Math Worksheet for 8th Grade

Scientific notation word problems

Name: Due Date: Teacher: Parent Sign:

Red blood cells (18)

1. A person has 2.5×10^{13} red blood cells. If they lose 5.0×10^{12} red blood cells, how many remain?

2. One red blood cell has diameter 7.5×10^{-6} m. How many meters across would 1.0×10^{6} red blood cells laid end to end be?

3. The volume of one red blood cell is about 9.0×10^{-14} liters. What is the total volume of 2.0×10^{13} red blood cells?

4. Bone marrow produces 2.5×10^{6} red blood cells per second. How many are produced in one day (8.64×10^{4} seconds)?

5. A microscope slide holds 4.0×10^{5} red blood cells. How many slides are needed to view 2.0×10^{13} cells?

6. If each red blood cell has mass 1.0×10^{-10} grams, what is the total mass of 2.5×10^{13} red blood cells in kilograms?

7. There are 5.0×10^{12} red blood cells per liter of blood. How many liters contain 2.5×10^{13} red blood cells?

8. A microscope image shows 2.0×10^{6} red blood cells covering an area of 1.0×10^{-2} m^2. What is the number of red blood cells per square meter?

9. Convert a red blood cell diameter of 7.5×10^{-6} meters into millimeters (in scientific notation).

10. One milliliter of blood contains about 5.0×10^{9} red blood cells. How many red blood cells are in 3.0×10^{3} mL of blood?

11. A red blood cell has surface area 1.8×10^{-9} m^2. What is the total surface area for 1.0×10^{12} red blood cells?

12. A lab counts 4.0×10^{5} red blood cells in 0.2 mL of sample. How many red blood cells are there per mL?

13. A red blood cell count is 2.0×10^{13}. It increases by a factor of 1.2×10^{0} (20% increase). What is the new count?

14. If 7.5×10^{6} red blood cells pass through a capillary every minute, how many pass in one hour?

15. A test tube holds 1.0×10^{-5} m^3 of blood. If 1 m^3 contains 5.0×10^{12} red blood cells, how many red blood cells are in the tube?

16. The radius of a red blood cell is 3.75×10^{-6} m. What is the radius in micrometers (m)?

17. One liter of blood has 5.0×10^{12} red blood cells. What fraction of this (in scientific notation) is 1.0×10^{11} red blood cells?

18. A person has 2.5×10^{13} red blood cells and 7.5×10^{9} white blood cells. What is the ratio red blood cells : white blood cells (in scientific notation)?

U.S. national debt (16)

19. The national debt is 3.0×10^{13} dollars and GDP is 2.5×10^{13} dollars. What is the debt-to-GDP ratio (as a number)?

20. If the national debt is 3.0×10^{13} dollars and it increases by 4.0×10^{11} dollars in one month, what is the new debt?

21. If debt per citizen is 9.0×10^{4} dollars and there are 3.3×10^{8} citizens, what is the total debt (multiply the two given numbers)?

22. How many \$100 bills equal 3.0×10^{13} dollars?

23. If interest on the debt is 5.0×10^{-2} (5%) per year and total debt is 3.0×10^{13} dollars, how much interest is paid in one year?

24. If the government pays 2.5×10^{11} dollars per month on the debt, how much is that in one year?

25. If the debt is 3.0×10^{13} dollars and is reduced by 1.0×10^{12} dollars per year, how many years to eliminate the debt?

26. How many trillions of dollars are in 3.6×10^{13} dollars? (1 trillion = 1.0×10^{12} dollars)

27. If 4.0×10^{7} people each pay an extra tax of 5.0×10^{3} dollars, how much money is collected?

28. If debt per household is 2.0×10^{5} dollars and there are 1.3×10^{8} households, what is the total debt implied?

29. An annual deficit is 7.5×10^{11} dollars. What fraction of a national debt of 3.0×10^{13} dollars is this deficit?

30. The debt grows from 1.5×10^{13} to 3.0×10^{13} dollars in 2.0×10^{1} years. What is the average yearly increase?

31. Foreign creditors own 6.0×10^{12} dollars of a $3.0\times10^{13-dollar}$ debt. What percentage of the debt is owned by foreigners?

32. Cutting spending by 8.0×10^{11} dollars per year reduces the debt by 4.8×10^{12} dollars. How many years does that take?

33. A program costs 2.4×10^{9} dollars per day. What is the annual cost (use 365 days)?

34. If debt is 3.0×10^{13} dollars and annual government revenue is 3.0×10^{12} dollars, how many years to pay off the debt if all revenue were used for repayment?

Speed of light (16)

35. The speed of light is $3.00\times10^{8}\ \frac{m}{s}$. How far does light travel in 1 second?

36. How far does light travel in 1 hour (3.6×10^{3} seconds)?

37. How far does light travel in 1 day (8.64×10^{4} seconds)?

38. One light-year is the distance light travels in 1 year (3.156×10^{7} seconds). What is one light-year in meters?

39. How many meters away is a star that is 4.0 light-years away? (Use your light-year answer.)

40. The average distance to the Moon is about 3.84×10^{8} meters. How many seconds does light take to travel from Earth to the Moon?

41. The average distance from Earth to the Sun is 1.496×10^{11} meters. How many seconds does light take to travel that distance?

42. How long (in seconds) does a radio signal at light speed take to travel 1.0×10^{6} kilometers? (Convert km to m first.)

43. A spacecraft travels at 2.0×10^{-4} times the speed of light. What is its speed in meters per second?

44. Light travels 1.0×10^{3} kilometers. How long does that take in microseconds? (1 microsecond = 1.0×10^{-6} s)

45. At closest approach Earth–Mars can be about 5.5×10^{10} meters. How many seconds does light take to travel that distance?

46. Green light has wavelength 5.5×10^{-7} meters. What is its frequency? (Use c = $3.00\times10^{8}\ \frac{m}{s}$; f = $\frac{c}{\lambda}$.)

47. A probe sends a signal that takes 8.0×10^{1} minutes to reach Earth. How far is the probe in meters?

48. A signal travels 2.0×10^{9} meters. How many seconds of travel time is that at the speed of light?

49. The circumference of Earth is about 4.0×10^{7} meters. How many seconds does light take to circle Earth once?

50. A spaceship is 1.2×10^{13} meters away. How many hours does light take to travel that distance?