■ KEY ■

First Name:_____   Last Name:_____

## L03 – Worksheet – Reflection Ray Diagrams

Textbook Questions

Pg 665 #4: Compare "virtual" images with "real" images.

VIRTUAL IMAGE - An image that appears to be "behind" a reflecting surface. If you were brushing your teeth in the morning, the image of the toothbrush doesn't appear to be "on" the surface of the mirror, it actually looks to be 2-3 ft "behind" the surface.
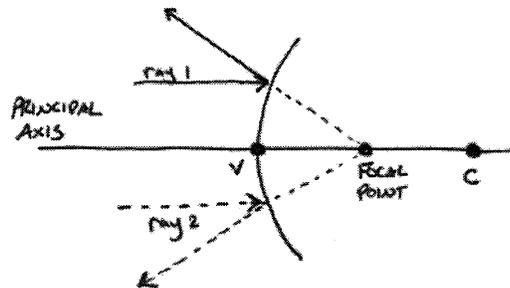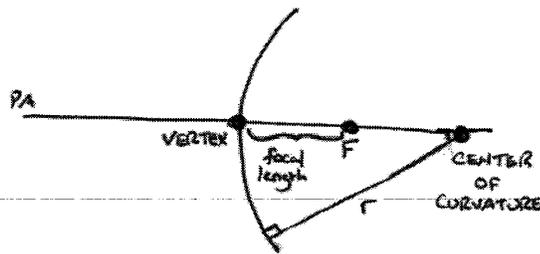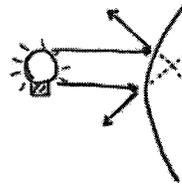
REAL IMAGE - An image that appears to be on the surface of an object, such as a shadow hand-puppet image appears on the surface of a wall.

Pg 665 #5: Compare "converging" and "diverging" mirrors.
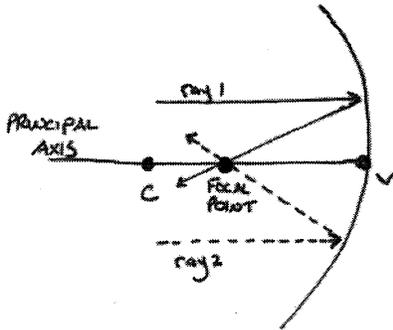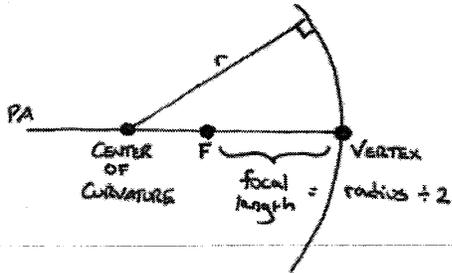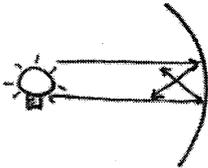
Pg 665 #6: Describe the path of the three rays that can be used to determine the characteristics of an image formed in a curved mirror.
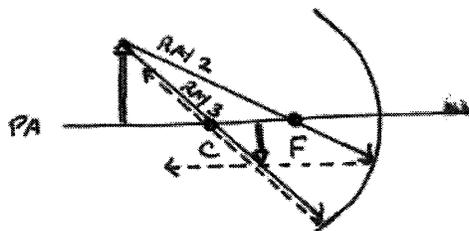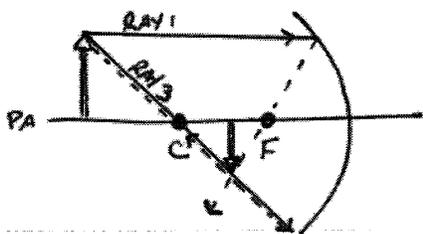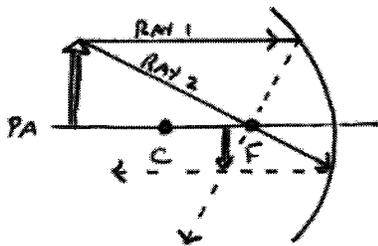
INCIDENT RAY 1 - Parallel to principal axis, reflect/originate through focal point.

INCIDENT RAY 2 - From point toward focal point, reflected back parallel to principal axis.

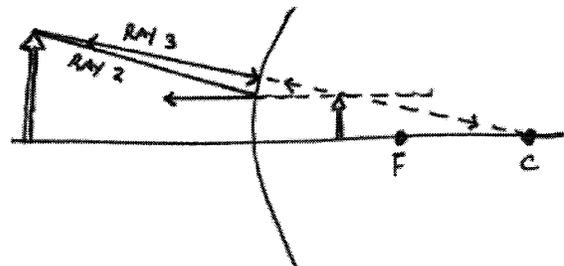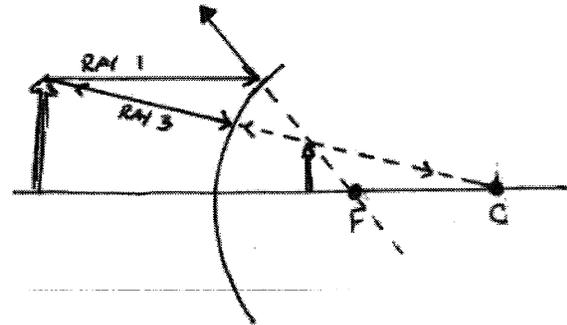INCIDENT RAY 3 - From point toward center of curvature and back along incident path.

You will need 2 of 3 of these to predict the location and characteristics of the image.

CONVEX MIRROR

CONCAVE MIRROR
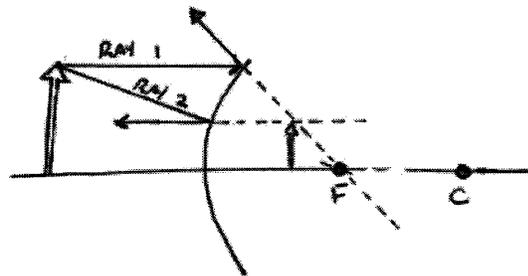
Pg 665 #9: Draw a ray diagram for a converging mirror and determine the image characteristics when the object is located at:

    a. 2.0 f

    b. 0.50 f

    c. 3.0 f

(A)

C   F

(B)

C   F

(C)

C   F

Pg 665 #10: Draw a ray diagram for a diverging mirror and determine the image characteristics when the object is located at:

    a.   0.50 f

    b.   1.0 f

    c.   1.5 f

Diploma Worksheet Questions – Reflection Ray Diagrams (Plane Mirrors)

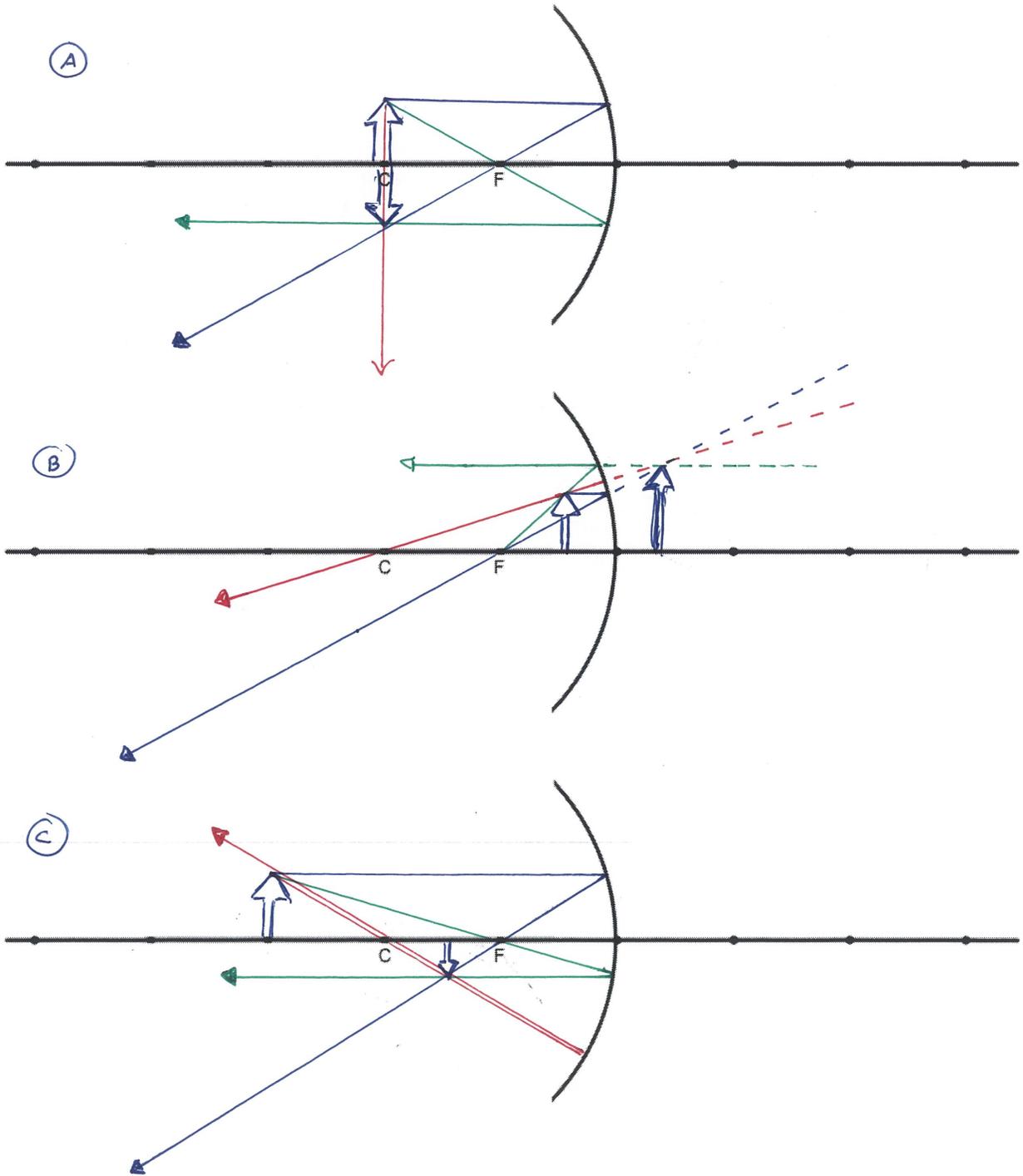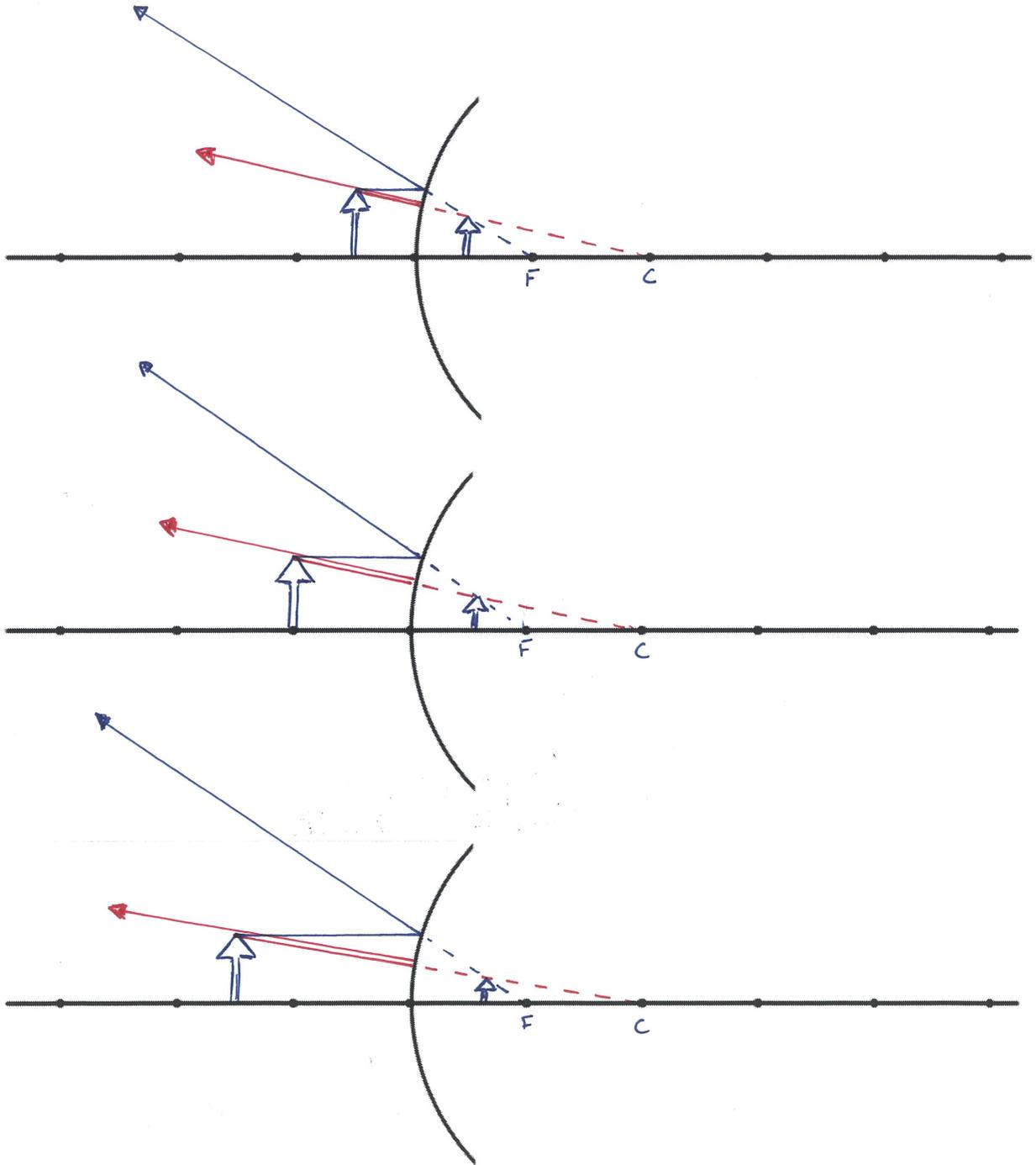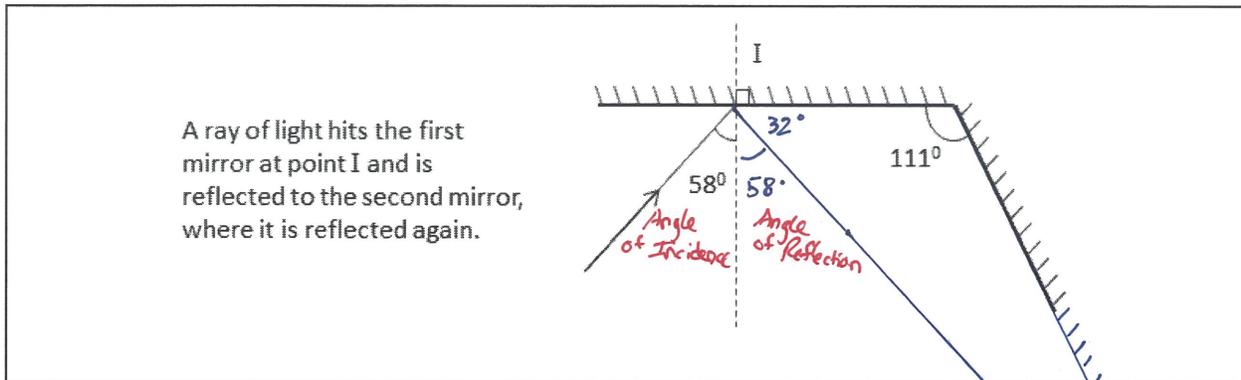*Use the following information to answer Q502:*

A ray of light hits the first mirror at point I and is reflected to the second mirror, where it is reflected again.

Q502: If the angle of incidence is 58^0 and the angle between the mirrors is 111^0, then the angle between the final reflected ray and the secondary mirror is

    a. 53^0
    b. 37^0
    c. 32^0
    d. 11^0

Use the following information to answer Q504:

Two plane mirrors XY and YZ are at right angles to each other.
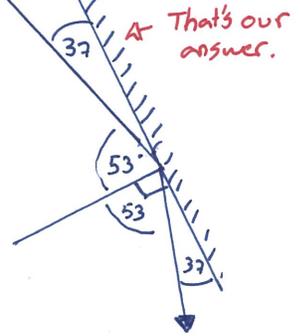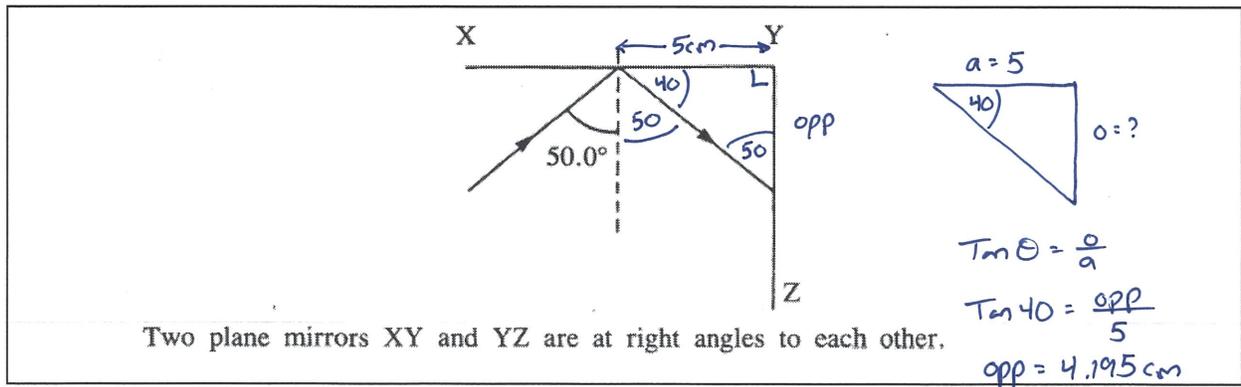
Q504: A ray of light strikes mirror XY 5.0 cm from Y. At what distance from Y will the reflected ray strike mirror YZ?

    a.   3.2 cm
    b.   3.8 cm
    c.   4.2 cm
    d.   6.0 cm

Cumulative Review from Previous Units

Use the following information to answer Q1:

Two Object Collision

A
0.5 kg

B
0.75 kg

$PA_{ix} = +6.000$

$PB_{ix} = -2.250$

22.62°
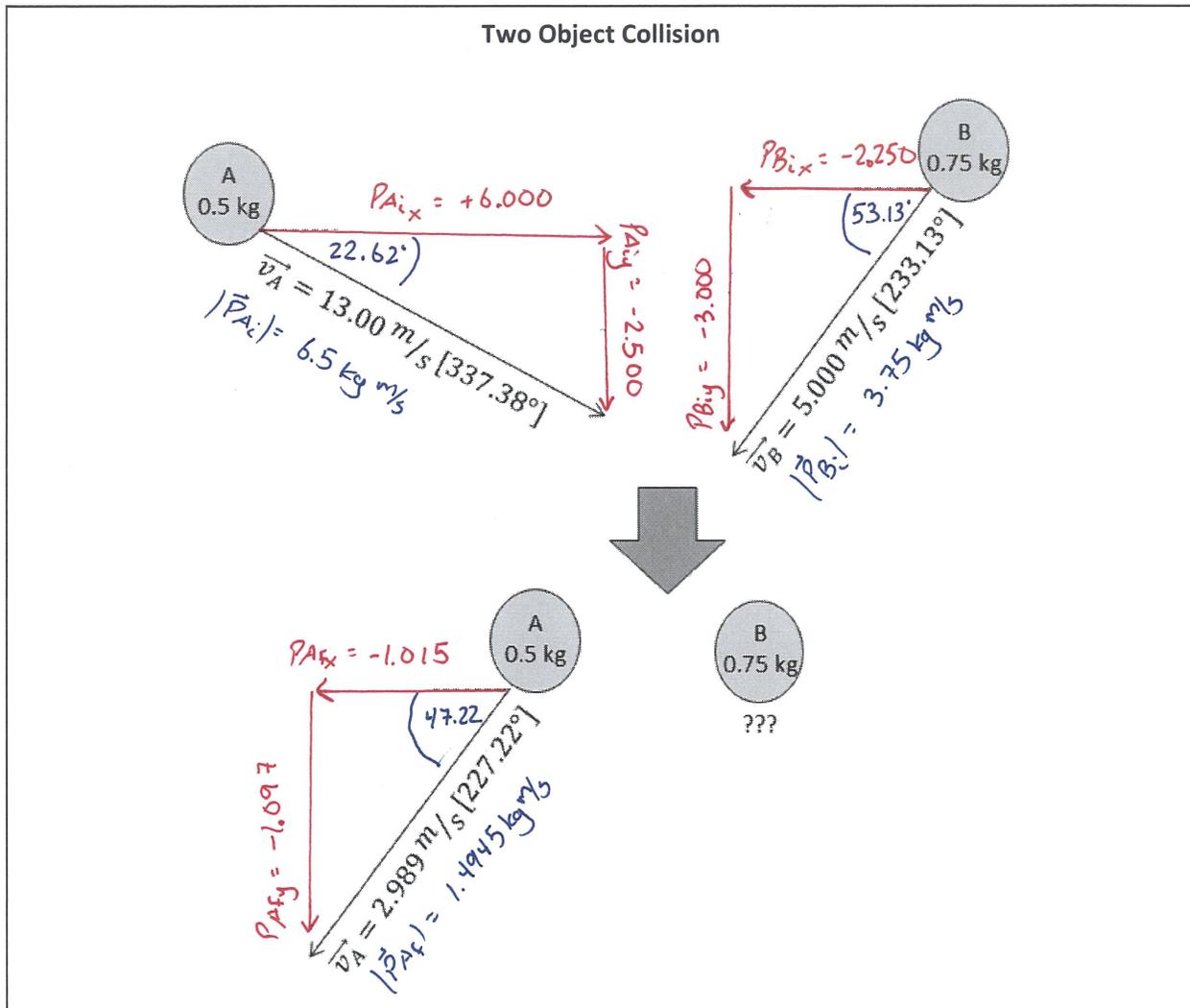
53.13°

$\vec{v}_A = 13.00 \, m/s \, [337.38°]$

$|\vec{P}_{Ai}| = 6.5 \, kg \, m/s$

$PA_{iy} = -2.500$

$PB_{iy} = -3.000$

$\vec{v}_B = 5.000 \, m/s \, [233.13°]$

$|\vec{P}_{Bi}| = 3.75 \, kg \, m/s$

A
0.5 kg

B
0.75 kg

???

$PA_{fx} = -1.015$

47.22

$PA_{fy} = -1.097$

$\vec{v}_A = 2.989 \, m/s \, [227.22°]$

$|\vec{P}_{Af}| = 1.4945 \, kg \, m/s$

Q1: What is the final velocity, in polar coordinates, of *Object B*?

x-comp
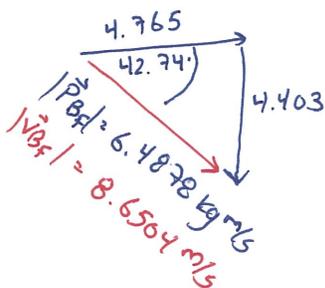
$P_i = P_f$

$(+6.000) + (-2.250) = (-1.015) + PB_{fx}$

$PB_{fx} = +4.765$

y-comp

$P_i = P_f$

$(-2.500) + (-3.000) = (-1.097) + PB_{fy}$

$PB_{fy} = -4.403$

4.765

42.74°

4.403

$|\vec{P}_{Bf}| = 6.4878 \, kg \, m/s$

$|\vec{v}_{Bf}| = 8.6504 \, m/s$

$\vec{v}_{Bf} = 8.65 \, m/s \, [317°]$