Pre-Algebra

Homework 10 Geometry

Use $\pi = 3$ for your calculations

1. I am building a ramp. The length of the ramp along the ground is 12 meters and it's 5 meters high and 5 meters wide. I want to paint it with wood preserver all over (including the base) before I install it. If the price of paint to cover 1 square meter is \$1, how much is this going to cost me?

2. Amy lives right in the center of town. Her friend Betty lives 2 miles north and 4 miles east of Amy. Amy drives to Betty's house to pick her up and they then drive 2 miles east to pick up Cathy, and then all three drive two miles north to a dance club. Plot these four points (call them A, B, C and D) on a map of the town and, on the assumption that all the roads in the town run north-south or east-west, draw Amy's path between her house and the dance club. If Amy can drive at 30 m.p.h., and it takes 5 minutes each to pick up Betty and Cathy, when should she leave home to get to the dance club by 7 pm?

3. My desk is a rectangle measuring 5 feet by 4 feet. (a) What is the area of my desk? (b) my desk has flaps at either end which can be raised to make its surface area bigger. If each flap is a semi-circle of diameter the same as that of the small dimension of my desk (4 feet), what is the area of my desk with the flaps raised? (c) I buy a flat-screen TV for my living room. The salesman tells me it's a 17" screen, but when I get home and measure it I find it's a rectangle measuring $8" \times 15"$. Was he lying to me? Explain.

4. The Earth's diameter is roughly 8,000 miles. (a) What is its circumference? (b) suppose the Earth is a perfect sphere and completely flat (no mountains, oceans etc.). I want to lay a fiber-optic cable all the way around the Equator, flat on the ground. What length of cable do I need to do this? (c) Instead, I decide to hang the cable from the tops of pylons 100 feet high. If I can make the cable taut, so that it's a circle, how much more cable do I need? (d) I also want to lay a cable round the Earth, flat to the ground, running due north between the

South Pole and the North Pole, then back down to the South Pole on the other side of the Earth. What length of cable do I need?

5. A grain silo is built out of sheet aluminum; it is cylindrical with radius r and height h. The silo has a floor and a hemispherical roof of radius r. Write the formula for the total surface area of the silo, and write it in the simplest form.

6. A washer (a flat disk of metal with a large concentric hole, used for a spacer in metal construction) has an outer radius (the radius of the washer) of x and an inner radius (the radius of the hole) of y. Draw the washer, and write in its simplest terms a formula for the area of the washer.

7. A straight line is the shortest distance between two points. What's the shortest distance between the North and the South pole of the Earth along the surface of the Earth (you can't make a tunnel).

8. My company makes copper piping by extrusion. I'm making piping with an outer wall of 11 cm and an inner wall of 10 cm. If the density of copper is 9 gm/cm^3 and the price of copper is \$7 per kilogram, what is the cost of materials to make 1 meter of copper tubing?

9. Butter has a density of about 1 gm/cm^3. I am making 1 kg packages of butter in (a) cubical blocks and (b) cylinders whose height is roughly 1/2 of the diameter. What is the size of the blocks of butter in both cases?

10. Time to paint the living room. The room measures 20 feet wide by 30 feet long by 12 feet high. There are two doors, 7 feet high by 3 feet wide, and four windows, each 4 feet high by 3 feet wide. I'm going to paint the walls and ceiling with two coats of paint at 25 cents per square foot. What will it cost?