Kinematics

Practicing Vector Diagrams

Being able to add vectors graphically, using diagrams, is an important skill in many fields. These exercises will let you practice this skill.

Practicing Vector Diagrams

Instructions

For each of the following problems, draw a **vector scale diagram** to determine the object's total displacement.

On each diagram, clearly indicate a **scale** and the **direction** of north.

Indicate the starting position of the object with a small cross:

✗

Draw the vectors as **solid directed line segments**:

⟶

Draw the resultant vectors as a **dashed directed line segment**:

⇢

Measure the length and direction of the resultant vector and convert the measurement back into a real world vector.

A

Very Easy Problems
These problems have vectors that are all at right angles to each other. They are very easy to draw.

B

Easy Problems
The problems have vectors at right angles and at 45° to each other. They are easy to draw.

C

More Challenging Problems
The problems have vectors at many different angles to each other. They are more challenging to draw.
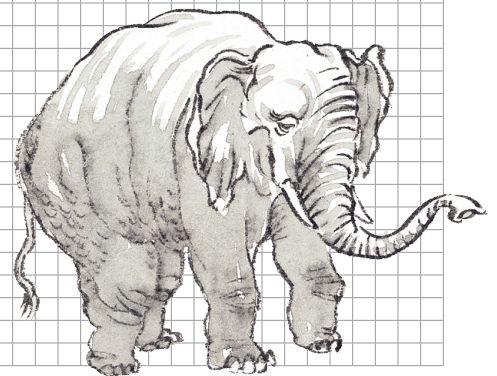
Perambulating Pachyderm

An elephant walks 25 km [N], 12 km [W], 32 km [S], and 21 km [E]. Use a vector diagram to find the elephant's displacement.
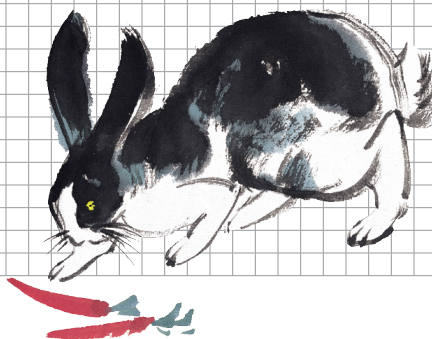
N

X

Scale: 1 cm = 2 km

Hopping Hares

A hare hops 142 m [N], 193 m [E], 94 m [S], and 12 m [E]. Use a vector diagram to find the hare's displacement.
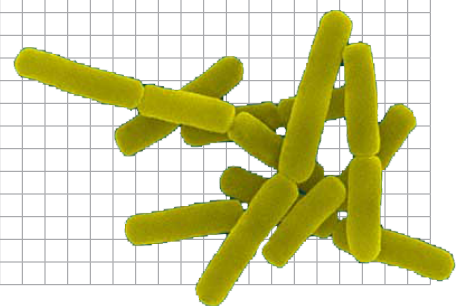
N

Scale: 1 cm = 10 m
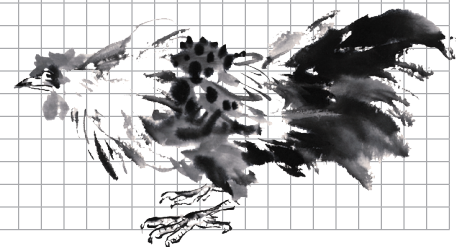
X

Ambulatory Anthrax

An anthrax bacillus moves 135 µm [up], 65 µm [left], 52 µm [up], 48 µm [left], and 34 µm [down]. Use a vector diagram to find the anthrax bacillus' displacement.
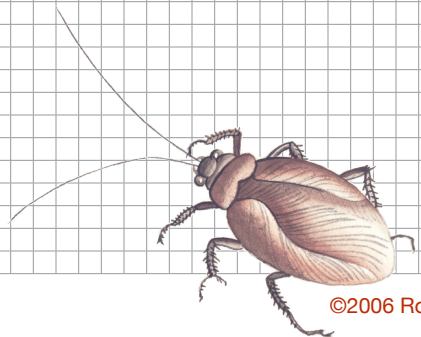
Roaming Rooters

A rooster walks 8.2 m [S], 4.5 m [W], 12.6 m [N], 13.2 m [E], 9.5 m [S], 6.2 m [W], 5.2 m [N], and 4.3 m [E]. Use a vector diagram to find the rooster's displacement.
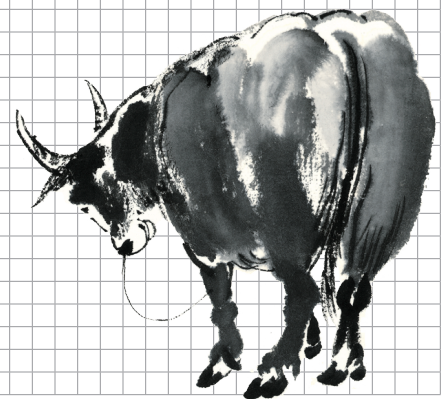
Bumbling Beetles

A beetle walks 2.1 cm [N], 4.5 cm [NW], 1.6 cm [S], and 3.2 cm [SE]. Use a vector diagram to find the beetle's displacement.
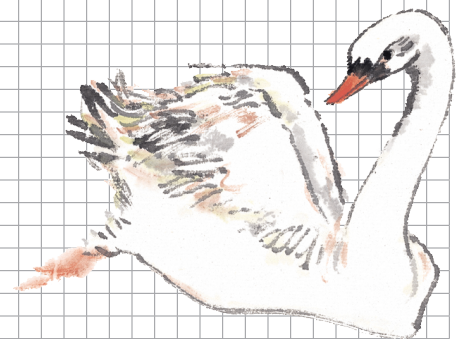
Wandering Water Buffalo

A water buffalo wanders 200 m [N], 150 m [SW], 180 m [W], and 250 m [SE]. Use a vector diagram to find the water buffalo's displacement.
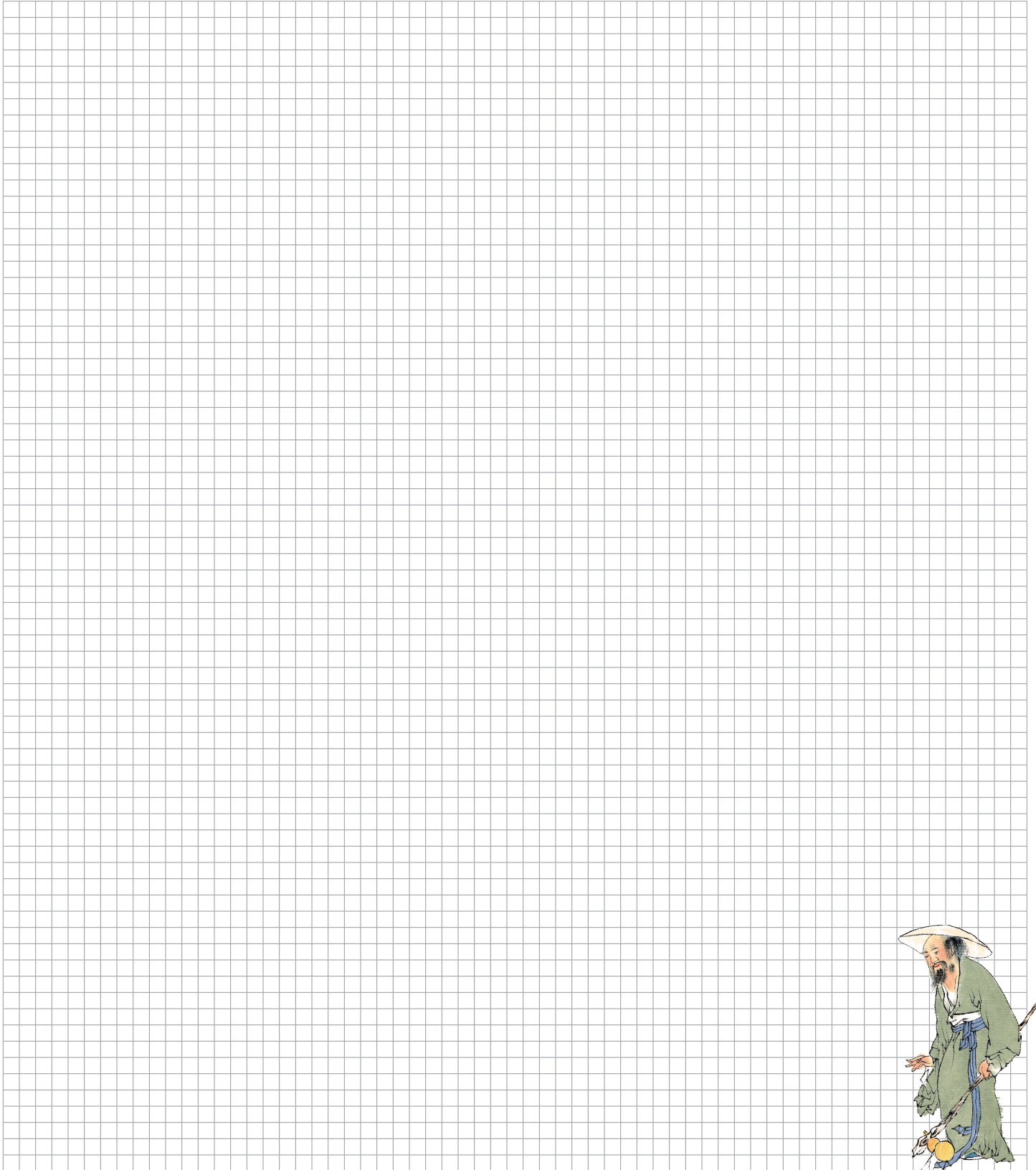
Swimming Swans

A swam swims 12 m [S], 15 m [E], 20 m [N30°W], and 10 m [S60°E]. Use a vector diagram to find the swan's displacement.
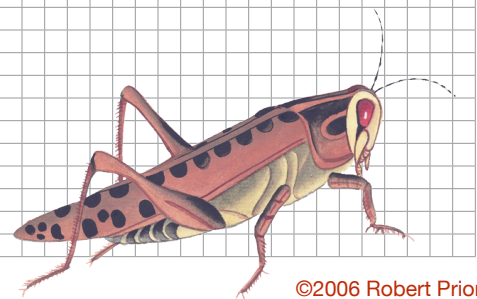
Meandering Monks

A monk walks 15.6 km [N], 9.5 km [S30°W], 12.3 km [E], 5.7 km [S], and 10.5 km [N60°E]. Use a vector diagram to find the monk's displacement.

Creeping Cricket

A cricket creeps 1.2 m [S], 0.8 m [30° S of W], 0.5 m [15° W of N], 0.4 m [E], and 0.8 m [25° E of N]. Use a vector diagram to find the cricket's displacement.

Perambulating Pandas

A panda walks 85 m [N], 125 m [15° S of E], 143 m [25° W of N], and 107 m [S]. Use a vector diagram to find the panda's displacement.