

# Number Concepts for Middle School (6 - 8)

Name \_\_\_\_\_

Read each problem carefully. Answer as many as you can. Write answers clearly. You may write on this test. You may not use a calculator.

1. Write in exponential form:  $\left[\frac{1}{6}\right]$   $\left[\frac{1}{6}\right]$   $\left[\frac{1}{6}\right]$  Answer: \_\_\_\_\_

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2. Find the value of each expression, then write your answer in standard form.

a)  $2^5 =$  \_\_\_\_\_

b)  $\left[\frac{1}{3}\right]^3 =$  \_\_\_\_\_

c)  $(0.3)^2 =$  \_\_\_\_\_

d)  $5^{-4} =$  \_\_\_\_\_

e)  $7^0 =$  \_\_\_\_\_

f)  $(-7)^3 =$  \_\_\_\_\_

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3. Continue the sequence by filling in the missing terms:

$2^4 = 16$ ;  $2^3 = 8$ ;  $2^2 = 4$ ;  $2^1 = 2$ ;  $2^0 = 1$ ;  $2^{-1} =$  \_\_\_\_\_;  $2^{-2} =$  \_\_\_\_\_

4. Write the prime factorization of 840.

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5. What is the least common multiple (LCM) of 15 and 18?

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6. Find the sum of  $\frac{5}{6} + \frac{3}{10}$  and express the answer in simplest form.

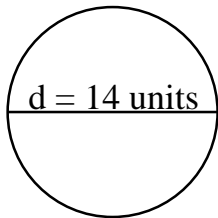
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7. Three joggers are running around the track. One jogger runs a lap in 6 minutes, the second jogger takes 8 minutes, and the third takes 10 minutes. If they start at the same time and place, how long will it take for them to meet at the same place at the same time again? Be sure to label your answer.

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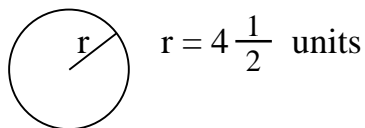
8. Find the circumference of the circle. Use  $\pi = 3.14$ . Be sure to label your answer.



C = \_\_\_\_\_

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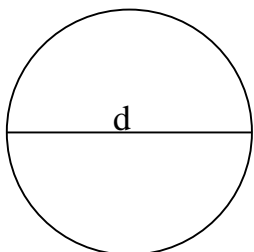
9. Find the circumference of the circle. Use  $\pi = \frac{22}{7}$ . Be sure to label your answer.



C = \_\_\_\_\_

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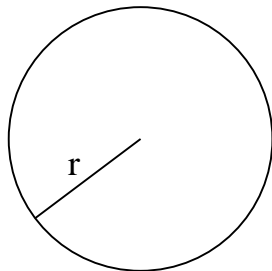
10. Find the diameter of the circle if  $C = 52$  units. Use  $\pi = 3.14$ . Be sure to label your answer.



d = \_\_\_\_\_

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11. Find the radius of the circle if  $C = 55$  units. Use  $\pi = \frac{22}{7}$ . Be sure to label your answer.



r = \_\_\_\_\_

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12. Write  $\frac{3}{20}$  in decimal form.

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13. Write  $\frac{8}{15}$  in decimal form.

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14. Will the following fractions terminate or repeat when written in decimal form?

Circle the word “terminate” or “repeat” for each fraction.

a)  $\frac{12}{18}$

b)  $\frac{17}{25}$

terminate    repeat

terminate    repeat

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15. Convert the following ratios to decimals:

a)  $\frac{3}{5}$  \_\_\_\_\_

b)  $\frac{12}{25}$  \_\_\_\_\_

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16. On Friday, in PE class, 10 students played basketball and 12 students played volleyball. What is the ratio of basketball players to all students in PE class?

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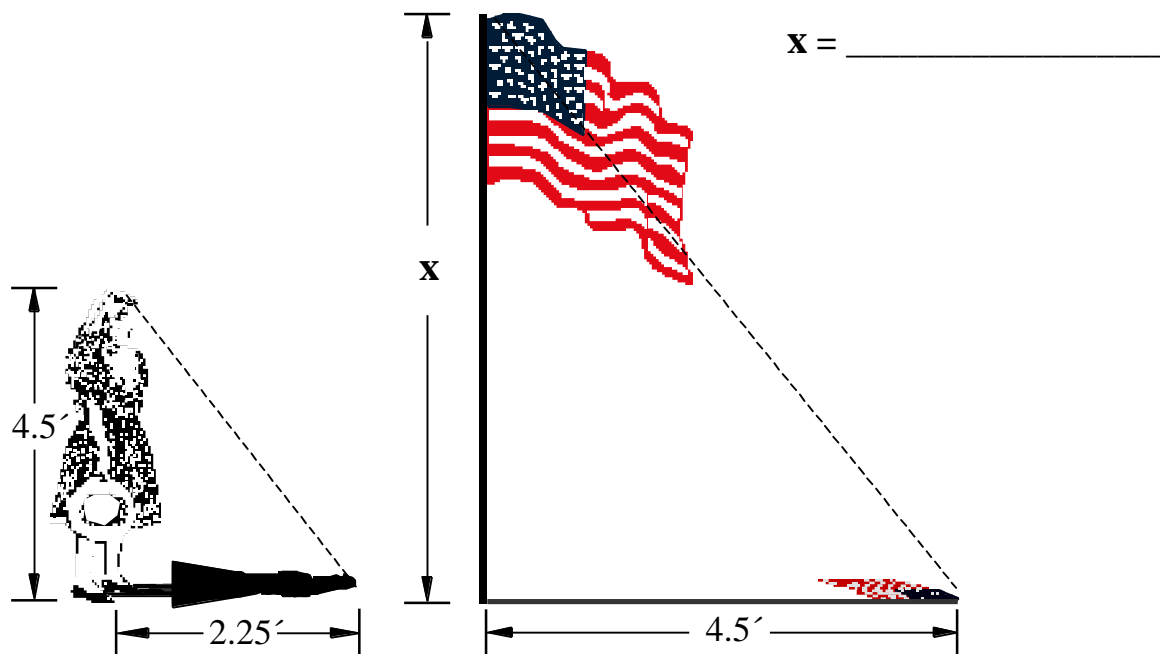
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17. Suppose 24 out of 42 students in a group do not like walnuts. In simplest form, what is the ratio of students in that group who do like walnuts to students do not like walnuts?

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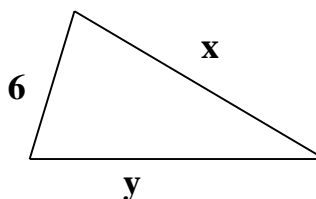
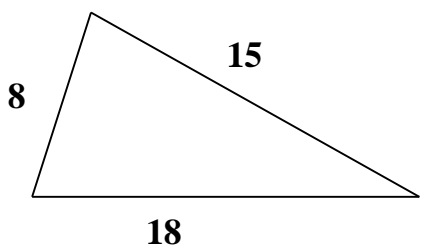
18. Find the height of the flag using the girl's height, her shadow and the flag's shadow. Be sure to label your answer.



19. A package of pretzels has 4950 calories and 450 milligrams of sodium. If each pretzel has 33 calories, how many milligrams of sodium does it have? Be sure to label your answer.

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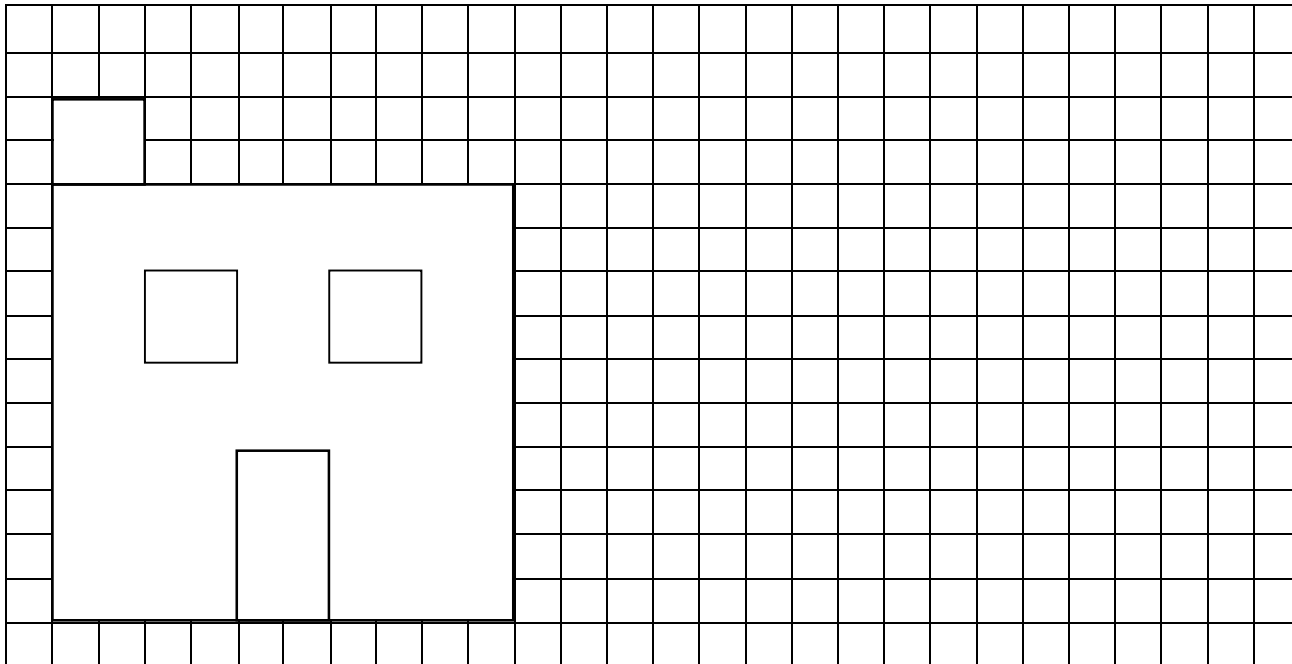
20. Use proportions to determine the values of  $x$  and  $y$  assuming that the 2 triangles are similar.



a)  $x =$  \_\_\_\_\_

b)  $y =$  \_\_\_\_\_

21. Draw the figure below using a scale factor of  $\frac{1}{2}$ .



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22. Find the value of  $n$  that makes the ratios equivalent.

a)  $\frac{1}{n} = \frac{2}{8}$                        $n =$  \_\_\_\_\_

b)  $\frac{3}{5} = \frac{n}{25}$                        $n =$  \_\_\_\_\_

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