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| 1. Why is scientific notation used in science?

|  |  |  |
| --- | --- | --- |
|   | a.  | because it makes it easy to write very big or very small numbers |
|   | b.  | because all astronomical distances are expressed in metric units |
|   | c.  | because it makes conversions between units easy |
|   | d.  | because it makes conversions between distances easy |

|  |  |
| --- | --- |
| *ANSWER:* | a |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2. What is the approximate diameter of the Earth?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1 AU |
|   | b.  | 13,000 light-years |
|   | c.  | 13,000 kilometres |
|   | d.  | 1,000,000 kilometres |

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| --- | --- |
| *ANSWER:* | c |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 3. What is the average distance from Earth to the Sun?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1 ly |
|   | b.  | 1 AU |
|   | c.  | 1 million km |
|   | d.  | 1 billion km |

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| *ANSWER:* | b |

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| 4. Which one of the following statements best describes a planet?

|  |  |  |
| --- | --- | --- |
|   | a.  | a non-luminous body |
|   | b.  | an irregular shape |
|   | c.  | a body that generates energy by nuclear fusion |
|   | d.  | a body located at the centre of the Solar System |

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| *ANSWER:* | a |

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| 5. Which one of the following statements best describes the Sun?

|  |  |  |
| --- | --- | --- |
|   | a.  | generates energy by nuclear fusion |
|   | b.  | located 10 AU from Earth |
|   | c.  | orbiting the Solar System |
|   | d.  | located in the centre of the Milky Way |

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| *ANSWER:* | a |

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| 6. What does the Solar System contain?

|  |  |  |
| --- | --- | --- |
|   | a.  | the Sun, its planets, and some smaller bodies |
|   | b.  | the Sun, galaxies, planets, and stars |
|   | c.  | the Sun, planets, moons, and stars |
|   | d.  | the Sun, planets, asteroids, and galaxies |

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| *ANSWER:* | a |

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| 7. Approximately how many times larger than the diameter of a typical planet (the Earth) is the diameter of a typical star (the Sun)?

|  |  |  |
| --- | --- | --- |
|   | a.  | 10 times |
|   | b.  | 100 times |
|   | c.  | 1000 times |
|   | d.  | 10,000 times |

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| --- | --- |
| *ANSWER:* | b |

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| 8. How does the radius of the Moon’s *orbit* compare to the radius of the Earth?

|  |  |  |
| --- | --- | --- |
|   | a.  | It is 0.6 times as large. |
|   | b.  | It is 6 times as large. |
|   | c.  | It is 60 times as large. |
|   | d.  | It is 600 times as large. |

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| *ANSWER:* | c |

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| 9. Which of the following is no longer considered a major planet?

|  |  |  |
| --- | --- | --- |
|   | a.  | Mercury |
|   | b.  | Uranus |
|   | c.  | Pluto |
|   | d.  | Saturn |

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| *ANSWER:* | c |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10. In the diagram, what is the diameter of Mercury?

|  |  |  |
| --- | --- | --- |
|   | a.  | about 240 km |
|   | b.  | about 2400 km |
|   | c.  | about 24,000 km |
|   | d.  | about 240,000 km |

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| *ANSWER:* | b |

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| 11. If the distance from the Sun to the Earth is represented by roughly 15 metres, then what would the distance from the Earth to the Moon on the same scale be?

|  |  |  |
| --- | --- | --- |
|   | a.  | about 30 metres |
|   | b.  | about 10 metres |
|   | c.  | about 1 metre |
|   | d.  | smaller than the width of your hand |

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| --- | --- |
| *ANSWER:* | d |

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| 12. Earth has a radius of about 6400 km, the Sun has a radius of about 7.0×105 km, and a rubber ball has a radius of 6.4 cm. If you were to construct a scale model of the Solar System using the rubber ball to represent Earth, what is the radius of a ball needed to represent the Sun in your model?

|  |  |  |
| --- | --- | --- |
|   | a.  | 7.0 × 105 cm |
|   | b.  | 7.0 cm |
|   | c.  | 700 cm |
|   | d.  | 70 cm |

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| *ANSWER:* | c |

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| 13. How is a planet different from a star?

|  |  |  |
| --- | --- | --- |
|   | a.  | Planets are larger than stars. |
|   | b.  | Planets reflect light, while stars produce their own light. |
|   | c.  | Stars move faster in the sky than planets. |
|   | d.  | Planets are brighter than stars. |

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| *ANSWER:* | b |

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| 14. Which of the following is the smallest?

|  |  |  |
| --- | --- | --- |
|   | a.  | size of a typical planet |
|   | b.  | 1 AU |
|   | c.  | 1 light-year |
|   | d.  | size of a typical galaxy |

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| *ANSWER:* | a |

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| 15. Assume the size of the Sun is represented by a baseball (diameter about 7 cm). At this scale, the Earth is about 15 metres (150 million km or 8 light-minutes) away. How far away, to scale, would the nearest stars to the Sun be? Pick the closest answer.

|  |  |  |
| --- | --- | --- |
|   | a.  | about the distance between Windsor and Toronto (about 400 km) |
|   | b.  | about 100 metres away |
|   | c.  | about the distance across Canada from Toronto to Vancouver (about 4300 km) |
|   | d.  | about the distance across 50 football fields (50 x 100 m, or 5 km) |

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| *ANSWER:* | c |

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| 16. In the diagram, what is the diameter of Jupiter?

|  |  |  |
| --- | --- | --- |
|   | a.  | about 7.0 × 104 km |
|   | b.  | about 7.0 × 105 km |
|   | c.  | about 1.4 × 104 km |
|   | d.  | about 1.4 × 105 km |

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| *ANSWER:* | d |

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| 17. What is 5.7×107 the same as?

|  |  |  |
| --- | --- | --- |
|   | a.  | 5.7 million |
|   | b.  | 57 thousand |
|   | c.  | 570 thousand |
|   | d.  | 57 million |

|  |  |
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| *ANSWER:* | d |

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| 18. What is 1.95 billion the same as?

|  |  |  |
| --- | --- | --- |
|   | a.  | 1.95 × 1012 |
|   | b.  | 1.95 × 109 |
|   | c.  | 1.95 × 106 |
|   | d.  | 1.95 × 105 |

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| *ANSWER:* | b |

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| 19. How many centimetres are there in one kilometre?

|  |  |  |
| --- | --- | --- |
|   | a.  | 100 |
|   | b.  | 1,000 |
|   | c.  | 10,000 |
|   | d.  | 100,000 |

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| *ANSWER:* | d |

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| 20. What is one thousandth of one metre?

|  |  |  |
| --- | --- | --- |
|   | a.  | one kilometre |
|   | b.  | one centimetre |
|   | c.  | one millimetre |
|   | d.  | one hectometre |

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| *ANSWER:* | c |

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| 21. Which of the following has the distances arranged in order from smallest to largest?

|  |  |  |
| --- | --- | --- |
|   | a.  | kilometre, light year, millimetre, Astronomical Unit |
|   | b.  | Astronomical Unit, millimetre, light year, kilometre |
|   | c.  | millimetre, kilometre, Astronomical Unit, light year |
|   | d.  | light year, kilometre, Astronomical Unit, millimetre |

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| *ANSWER:* | c |

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| 22. Which of the following has the distances arranged in order from largest to smallest?

|  |  |  |
| --- | --- | --- |
|   | a.  | light year, Astronomical Unit, kilometre, millimetre |
|   | b.  | Astronomical Unit, millimetre, light year, kilometre |
|   | c.  | kilometre, millimetre, Astronomical Unit, light year |
|   | d.  | light year, kilometre, Astronomical Unit, millimetre |

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| --- | --- |
| *ANSWER:* | a |

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| 23. It takes light 1.3 seconds to travel from the Moon to Earth and 8 minutes for light to travel from the Sun to Earth. Which of the following statements is true?

|  |  |  |
| --- | --- | --- |
|   | a.  | The Sun is 6.2 times farther from Earth than the Moon. |
|   | b.  | The Sun is 10 times farther from Earth than the Moon. |
|   | c.  | The Sun is 370 times farther from Earth than the Moon. |
|   | d.  | The Sun is 0.10 times farther from Earth than the Moon. |

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| *ANSWER:* | c |

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| 24. If light takes 8 minutes to travel from the Sun to Earth, and over 4 hours to travel from the Sun to the planet Neptune, what is the distance from the Sun to Neptune?

|  |  |  |
| --- | --- | --- |
|   | a.  | 5 AU |
|   | b.  | 30 AU |
|   | c.  | 30 ly |
|   | d.  | 5 ly |

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| *ANSWER:* | b |

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| 25. How long does it take for light to travel from the Sun to Neptune?

|  |  |  |
| --- | --- | --- |
|   | a.  | several seconds |
|   | b.  | several minutes |
|   | c.  | several hours |
|   | d.  | several weeks |

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| *ANSWER:* | c |

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| 26. The speed of light is 3.0×105 km/s, and it takes 1.3 seconds for light to travel from the Moon to Earth. Based on this information, what is the distance from the Earth to the Moon?

|  |  |  |
| --- | --- | --- |
|   | a.  | 390,000 km |
|   | b.  | 230,000 km |
|   | c.  | 3.9 km |
|   | d.  | 2.3 km |

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| *ANSWER:* | a |

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| 27. Which sequence is correct when ordered by increasing size?

|  |  |  |
| --- | --- | --- |
|   | a.  | Earth, Solar System, Milky Way Galaxy, clusters of galaxies |
|   | b.  | Solar System, Earth, galaxy clusters, Milky Way Galaxy |
|   | c.  | Earth, Milky Way Galaxy, Solar System, galaxy clusters |
|   | d.  | galaxy clusters, Solar System, Milky Way Galaxy, Earth |

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| *ANSWER:* | a |

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| 28. How does one light-year relate to Astronomical Units, roughly?

|  |  |  |
| --- | --- | --- |
|   | a.  | 63,000 AU |
|   | b.  | 10,000 AU |
|   | c.  | 380,000 AU |
|   | d.  | 1,400 AU |

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| *ANSWER:* | a |

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| 29. What does a typical galaxy like our Milky Way galaxy contain?

|  |  |  |
| --- | --- | --- |
|   | a.  | primarily planets |
|   | b.  | gas only |
|   | c.  | stars (some with planets), gas, and dust |
|   | d.  | a single star and planets |

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| *ANSWER:* | c |

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| 30. If the distance to a star is 450 light-years, what can we conclude about the star?

|  |  |  |
| --- | --- | --- |
|   | a.  | The star is 450 million AU away. |
|   | b.  | The star’s light takes 450 years to reach us. |
|   | c.  | The star must have formed 450 billion years ago. |
|   | d.  | The star must be very young. |

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| --- | --- |
| *ANSWER:* | b |

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| 31. How long does it take for light to cross the Milky Way galaxy?

|  |  |  |
| --- | --- | --- |
|   | a.  | about 8 minutes |
|   | b.  | about 8 years |
|   | c.  | about 80,000 years |
|   | d.  | about 200 million years |

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| --- | --- |
| *ANSWER:* | c |

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| 32. Which statement best describes the Milky Way Galaxy?

|  |  |  |
| --- | --- | --- |
|   | a.  | It contains about 100 billion stars. |
|   | b.  | It is about 400 light-years in diameter. |
|   | c.  | It is the largest known object in the universe. |
|   | d.  | It contains numerous clusters and superclusters. |

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| *ANSWER:* | a |

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| 33. What is the name of the hazy band of light that circles our sky, produced by the glow of our galaxy?

|  |  |  |
| --- | --- | --- |
|   | a.  | the Milky Way |
|   | b.  | the Solar System |
|   | c.  | a spiral arm |
|   | d.  | Alpha Centauri |

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| --- | --- |
| *ANSWER:* | a |

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| 34. If we say that an object is 1,000 light-years away, how does that affect how we see it?

|  |  |  |
| --- | --- | --- |
|   | a.  | We see it as it looked 1,000 years ago. |
|   | b.  | We see it as it would appear to our ancestors 1,000 years ago. |
|   | c.  | We see it as it looked 1,000 light-years ago. |
|   | d.  | We see it as it is right now, but it appears 1,000 times dimmer. |

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| *ANSWER:* | a |

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| 35. What is the implication if the distance to the nearest star is 4.2 light-years?

|  |  |  |
| --- | --- | --- |
|   | a.  | The star is 4.2 million AU away. |
|   | b.  | The light we see left the star 4.2 years ago. |
|   | c.  | The star must be very old. |
|   | d.  | The star must be very young. |

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| --- | --- |
| *ANSWER:* | b |

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| 36. Which statement best describes the Milky Way Galaxy?

|  |  |  |
| --- | --- | --- |
|   | a.  | It is a spiral galaxy. |
|   | b.  | It is comprised of several smaller galaxies. |
|   | c.  | It is about 1,000 light-years in diameter. |
|   | d.  | It is type of supercluster. |

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| *ANSWER:* | a |

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| 37. What is the reason for compressing the history of the universe into a single year in the cosmic calendar?

|  |  |  |
| --- | --- | --- |
|   | a.  | to compare astronomical timescales with human experience |
|   | b.  | to emphasize how old the universe is |
|   | c.  | to simplify calculations of ages of objects in the universe |
|   | d.  | to express the distances of objects in light-years |

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| *ANSWER:* | a |

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| 38. Using the cosmic calendar, where the Big Bang happened January 1, in what month did the Milky Way form?

|  |  |  |
| --- | --- | --- |
|   | a.  | January |
|   | b.  | March |
|   | c.  | August |
|   | d.  | December |

|  |  |
| --- | --- |
| *ANSWER:* | b |

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| 39. The name of the average distance from Earth to the Sun is one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| *ANSWER:* | Astronomical Unit |

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|  |  |  |
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| 40. Light takes about 8 minutes to travel from the Sun to Earth and about 40 minutes to travel from the Sun to Jupiter. Jupiter is about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AU from the Sun.

|  |  |
| --- | --- |
| *ANSWER:* | five (5) |

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| 41. The number 52,700,000,000 would be written in scientific notation as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |
| --- | --- |
| *ANSWER:* | 5.27 × 1010 |

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| --- | --- | --- |
| 42. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the largest known structure in the universe.

|  |  |
| --- | --- |
| *ANSWER:* | filament |

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| 43. A(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the distance that light would travel in one year.

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| --- | --- |
| *ANSWER:* | light-year |

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| 44. A cluster of galaxy clusters is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| *ANSWER:* | supercluster |

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| 45. Proxima Centauri is 4.2 ly away. That means that it takes light \_\_\_\_\_\_\_\_ years to travel from Proxima Centauri to the Earth.

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| *ANSWER:* | 4.2 |

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| 46. The average distance from Earth to the Sun is 1 AU.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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| 47. The nearest star is 1 ly from the Solar System.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 48. A light-year is the distance that light travels in one year.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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| 49. A kilometre contains 1 million metres.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 50. The Sun is a star in the Milky Way Galaxy.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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| 51. The metric system is a decimal system.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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| 52. 3.49 × 107 km is the same as 3.49 × 104 m.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 53. The numbers 9.85 × 105 and 985,000 are equivalent.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | True |

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| 54. An astronomical unit is larger than a light-year.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 55. The Sun is located at the centre of the Milky Way.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 56. A supercluster refers to a large group of stars within the Milky Way.

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|   | a.  | True |
|   | b.  | False |

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| *ANSWER:* | False |

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| 57. Explain the difference between a light-year and the orbital period of Earth.

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| *ANSWER:* | Answer not provided. |

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| 58. What is scientific notation? Explain.

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| *ANSWER:* | Answer not provided. |

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| 59. Why would the English system of units be more useful if a foot contained 10 inches?

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| *ANSWER:* | Answer not provided. |

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| 60. Why do we measure some distances in astronomy in light-years and some in astronomical units?

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| *ANSWER:* | Answer not provided. |

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| 61. From what you know about astronomical units and light-years, how would you define a light-minute?

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| *ANSWER:* | Answer not provided. |

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| 62. “I live 20 minutes from Centre City.” How is this statement similar to giving astronomical distances in light-years?

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| *ANSWER:* | Answer not provided. |

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| 63. Describe the difference between a solar system and a galaxy.

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| *ANSWER:* | Answer not provided. |

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| 64. Considering that the Sun is about 1/100 AU in diameter and a typical planet like Earth is 1/10,000 AU, discuss whether or not our Solar System is crowded or empty.

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| *ANSWER:* | Answer not provided. |

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| 65. Briefly describe the scientific method.

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| *ANSWER:* | No answer provided. |

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