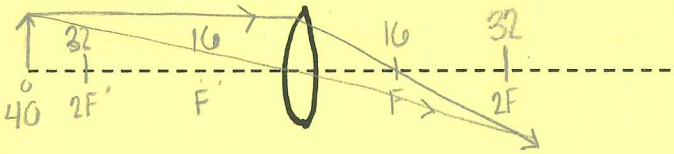
18/18 ed

Name: Amber Orlikowski

HOCUS FOCUS

1. A converging lens has a focal length of 16 cm. An object is placed 40 cm in front of the lens. Draw a lens ray diagram and calculate the position and magnification of the image. What type of image is formed?



$80 \times \frac{1}{16} = \frac{80 \times 1}{40} + \frac{80 \times 1}{x}$

$5x = 2x + 80$

$3x = 80$

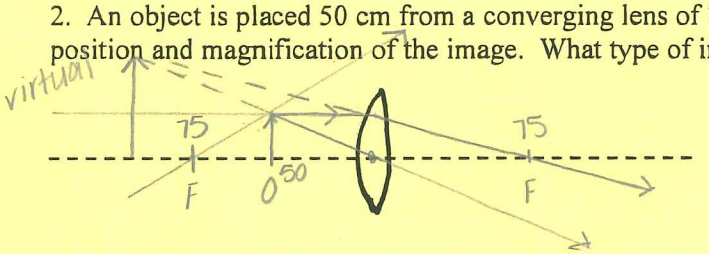
$\boxed{x = \frac{80}{3}}$

$m = \frac{-si}{so}$

$m = \frac{-\frac{80}{3}}{\frac{40}{1}} \cdot \frac{1}{40}$

$\boxed{m = -\frac{2}{3}}$

2. An object is placed 50 cm from a converging lens of 75 cm focal length. Draw a lens ray diagram and calculate the position and magnification of the image. What type of image is formed?



$\frac{1}{75} = \frac{1}{50} + \frac{1}{x}$

$\frac{2}{150} - \frac{3}{150} = \frac{1}{x}$

$\boxed{x = -150\text{cm}}$

$m = \frac{-si}{so}$

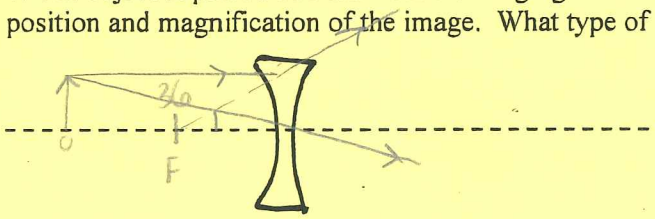
$m = \frac{150}{50}$

$\boxed{m = 3}$

3. An object 60 cm from a lens produces a real image 40 cm from the lens. Calculate the focal length of the lens.

$\frac{1}{f} = \frac{1}{60} + \frac{1}{40}$ $\frac{1}{f} = \frac{2}{120} + \frac{3}{120}$ $\frac{1}{f} = \frac{5}{120}$ $\boxed{f = 24\text{cm}}$

4. An object is placed 108 cm from a diverging lens of -36 cm focal length. Draw a lens ray diagram and calculate the position and magnification of the image. What type of image is formed?



$108 \times \frac{1}{-36} = \frac{1 \cdot 108 \times}{108} + \frac{1}{x} 108 \times$

$-3x = x + 108$

$-4x = 108$

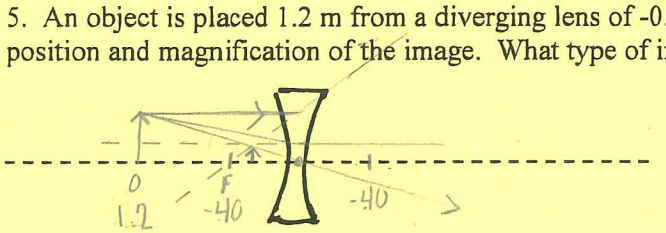
$\boxed{x = -27}$

$m = \frac{-si}{so}$

$m = \frac{-(-27)}{108}$

$\boxed{m = \frac{1}{4}}$

5. An object is placed 1.2 m from a diverging lens of -0.40 m focal length. Draw a lens ray diagram and calculate the position and magnification of the image. What type of image is formed?



$\frac{-1}{.40} = \frac{1}{1.20} + \frac{1}{x}$

$\frac{-3}{1.20} - \frac{1}{1.20} = \frac{1}{x}$

$x = \frac{-1.20}{.4}$

$\boxed{x = -30\text{cm}}$

$m = \frac{-si}{so}$

$m = \frac{30}{120}$

$m = \frac{1}{4}$

6. What happens to the focal length of a magnifying glass when placed under water? Why?

it decreases because there is a larger change in the index of refraction

7. How are your eyes able to see? Why does it help to wear a mask underwater?

When the light hits your cornea it bends (refraction) (air to water) you have an air pocket over your eye so the light bends

8. Would a convex-shaped air bubble under water converge or diverge light? Does the object look larger or smaller?

It looks smaller, the light diverges

9. Why does the moon have a reddish hue during a lunar eclipse?

the refraction of sunlight by the Earth's atmosphere. The sunlight reaching the moon passes through Earth's atmosphere and scatters. Shorter wavelengths scatter more leaving red light

10. Why is it not a good idea to water your lawn during the daytime? When is the optimum time?

morning because evaporation and water will form beads that will create burn spots due to the sun, like a lens