

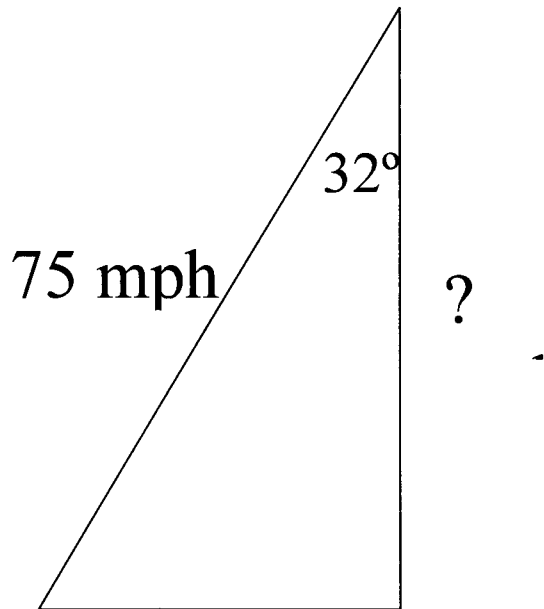
*Applications using Trigonometry and
Similar Triangles*

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CHANGING LANES

THE ANNOYING LANE SWERVER

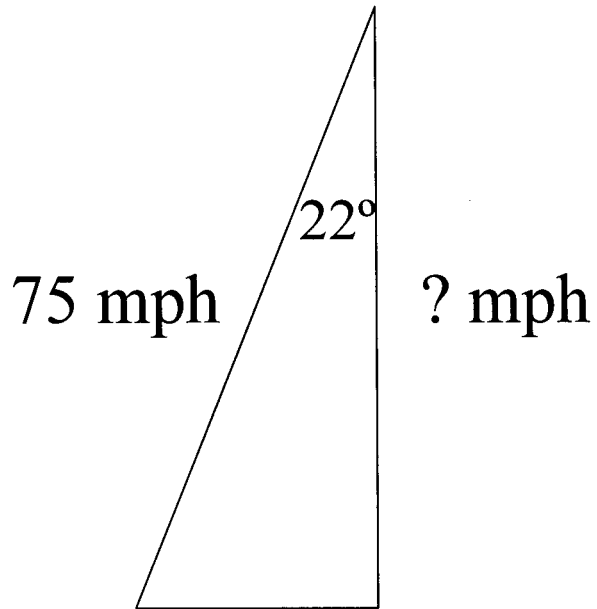


$$\cos \theta = \frac{A}{H}$$

$$\cos 32^\circ = \frac{A}{75}$$

$$A = 75 \cos 32^\circ \approx 63.6 \text{ mph}$$

The polite gradual lane changer



$$\cos \theta = \frac{A}{H}$$

$$\cos 22^\circ = \frac{A}{75}$$

$$A = 75 \cos 22^\circ \approx 69.5 \text{ mph}$$

http://citydoc.cityofmesa.org/stellent/groups/public/documents/jobdescriptions/com_c5_002673.hcsp

City of Mesa Arizona job opening

City of Mesa - Development Services

ENGINEERING TECHNICIAN II

POSITION DESCRIPTION

Classification Responsibilities: An Engineering Technician II performs paraprofessional engineering work, including technical and skilled drafting assignments. This class performs related duties as required.

Distinguishing Features: (By Assignment)

An Engineering Technician II performs basic and intermediate traffic engineering tasks and functions at full performance regarding the resolution of visibility concerns and other traffic safety issues.

QUALIFICATIONS

Education and Experience: Requires graduation from high school or GED and any combination of training, education, and experience equivalent to two years experience in paraprofessional engineering (civil or traffic by assignment) work

Mental: Interprets blueprints and work plans. Applies the techniques of drafting to produce neat, precise, and well-balanced drawings. Prioritizes work assignments. Comprehends and makes inferences from "as-builts," written procedures, and specifications. Conducts research to properly identify land and utility data and plans.

Performs mathematical calculations, statistical computations, and applies fractions, percentages, ratios and proportions, algebra, geometric constructions, and the essentials of trigonometry.

Performs detailed engineering records research and applies research to ensure the precision, accuracy, and completion of computerized engineering maps.

Career: Traffic Technicians

<http://www.iseek.org/sv/13000.jsp?id=100472>

Hiring Practices

Employers prefer to hire traffic technicians who have a high school diploma or GED. Some employers require two years of experience or an associate degree.

Employers look for technicians who have good communication skills. Since they interview the public, technicians must be good at asking questions and listening. Technicians also must be able to convey their findings in reports to their supervisors.

Mathematics

Pre-Algebra

Algebra

Geometry

Advanced Algebra courses

Trigonometry

Advanced Geometry courses

Advanced Trigonometry courses

Pre-Calculus

Calculus

Probability and Statistics

Wages

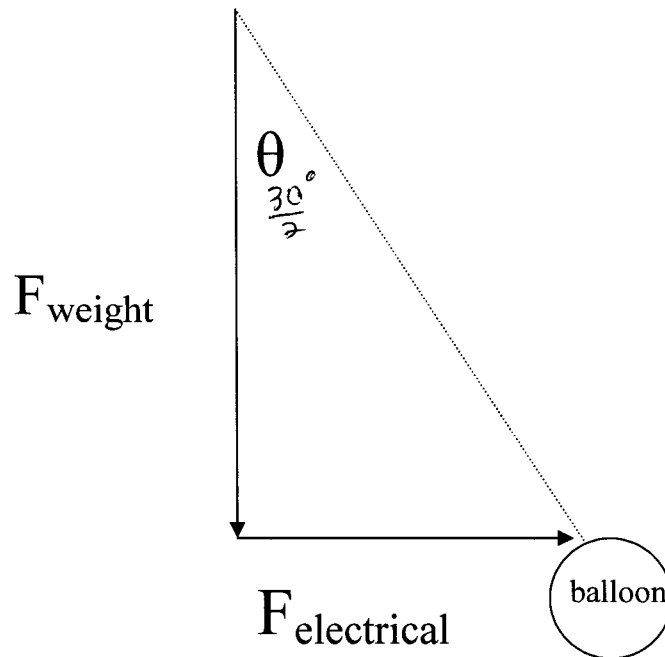
Wage information for traffic technicians in Minnesota is not available

Nationally, the median wage for traffic technicians is \$2,640 per month (\$15.22 per hour). Half of all traffic technicians earn between \$2,010 and \$3,570 per month (\$11.60 and \$20.61 per hour).

Mass of the balloon: 0.0066 kg

$$\begin{aligned}\text{Weight of the balloon} &= F_{\text{gravity}} = mg \\ &= (0.0066 \text{ kg}) (9.8 \text{ m/s}^2) = 0.006468 \text{ N}\end{aligned}$$

Distance (balloon to midpoint) = 0.16 m
(32 cm total)



$$F_e = \frac{kq_1q_2}{r^2}$$

and since we'll have to assume $q_1 \approx q_2$ we have

$$F_e = \frac{kq^2}{r^2}$$

$$k_{\text{air}} = 8.93 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2}$$

Using simple trig,

$$\tan \theta = \frac{F_e}{F_W}$$

Solving for F_e we get

$$F_e = F_G \tan \theta$$

$$F_e = (0.006468 \text{ N}) \tan 15^\circ = 0.001733$$

$$q = \sqrt{\frac{F_e r^2}{k}} = \sqrt{\frac{(0.001733)(.16)^2}{8.93 \times 10^9}} = 7.04 \times 10^{-8} \text{ Coulombs}$$

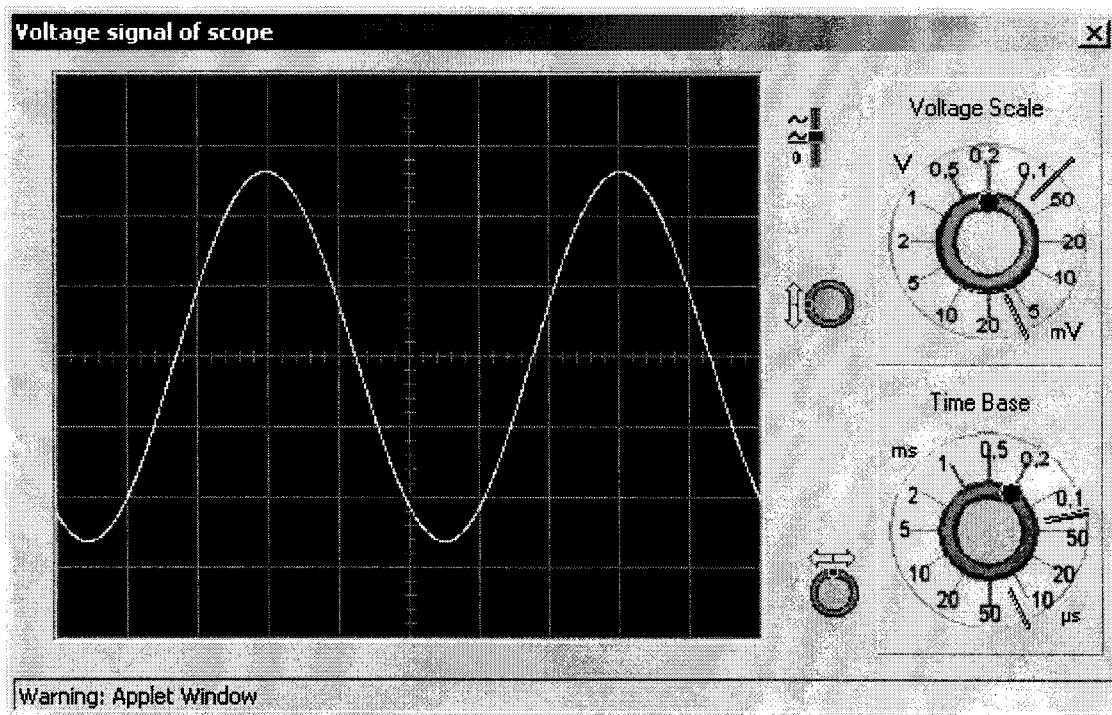
Number of lost electrons

$$= q (6.25 \times 10^{18} \text{ electrons / C})$$

$$= (7.04 \times 10^{-8}) 6.25 \times 10^{18}$$

$$= \underline{4.4 \times 10^{11} \text{ electrons}}$$

CHANGES FASTER THAN THE WEATHER IN MISSOURI



Amplitude peak is at 170 Volts.

120 Volts as measured by Voltmeters is the RMS Voltage = $\frac{170}{\sqrt{2}}$