Grade Resistance

Formula: $F=W\sin\theta$

To get the correct answer on your calculator do one of the following.

- After putting in your equation clip 2nd APPS and click the degree symbol to but on the degree for sin
- Before beginning, click the mode button on your calculator and change the setting from radian to degree.

1. A Truck weighing 2400lbs is traveling uphill. The road has a slope of 20°. Find both the parallel and perpendicular weight acting to the slope. Show all your steps

Parallel

$F=W\sin\theta$

$F=2400(\sin 20)$

$F=2400\cdot 0.342$

$F=820.8$

Perpendicular

$F=W\cos\theta$

$F=2400(\cos 20)$

$F=2400\cdot 0.94$

$F=2259.262$

2. A car weighing 1500lbs is going downhill at 15°. Find both the parallel and perpendicular weight acting to the slope. Show all your steps

negative

Parallel

$F=W\sin\theta$

$F=1500(\sin 15°)$

$F=1500\cdot 0.259$

$F=-388.5$

Perpendicular

$F=W\cos\theta$

$F=1500(\cos 15°)$

$F=1500\cdot 0.966$

$F=-1449$

3. The car weighing 950lbs is going downhill at 3.43°. Find both the parallel and perpendicular weight acting to the slope. Show all your steps.

negative

Parallel

$F = W \sin\theta$

$F = 950 (\sin 3.43^\circ)$

$F = 950 \cdot 0.059$

$F = 56.05$

Perpendicular

$F = W \cos\theta$

$F = 950 (\cos 3.43^\circ)$

$F = 950 \cdot 0.998$

$F = -948.1$

4. There is a truck weighing 4500lbs going uphill at a slope of 5.78°. Find both the parallel and perpendicular weight acting to the slope. Show all your steps.

Parallel

$F = W \sin\theta$

$F = 4500 (\sin 5.78^\circ)$

$F = 4500 \cdot 0.101$

$F = 454.5$

Perpendicular

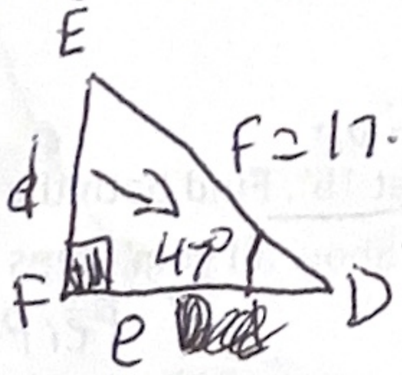
$F = W \cos\theta$

$F = 4500 (\cos 5.78^\circ)$

$F = 4500 \cdot 0.995$

$F = 4477.5$

5. A Right triangle <DEF has angle D= 47°, side f= 17.86cm. What is the length of side d.



$\sin(\angle D) = \frac{d}{f}$

$17.86 (\sin(47^\circ)) = \left(\frac{x}{17.86}\right) \cdot 17.86$

$17.86 (\sin 47^\circ) = d$

$d = 13.06\text{cm}$

6. A right Triangle <ABC has angle A= 65°, side c= 26.53inch. Find all other sides and angles of the Triangle.

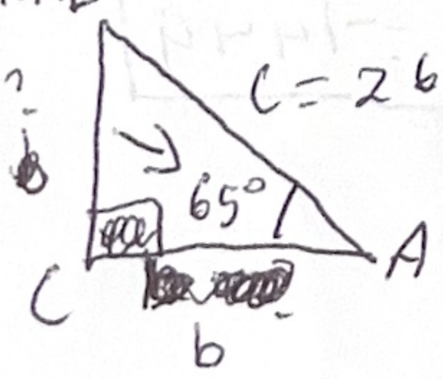
$24.04^2 + b^2 = 26.53^2$

$577.92 + b^2 = 703.84$

$-577.92 \quad -577.92$

$b^2 = 125.92$

$b = 11.22\text{inch}$



$\sin(\angle A) = \frac{a}{c}$

$\sin(65^\circ) = \frac{x}{26.53}$

$26.53 \cdot \sin(65^\circ) = a$

$a = 24.04\text{inch}$

$65 + 90 = 155$

$180 - 155$

$\angle B = 25^\circ$