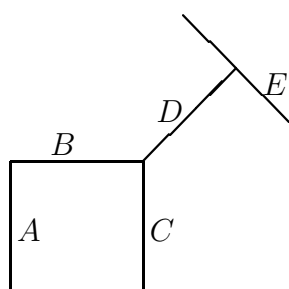


Target Practice 2

1. How many ordered pairs  $(x, y)$  of positive integers satisfy

$$xy + x + y = 199?$$

2. The quantity  $V$  varies inversely with quantity  $t$  and directly with quantity  $R$ . When  $R = 2$  and  $t = 4$ ,  $V = 12$ . What is the value of  $V$  when  $t = 9$  and  $R = 3$ ?
3. How many different amounts can be made using one or more coins from a stack consisting of two pennies, three nickles, four dimes and five quarters.
4. Triangle  $T$  has vertices  $(0, 1)$ ,  $(1, 0)$ , and  $(5, 0)$ . Circle  $C$  circumscribes  $T$ . If  $(a, b)$  is the center of  $C$ , then  $a + b =$
5. A particle starts at the origin  $(0, 0)$  at time 0. It moves at one unit per second first to  $(1, 0)$  then to  $(1, 1)$ ,  $(0, 1)$ ,  $(-1, 1)$  and to  $(-1, 0)$  spiraling outward and tracing out rectangular regions. Find the location of the particle after 2000 seconds.
6. The animal shown in the diagram is a *gnu*. Which one of the labeled body parts can be repositioned to produce a new gnu?



7. Let

$$g(x) = \begin{cases} |x| & \text{if } x < 3 \\ x^2 - 1 & \text{if } x \geq 3 \end{cases}$$

What is slope of the line joining the two points  $(-2, g(-2))$  and  $(3, g(3))$ ?

Mathcounts Coaches Workshop, IOLANI SCHOOL, Summer 2000

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8. There exist positive integers  $x, y,$  and  $z$  satisfying

$$28x + 30y + 31z = 365.$$

Compute the value of  $z - 2x$  for some such triplet.

9. The product of four distinct positive integers,  $a, b, c,$  and  $d$  is  $8!$ . The numbers also satisfy

$$ab + a + b = 391 \tag{1}$$

$$bc + b + c = 199. \tag{2}$$

What is  $d$ ?

10. Find the sum of all values of  $x$  that satisfy

$$|x + 1| + 3|x - 2| + 5|x - 4| = 20.$$

11. What is the product of the roots of

$$(x - 1)(x - 3) + (x - 4)(x + 5) + (x - 3)(x - 7) = 0?$$

12. Twelve lattice points are arranged along the edges of a  $3 \times 3$  square as shown. How many triangles have all three of their vertices among these points? One such triangle is shown.

