

SCIENTIFIC AND QUANTITATIVE REASONING TEST

In this test, we wish to obtain a reading of your quantitative skills as you begin your career at the University of Michigan-Flint. Complete the 17 questions below to the best of your ability. You are expected to take this exam seriously and to try your best. Please answer all questions in the space provided (Multiple Choice answers and response space eliminated in this Appendix).

1. Given that the average morning temperature in degrees Fahrenheit at a certain location t hours after 2:00 a.m. on June 1 is given approximately by $F(t) = 40 + t$, the approximate temperature at 9 a.m. on June 1 should be (Multiple Choice Question):
2. If the cost of producing x hundred units of a product is $C(x) = x(2 - 0.01x)$ hundred dollars, what is the cost to produce 2000 units? (Multiple Choice Question)
3. The number of forest fires in California was about 7,500 in 1999 and about 5,000 in 2000. This represents what percentage decrease in fires (to the nearest percent)? (Multiple Choice Question)
4. In a sample of 25 fish of a particular species from an inland lake, 3 showed traces of sickness and/or deformity. If the total number of fish of that species in the lake is estimated to be 1000, how many could be expected to be sick and/or deformed? (Multiple Choice Question)
5. A truck moving 50 miles per hour is moving how many feet per second? (There are 5280 feet in a mile.) (Multiple Choice Question)
6. How many meters are there in 3.2 kilometers?
7. Given that the formula for converting degrees Fahrenheit ($^{\circ}\text{F}$) to degrees Celsius ($^{\circ}\text{C}$) is $F - 32 = 9C/5$ or $(9/5)C$, convert 32°C to degrees Fahrenheit.
8. A ball's height above ground is given by $s(t) = -16t^2 + 48t + 20$. When does it reach its highest point?
9. If force is mass times acceleration ($F = ma$), does the force increase or decrease if the mass is tripled and the acceleration is halved?
10. A hotel can rent 100 rooms at \$60 per night for a total revenue of \$6000, but finds that for each \$5 increase in rent, occupancy will drop by 3 units. Find the revenue when the rooms are rented for \$70 per night.
11. Calculate the mean, median, and range for the data $\{1, 3, 3, 5, 8, 16\}$.

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12. Table 1 below presents the number of fires in California in two years, 2000 and 1999. The table also reports the number of acres burned in these two years. Select an appropriate style of graph for all the data and construct the graph below Table 1.

Table 1: Fires and Effected Acres in California,
2000-1999

	Fires	Acres
2000	5,177	72,718
1999	7,562	285,272
5 year average	6,692	157,868

Construct your graph here:

Explain why you chose the graph type you did.

13. Referring again to the fire data presented in Table 1, was 1999 or 2000 a better year for fires? Justify your response.
14. From the data in Table 1 or your graph, how many fires would you predict for 2001? Justify your answer.
15. Imagine that you have data on cardiovascular risk factors as well as socio-economic data on 184 randomly selected individuals within Genesee County. Specifically, you have data on Systolic Blood Pressure (mm hg), Total Cholesterol (mg/dl) and HDL Cholesterol (mg/dl) Age, Sex, and Income. Construct a causal hypothesis that is consistent with these variables.
16. Using the imaginary data set in Question 15, identify variables that would be important to “control for” in the testing of the hypothesis you derived in Question 15.
17. Finally, what statistical tests would you employ to find support for your hypothesis?