B3 · Extra practice

Original diploma-style practice | Items 1-2

Extra practice for this lesson. Original questions, not released diploma items. Select one option for multiple choice; other tasks state the required response.

Use $k = 8.99 \times 10^9$ N·m²/C² and $g = 9.81$ m/s² where needed (Alberta Physics 30 data sheets, Constants). For numerical responses, use the stated unit or coefficient and precision. Work in degrees.

B3-D01 · Multiple choice

A positive source is left of a negative target and a negative source is right of it. Which pair of target-force arrows is correct, in left-source then right-source order?

A. Left; right.
B. Right; left.
C. Right; right.
D. Left; left.

Response: _____

B3-D02 · Multiple choice

A target feels two perpendicular forces of magnitudes 3 units and 4 units. Which net force magnitude is correct?

A. 1 unit
B. 5 units
C. 7 units
D. 12 units

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 3-4

B3-D03 · Multiple choice

A sphere is at rest under weight, tension and a horizontal electric force. String angle θ is measured from vertical. Which equation balances vertical forces?

A. $T \sin \theta = mg$
B. $T = mg$
C. $T \cos \theta = mg$
D. $F_e \cos \theta = mg$

Response: _____

B3-D04 · Multiple choice

A problem gives a hanging sphere’s mass and string angle, but no source charges or distance. Which method directly finds the horizontal electric force?

A. Balance horizontal and vertical force components.
B. Substitute directly into Coulomb’s law.
C. Add mass to the string angle.
D. Assume the electric force is zero because the sphere is at rest.

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 5-6

B3-D05 · Numerical response

Forces on one target are 0.720 N right and 0.180 N left. What is net force magnitude in N? Record three significant figures.

Response: _____

B3-D06 · Numerical response

Forces on a target are 0.900 N east and 1.20 N south. What is the magnitude of the net force in N? Record three significant figures.

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 7-8

B3-D07 · Numerical response

A sphere of mass 2.00×10^{-4} kg is at rest with its string 40.0° from vertical. The electric force is horizontal. Use g = 9.81 m/s². What is its electric-force magnitude, expressed as a $\times 10^{-3}$ N? Record a to three significant figures.

Response: _____

B3-D08 · Numerical response

Point charges in air: target B = −1.00 µC at x = 0, A = +1.00 µC at x = −0.300 m, C = −3.00 µC at x = +0.300 m. Use $k = 8.99 \times 10^{9}$ N·m²/C². What is the net force magnitude in N? Record three significant figures.

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 9-10

B3-D09 · Select all that apply

A suspended sphere is at rest under weight, tension and horizontal electric force. Choose every true statement: A. Net force is zero. B. Electric force must be zero. C. Tension acts along the string. D. Vertical tension balances weight.

Response: _____

B3-D10 · Matching

Match each description to a method. 1 = add signed forces on one line; 2 = the Pythagorean theorem and an angle; 3 = balanced forces. Cases: (a) known forces east and north; (b) mass and steady string angle; (c) known forces left and right. Record a-b-c codes.

Response: _____

B3 · Extra practice

Original diploma-style practice | Items 11-12

B3-D11 · Ranking

Each pair acts on one target: A has 0.300 N east and 0.400 N north; B has 0.300 N east and 0.400 N east; C has 0.300 N east and 0.400 N west. Rank net force magnitudes largest to smallest.

Response: _____

B3-D12 · Ordering

For several charges around a target, order these actions: 1 add signed components; 2 identify the target and source-target distances; 3 draw each force direction from signs and positions; 4 calculate each force magnitude. Give a sensible four-digit order.

Response: _____