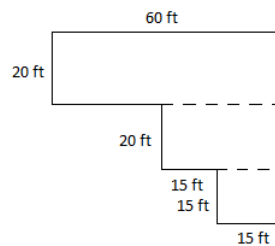
Dobby must first swim 2000 meters. If one lap is 50 meters, let A equal the number of laps Dobby must swim.

Dobby then must run 12 miles. If 2 laps are 4 miles, let B equal the number of laps Dobby must run.

Finally, Dobby has to hop around a field for 200 miles. If 5 laps are 20 miles, let C equal the number of laps Dobby must hop to complete the Ultimate Challenge of Doom.

Compute the value of $A \times B \times C$.

14. (5 Points) Farmer Joe owns the following pigpen.



Ignoring units, compute the sum of the perimeter and area of the pen. Note that the perimeter is the sum of the solid lines.

15. (5 Points) Bob the brickmaster is using bricks which are 10 cm tall to build a wall. Bob builds a wall with 10 layers of bricks, putting a 2 cm layer of mortar between every two bricks. How tall, in cm, is Bob's wall?
16. (5 Points) In Hogwarts School of Witchcraft and Wizardry, 4th year students must take at least one of two classes: Transfiguration, and Potions. There are 100 4th year students total. Of these students, 75 take Potions and 50 take Transfiguration. Determine the number of students who take both classes.