Supplemental Worksheet: EAGLE Problem Set 7—Number Strand

1. Which set does **not** include 1,322?
   a. Integers b. whole numbers c. natural numbers d. irrational numbers
2. Which student provided the **most** accurate definition of *the set of all integers*?
   a. Adam: "The set of all integers is all real numbers except fractions."
   b. Beth: "The set of all integers is all positive numbers and 0."
   c. Carline: "The set of all integers is all whole numbers and their negatives."
   d. Dave: "The set of all integers is decimals, fractions, and negatives."
3. Which value of n makes this equation true? $3n^2 = -n$
   a. -3 b. -1 c. -1/3 d. -1/9
4. Simplify this expression. $4^{-16}\left\{\left[4^3\left(4^6\right)\right]^2\right\}$
   a. 1/16 b. ¼ c. 4 d. 16
5. Which is another way of writing 5^{-2}?
   a. -25 b. -10 c. 1/25 d. 1/10
6. What is the value of the following expression? $3^{-2} + 2^4$
   a. 2 b. $8\frac{1}{6}$ c. $16\frac{1}{9}$ d. $16\frac{2}{3}$
7. Alpha Centauri is the closest star system to our solar system. It is 2.58×10^{13} miles away. How many **feet** is this distance, written in scientific notation? (1 mile = 5,280 feet)
   a. 1.36224×10^{16} feet b. 1.36224×10^{17} feet c. 13.6224×10^{15} feet d. 13.6224×10^{16} feet
8. What value of *n* makes the equation true? $3.517 \times 10^n = 351,700$
   a. 3 b. 4 c. 5 d. 6
9. The most expensive computer game ever developed cost more than $20 million. How is 20 million written in scientific notation?
   a. 2.0×10^6 b. 2.0×10^7 c. 2.0×10^8 d. 2.0×10^9
10. What is 3.72×10^{-4} written in standard form?
    a. 0.000372 b. 0.0000372 c. 37,200 d. -3,720,000
11. Mercury is approximately 36,000,000 miles from the Sun. Pluto is approximately 100 times farther from the Sun than Mercury. How would you write Pluto's approximate distance from the Sun in scientific notation?
    a. 3.6×10^{-9} miles b. 3.6×10^{-10} miles c. 3.6×10^9 miles d. 3.6×10^{10} miles

12. Which number represents the value of the quotient? $\frac{5.0 \times 10^8}{2.0 \times 10^4}$

a. 2.5×10^2 b. 2.5×10^4 c. 3.0×10^2 d. 3.0×10^4

13. The amount of money produced by the government each day is close to 635 million dollars. How is 635 million written in scientific notation?

a. 6.35×10^6 b. 6.35×10^7 c. 6.35×10^8 d. 6.35×10^9

14. What number is the product of the expression? $(2.35 \times 10^5)(5.92 \times 10^7)$

a. 1.3912×10^{10} b. 1.3912×10^{11} c. 1.3912×10^{12} d. 1.3912×10^{13}

15. A honeybee is 1.9065×10^{-2} meters long. It has a mite living on it that is 1.55×10^{-3} meters long.

a. How many **times** as long is the bee compared to the mite? Write your answer in scientific notation. Show your work.
b. How much longer, in meters, is the bee than the mite? Write your answer in scientific notation. Show your work.

16. Laura will compute the mean of 3 numbers and express her answer to 2 decimal places. For which set of numbers will her answer be exact?

a. {12, 31, 42} b. {15, 30, 40} c. {17, 31, 45} d. {18, 36, 50}

17. Joshua needs to find the decimal equivalent for $\frac{1}{3}$ of $\frac{4}{9}$. He first finds the decimal equivalent of each fraction on a calculator that shows a maximum of ten digits. Then he multiplies the decimals together. How does his result compare to the **actual**, non-rounded answer?

a. His result is less than the actual answer because the calculator rounded down both of the original fractions.
b. His result is less than the actual answer because the calculator rounded down only one of the original fractions.
c. His result is greater than the actual answer because the calculator rounded up both of the original fractions.
d. His result is greater than the actual answer because the calculator rounded up only one of the original fractions.

18. Which decimal **most accurately** represents $3\frac{2}{3}$?

a. $3.\overline{66}$ b. $3.\overline{667}$ c. 3.666666 d. 3.666667

19. The side lengths of a triangle are: 8.6875 inches; 10.75 inches; and 6.875 inches. Alex estimates the perimeter of this triangle to be 27 inches. Which statement **best** describes this estimated perimeter?

a. It is lower than the actual perimeter since each length was rounded to the nearest tenth.
b. It is equal to the actual perimeter since each length was rounded to the nearest tenth.
c. It is lower than the actual perimeter since each length was rounded to the nearest whole number.
d. It is higher than the actual perimeter since each length was rounded to the nearest whole number.

20. A round dinner plate has a radius of 5 inches. Which expression gives the **most** accurate estimate of the area of the plate?

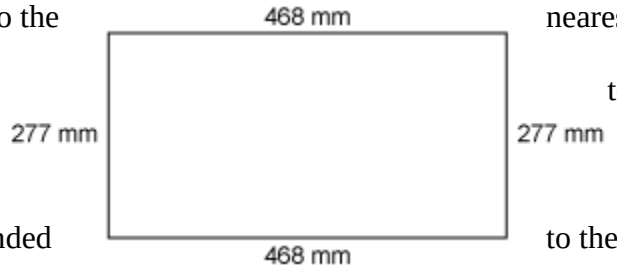
a. $3 \times 5^2 = 75$ b. $3.14 \times 5^2 = 78.5$ c. $\pi \times 5^2 \approx 78.54$ d. $\frac{22}{7} \times 5^2 \approx 78.5714$

21. Gia uses the number 3.14 for π to find the approximate circumference of a circle. Which statement **best** describes the result of Gia's calculation?
    a. The result is the exact circumference.
    b. The result is less than the exact circumference.
    c. The result is greater than the exact circumference.
    d. The result is 3.14 units away from the exact circumference.

22. Which answer shows the **exact** value of this expression? $\frac{4 + 2\sqrt{7}}{8}$

a. 1.2 b. 1.16 c. $\frac{2 + \sqrt{7}}{4}$ d. $\frac{1 + \sqrt{14}}{2}$

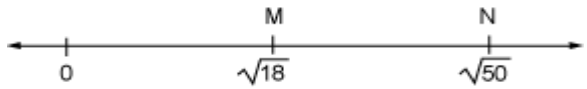
23. Derek approximated the perimeter of the rectangle shown as 1,500 mm. Which statement best describes Derek's approximation?
    a. It is slightly lower than the actual perimeter since each side was rounded to the nearest 10.
    b. It is slightly higher than the actual perimeter since each side was rounded to the nearest 10.
    c. It is significantly lower than the actual perimeter since each side was rounded to the nearest 100.
    d. It is significantly higher than the actual perimeter since each side was rounded to the nearest 100.



24. Simplify this expression: $\sqrt{4 + 9 + 13}$

a. 13 b. $\sqrt{26}$ c. $6\sqrt{13}$ d. $5 + \sqrt{13}$

25. What is the length of $\overline{MN}$ on the number line?



a. $2\sqrt{2}$ b. $2\sqrt{17}$ c. $4\sqrt{2}$ d. $\sqrt{32}$

26. Which is the simplified form of the expression? $4\sqrt{3}+5\sqrt{2}+3\sqrt{3}$

a. $12\sqrt{3}$ b. $12\sqrt{8}$ c. $7\sqrt{3}+5\sqrt{2}$ d. $9\sqrt{2}+3\sqrt{3}$

27. A rectangle has a length of $5\sqrt{3}$centimeters and a width of $4\sqrt{6}$centimeters. What is the area of the rectangle?

a. $40\sqrt{3}$ square centimeters
b. 60 square centimeters
c. $60\sqrt{2}$ square centimeters
d. $180\sqrt{2}$ square centimeters

28. What is the value of $\sqrt{\frac{12}{27}}$ in simplest form?

a. $\frac{2}{3}$ b. $\frac{2}{3}\sqrt{3}$ c. $\frac{4}{9}$ d. $\sqrt{\frac{2}{3}}$

29. Which expression is equivalent to the one shown? $\sqrt{6}\times\sqrt{15}$

a. $3\sqrt{10}$ b. $9\sqrt{10}$ c. $10\sqrt{3}$ d. $10\sqrt{9}$

30. The area of a square is 48 square centimeters. The length of each side is $\sqrt{48}$centimeters. Which of these expressions is equivalent to $\sqrt{48}$?

a. $4\sqrt{3}$ b. $2\sqrt{6}$ c. $8\sqrt{6}$ d. $16\sqrt{3}$

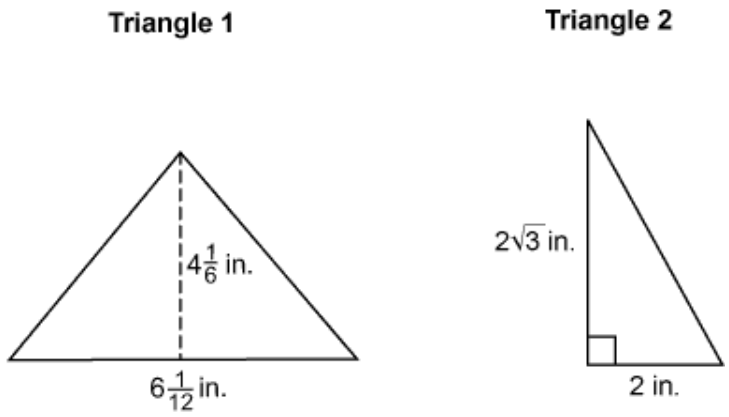
Free Response:

31. What number remains under the radical after this expression is completely simplified? $\sqrt{48}+\sqrt{75}$

32. The expression $\sqrt{30{,}800}$ represents the distance, in miles, between two state capitals on a map. Jermaine calculates this distance as 175.5 miles. Is this calculation an exact distance or an approximation? Justify your reasoning.

33. Janet wants to sew a lace border around the edge of a round tablecloth that has a diameter of 80 inches. Janet uses her calculator to find the value of π to use in the circumference formula. Her calculator shows this value as 3.141592654. Explain whether Janet's calculation for the distance around the tablecloth will be exact or an approximation.

34. Debra wants to calculate the areas of the triangles shown below. Debra uses the formula A = ½ x base x height to find the area of each triangle, in square inches.



a. Debra estimates the area of Triangle 1 using the equation $\text{Area} = \frac{1}{2}(6)(4)$. Is Debra's estimation greater than or less than the actual area of Triangle 1? Justify your answer.

b. Write an expression in simplest form that shows the exact area of Triangle 2 in square inches.

c. Debra's calculator shows the value of $\sqrt{3}$ as 1.7320508. She uses this value to calculate the area of Triangle 2. Is her area calculation an exact answer or an estimation? Justify your answer.