

Math 1030 #18b



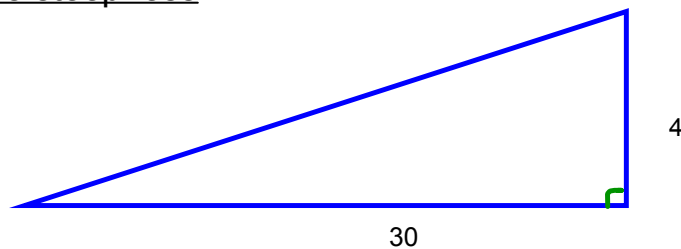
Problem Solving in Geometry



Pitch, Grade, Slope



Ways to measure steepness



Pitch

pitch of 4 in 30 (or 2 in 15)
"pitch of (vert. ht) in (horiz. distance)"

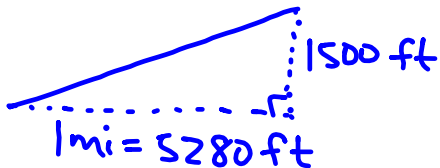
Slope

$$\frac{\text{rise}}{\text{run}} = \frac{4}{30} = \frac{2}{15}$$

Grade

slope expressed as percentage
 $\frac{2}{15} \approx 13.3\%$

EX 1: What is the approximate grade of a path that rises 1500 feet every mile?



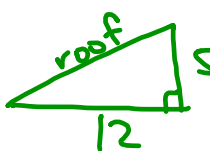
$$\text{grade} = \frac{1500 \text{ ft}}{5280 \text{ ft}} \approx 28.4\%$$

EX 2: Which is steeper, a trail with an 18% grade or a trail with a pitch of 2 in 11?

$$\text{pitch of 2 in 11} = \text{grade of } \frac{2}{11} = 0.\overline{18} \approx 18.18\%$$

⇒ pitch of 2 in 11 steeper than a grade of 18%

EX 3: What is the grade of a 5 in 12 roof? How much does it rise in 18 horizontal feet?



$$\text{pitch of 5 in 12} = \frac{5}{12} \approx 41.7\% \text{ grade}$$

$$\begin{aligned} \text{rise} &= 41.7\% \text{ of its horizontal length} \\ &= 0.417 (18 \text{ ft}) \approx 7.5 \text{ ft} \end{aligned}$$