

Worksheet

These problems deal as much with how certain words are used in mathematics and how these words are changed into numbers or formulas. To make these more interesting I note had these are exactly the type of surprise mystery question that I am likely to ask on the exam.

1. Recall the area A of a circle of radius r is $A = \pi r^2$.
 - (a) If the radius of a circle is increased from $r = 1$ by an amount $\Delta r = .5$ then
 - i. What is the new radius? (Don't try to make this hard.)
 - ii. What the the corresponding change ΔA in the area?
 - iii. What is the percent increase in the area?
 - (b) If the radius of a circle is decreased from $r = 4$ by an amount $\Delta r = -1$ (we use the negative sign to indicate decrease) then
 - i. What is the new radius?
 - ii. What the the corresponding change ΔA in the area?
 - iii. What is the percent decrease in the area?
 - (c) More generally if the radius r is changed by an amount Δr then
 - i. What is the new radius?
 - ii. What is the corresponding change in the area?
 - (d) Is the radius of a circle is doubled, then by what factor does the area change by?
 - (e) Is a 20in pizza at three times the price of a 10in pizza a good deal?
 - (f) If the radius of a circle is doubled, then what is the percent change in the area?
 - (g) If the area of a circle is doubled, then by what factor does the radius change?
2. The volume V of a right circular cylinder with base of radius r and height h is $V = \pi r^2 h$.
 - (a) If the radius of the of the cylinder is increased by 20% then what is the percent increase in the volume?
 - (b) If the height of the cylinder is increased by 20% then what is the percent increase in the volume?
 - (c) If the radius of the cylinder is doubled and the volume stays the same, then by what factor does the height change?
 - (d) Which has the greater effect on the volume of the cylinder, doubling the radius or doubling the height?
 - (e) What is the formula for the change ΔV in the volume of the cylinder when the radius is changed by Δr and the height is changed by Δh ? (This will involve some algebra.)