

Final Reg Optics Review

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 1) How far are you from your image when you stand 0.75 m in front of a vertical plane mirror? 1) _____
- 2) A object is 12 cm in front of a concave mirror, and the image is 3.0 cm in front of the mirror. What is the focal length of the mirror? 2) _____
- 3) Sometimes when you look into a curved mirror you see a magnified image (a great big you) and sometimes you see a diminished image (a little you). If you look at the bottom (convex) side of a shiny spoon, what will you see? 3) _____
- 4) Lenses that are thickest at the center called 4) _____
- 5) A 1.4 cm tall object is 4.0 cm from a concave mirror. If the image is 4.0 cm tall, how far is it from the mirror? 5) _____
- 6) An object is 6.0 cm tall, and is in front of a diverging lens. The image is 2.5 cm tall, and 7.5 cm from the lens. What is the focal length of the lens? 6) _____
- 7) An object is placed 15 cm from a concave mirror of focal length 20 cm. The object is 4.0 cm tall. Where is the image located? 7) _____
- 8) Plane mirrors produce images which 8) _____
- 9) A substance has an index of refraction of 1.46. Light is passing through it at 53.0° . At what angle will it leave into the air? 9) _____
- 10) A spherical mirror on which reflection takes place on the inner surface of the sphere is referred to as a 10) _____
- 11) An object is 10 cm in front of a concave mirror with focal length 3 cm. Where is the image? 11) _____
- 12) An object is placed 15 cm from a concave mirror of focal length 20 cm. The object is 4.0 cm tall. How tall is the image? 12) _____
- 13) An object is placed at a distance of 40 cm from a thin lens. If a virtual image forms at a distance of 50 cm from the lens, on the same side as the object, what is the focal length of the lens? 13) _____
- 14) An object is situated between a concave mirror's surface and its focal point. The image formed in this case is 14) _____
- 15) If you stand in front of a concave mirror, exactly at its focal point, 15) _____
- 16) A 4.0 cm tall object is placed 60 cm away from a converging lens of focal length 30 cm. What is the nature and location of the image? 16) _____

- 17) If the magnification is a positive value, the image is 17) _____
- 18) A convex lens has focal length f . An object is placed at $2f$ on the axis. The image formed is located 18) _____
- 19) Light enters a substance from air at an angle of 32.0° , and continues at an angle of 23.0° . What is the index of refraction of the substance? 19) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 20) A convex lens always produces a virtual image. 20) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 21) A beam of light, traveling in air, strikes a plate of transparent material at an angle of incidence of 56.0° . It is observed that the reflected and refracted beams form an angle of 90.0° . What is the index of refraction of this material? 21) _____
- 22) An object is placed 60 cm from a convex lens of focal length 10 cm. What is the magnification? 22) _____
- 23) Select which statement is correct in describing the image formed by a thin lens of a real object placed in front of the lens. 23) _____
- 24) An object is placed at 30 cm in front of a diverging lens with a focal length of 10 cm. What is the magnification? 24) _____
- 25) A convex spherical mirror has a focal length of -20 cm. An object is placed 10 cm in front of the mirror on the mirror's axis. Where is the image located? 25) _____
- 26) An object is placed 10 cm from a convex lens of focal length 20 cm. What is the magnification? 26) _____
- 27) An image is 4.0 cm behind a concave mirror with focal length 5.0 cm. Where is the object? 27) _____
- 28) A light ray in air is incident on an air to glass interface at an angle of 45° and is refracted at an angle of 30° to the normal. What is the index of refraction of the glass? 28) _____
- 29) A spherical mirror on which reflection takes place on the outer surface of the spherical shape is referred to as a 29) _____
- 30) If the magnification is a negative value, the image is 30) _____
- 31) Convex spherical mirrors produce images which 31) _____
- 32) An object is placed at 30 cm in front of a diverging lens with a focal length of 10 cm. What is the image distance? 32) _____

- 33) A concave mirror with a radius of 20 cm creates a real image 30 cm from the mirror. What is the object distance? 33) _____
- 34) If you stand in front of a convex mirror, at the same distance from it as its focal length, 34) _____
- 35) A light ray, traveling parallel to a concave mirror's axis, strikes the mirror's surface near its midpoint. After reflection, this ray 35) _____
- 36) A 4.0-cm-tall object is placed 50.0 cm from a diverging lens of focal length 25.0 cm. What is the nature and location of the image? 36) _____
- 37) Lucite has an index of refraction of 1.50. What is its critical angle of incidence? 37) _____
- 38) An object is 8.90 cm tall. The image is 7.80 cm tall, and 14.8 cm from a convex mirror. What is the mirror's focal length? 38) _____
- 39) For all transparent material substances, the index of refraction 39) _____
- 40) An object is 5.7 cm from a concave mirror. The image is 4.7 cm tall, and 10 cm from the mirror. How tall is the object? 40) _____
- 41) An image formed when the light rays do not actually pass through the image location, and would not appear on paper or film placed at that location is referred to as a 41) _____
- 42) A convex lens has a focal length f . An object is placed at f on the axis. The image formed is located 42) _____
- 43) A convex lens has a focal length f . An object is placed between infinity and $2f$ from the lens on its axis. The image formed is located 43) _____
- 44) The images formed by concave lenses 44) _____
- 45) The critical angle for a beam of light passing from water into air is 48.8° . This means that all light rays with an angle of incidence greater than this angle will be 45) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 46) A convex lens is known as a diverging lens and a concave lens is known as a converging lens. 46) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 47) A convex spherical mirror has a focal length of -20 cm. An object is placed 30 cm in front of the mirror on the mirror's axis. Where is the image located? 47) _____
- 48) If the image distance is positive, the image formed is a 48) _____

- 49) A beam of light traveling in air is incident on a slab of transparent material. The incident beam and the refracted beam make angles of 40° and 26° to the normal. What is the speed of light in the transparent material? 49) _____
- 50) Lenses that are thinner at the center than the edges are called 50) _____
- 51) An object is placed at a concave mirror's center of curvature. The image produced by the mirror is located 51) _____
- 52) An object is 14 cm in front of a convex mirror. The image is 5.8 cm behind the mirror. What is the focal length of the mirror? 52) _____
- 53) If the radius of curvature of the concave mirror is r , the focal length is 53) _____
- 54) What is the critical angle for light traveling from crown glass ($n = 1.52$) into water ($n = 1.33$)? 54) _____
- 55) An index of refraction less than one for a medium would imply 55) _____
- 56) An object is placed 40 cm in front of a 20 cm focal length converging lens. How far is the image of this object from the lens? 56) _____
- 57) A negative magnification for a mirror means 57) _____
- 58) An object is placed 21 cm from a concave lens of focal length 25 cm. What is the magnification? 58) _____
- 59) An object is located 2.6 m in front of a plane mirror. The image formed by the mirror appears to be 59) _____
- 60) If a material has an index of refraction of 1.50, what is the speed of light through it? 60) _____
- 61) When a person stands 40 cm in front of a cosmetic mirror (concave mirror), the erect image is twice the size of the object. What is the focal length of the mirror? 61) _____
- 62) An object is 47.5 cm tall. The image is 38.6 cm tall, and 14.8 cm from the mirror. How far is the object from the mirror? 62) _____
- 63) A convex lens has a focal length f . An object is placed between f and $2f$ on the axis. The image formed is located 63) _____
- 64) A spherical concave mirror has a radius of curvature of 20 cm. How far from the mirror is the focal point located? 64) _____
- 65) A plane mirror forms an image that is 65) _____
- 66) Light arriving at a concave mirror on a path through the focal point is reflected 66) _____

- 67) Light arriving at a concave mirror on a path parallel to the axis is reflected 67) _____
- 68) If the image distance is negative, the image formed is a 68) _____
- 69) A single concave spherical mirror produces an image which is 69) _____
- 70) A ray of light, which is traveling in air, is incident on a glass plate at a 45° angle. The angle of refraction in the glass 70) _____
- 71) If you stand in front of a convex mirror, at the same distance from it as its radius of curvature, 71) _____
- 72) An object is positioned between a concave mirror's center of curvature and its focal point. The image produced by the mirror is located 72) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 73) Magnification is positive for inverted images. 73) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 74) Light traveling at an angle into a denser medium is refracted 74) _____
- 75) A laser beam strikes a plane's reflecting surface with an angle of incidence of 52° . What is the angle between the incident ray and the reflected ray? 75) _____
- 76) A object is placed between a convex lens and its focal point. The image formed is 76) _____
- 77) A single convex spherical mirror produces an image which is 77) _____
- 78) A concave spherical mirror has a focal length of 20 cm. An object is placed 30 cm in front of the mirror on the mirror's axis. Where is the image located? 78) _____
- 79) An image formed when the light rays pass through the image location, and could appear on paper or film placed at the that location is referred to as a 79) _____
- 80) A concave spherical mirror has a focal length of 20 cm. An object is placed 10 cm in front of the mirror on the mirror's axis. Where is the image located? 80) _____
- 81) How fast do you approach your image when you approach a vertical plane mirror at a speed of 2 m/s? 81) _____
- 82) An object is 12 cm in front of a converging lens with focal length 4 cm. Where is the image? 82) _____
- 83) Concave spherical mirrors produce images which 83) _____

84) Light passes from air to water. The incoming ray is at an angle of 17.0° to the normal. The index of refraction is 1.33. What is the angle in the water? 84) _____

85) Light arriving at a concave mirror on a path through the center of curvature is reflected 85) _____

86) The angle of incidence 86) _____