

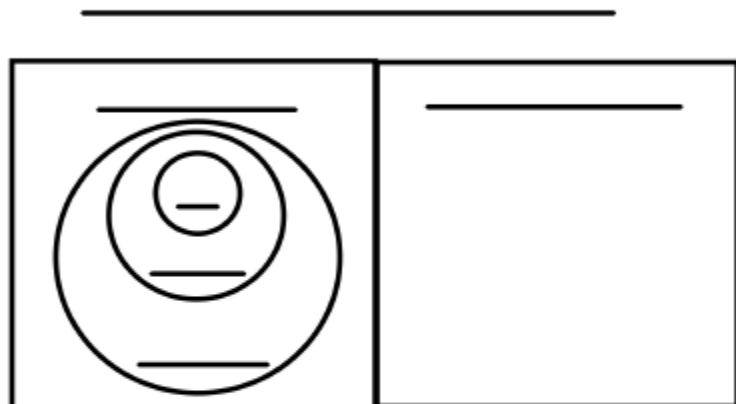
Student Name: _____

Date: _____

Summer Mathematics Review: 8th Grade to Algebra 1

- 1.) Complete the diagram by filling in the following words in the appropriate spot:

Natural **Integer** **Real**
Irrational **Rational** **Whole**



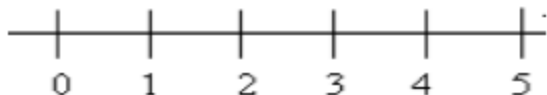
- 2.) Complete the chart. Make a check in the box if the number is a member of the set described, leave it blank if it is not.

	Natural	Whole	Integer	Rational	Irrational	Real
1.3						
-5						
8						
$5\frac{1}{2}$						
$\sqrt{13}$						
$-\sqrt{25}$						

- 3.) Explain why all integers are also rational numbers. Use a negative integer, zero, and a positive integer as examples to justify your response.
- 4.) Give the name of the set of real numbers that is **not** rational. Describe the two characteristics of such numbers. Then provide two numerical examples.

5.) $\sqrt{130}$ is between which two consecutive integers?

6.) Put a point on the number line for an approximate value of $\sqrt{15}$.



Simplify:

7.) $13 - \sqrt{9+16}$

8.) $\sqrt{144} + 3 \cdot \sqrt{16}$

9.) $-36 + \sqrt{15(5)+3}$

10.) Find the side length of a square with an area of 169 square meters. Label your answer.
Work:

Answer: _____

For Problems 11 – 14: Show your work to estimate (approximate) the square roots of the following numbers. Then plot the points on the given line to show their relative positions.

11.) $-\sqrt{5}$

12.) $\sqrt{11}$

13.) $\sqrt{8}$

14.) $\sqrt{3}$



For Problems 15 and 16: Calculate the approximate square root (showing all your work):

15.) Estimate $\sqrt{19}$ to the nearest hundredth. Show your iterative process.

Work:

Answer: _____

16.) Estimate $\sqrt{50}$ to the nearest tenth. Show your iterative process.

Work:

Answer: _____

For Problems 17 and 18: Solve the following equations:

17.) $y^2 = 484$

18.) $t^2 = 42 - 6 \cdot 4 + 18$

- 19.) The period of a pendulum is the time that it takes to swing from one side to the other and back. A pendulum's period P (in seconds) and its length l (in feet) are related by the equation $P = 1.1\sqrt{l}$. If a pendulum has a length of 42 feet, what is the approximate time of its period?

Answer: _____

- 20.) One attraction at an amusement park ride is a free-fall drop ride. The equation $d = 16t^2$ can be used to determine the time, t , (in seconds) that it takes a dropped object to fall a distance of d feet. How far do you fall if the time of free-fall is $\frac{3}{4}$ seconds?

Answer: _____

- 21.) Convert each of the following into their equivalent decimal form:

a.) $\frac{5}{8} =$ _____

b.) $\frac{2}{3} =$ _____

- 22.) Express each of the following decimal numbers as the ratio of two integers in lowest terms.

a.) $-0.625 =$ _____

b.) $0.\bar{4} =$ _____

c.) $0.\overline{24} =$ _____

For Problems 1 – 4, write the equivalent fraction (simplified), decimal, and/or percent.

	Fraction	Decimal	Percent
1.)	_____	_____	0.68%
2.)	$\frac{5}{8}$	_____	_____
3.)	_____	5.6	_____
4.)	$\frac{1}{6}$	_____	_____

For Problems 5 – 7, use a proportion to solve the percent problem.

5.) What percent of 125 is 15?

6.) What is 50% of 78?

7.) 15 is 20% of what number?

In problems 9 - 11, use an equation to solve the percent problem.

8.) What percent of 78 is 26?

9.) What is 7% of \$56.00?

10.) 23 is $\frac{1}{6}$ of what number?

Show all work to show how you solved the following problems:

11.) From 1980 to 1990, the population of Cook County, Illinois increased from 5,000,000 to 5,300,000. By what percent did the population change from 1980 to 1990? Show all work!

12.) We are currently feeding our country on 920 million acres of farmland. This is about 40% of the nation's total land mass. What is the total number of acres of land in the United States?

13.) The average ant weighs 0.3 grams and can carry up to 15 grams. What percent of its own body weight can the average ant carry?

14.) Explain (in words), why the percent change from 1 to 2 is not equal to the percent change from 2 to 1.

- 15.) Use the given information to find the total cost. Round up to the nearest cent.
Food bill: \$65 Sales tax: 8% Tip: 20% (on food bill only)
- 16.) a.) A salesperson makes \$11.00/hr. After a training period, the worker will receive a 5% increase on his/her hourly wage. If the person then works 35 hrs per week, how much should the worker be paid per week?
- b.) If the government withholds 20% of the paycheck for tax purposes, how much should the worker actually receive in their paycheck?
- 17.) The iPhone6s Plus is on sale for 15% off the original price. The sale price is \$901. What was the original price? (Hint: The sale price is always a part of the whole).
- 18.) Suppose you deposit \$600 into an account that earns simple annual interest of 5%. After 2 years, what is the account balance?
-
-

For Problems 1 – 9, simplify the following expressions:

1.) $84 \div [(19 - 16) \cdot 2]$

2.) $4 + \left(\frac{2}{3} - \frac{4}{5} \cdot \frac{3}{4}\right) \div 0.7$

3.) $(8 - 4)^2 + (5 - 12 \div 6)$

4.) $3 \cdot (11 \cdot 9 - 6^2) + 17$

5.) $(22 + 14 - 4) \div 4 + 5^2$

6.) $\sqrt{16+9} - 3$

7.) $3^3 + (4 - 2)^2$

8.) $3^3 + (4 - 2^2)$

9.) $\sqrt{(7)^2} + 2 \cdot \sqrt{169}$

10.) Find the length of each side of a square whose area is 81 cm^2 .Answer:

11.) Find the perimeter of the square whose area is 144 in^2 .Answer:

For Problems 12 – 17, solve each equation for the variable x , showing all work:

12.) $3x - 9 = 6$

13.) $5 - 6x = -61$

14.) $19 = 7 - 3x$

15.) $1 = 5 + \frac{1}{2}x$

16.) $-0.3 + 0.8x = -0.5$

17.) $\frac{3}{5}x - 5 = 25$

18.) Solve; then list the property you used.
Then check your solution.

$$3x + 15 = 48 \quad \text{Property}$$

Check:

19.) Solve; then list the property you used.
Then check your solution.

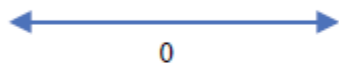
$$16 = \frac{2}{5}x - 24 \quad \text{Property}$$

Check:

For Problems 20 – 25, solve each inequality, then graph its solution set on the number line provided.

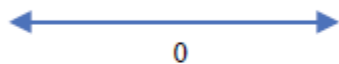
20.) $-8 + x < -14$

Answer: _____



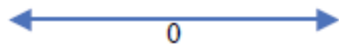
21.) $\frac{x}{5} < -2$

Answer: _____



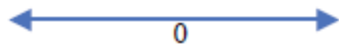
22.) $\frac{x-7}{3} \geq 12$

Answer _____



23.) $-2 > -8x - 4$

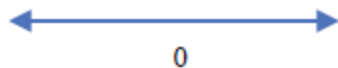
Answer _____



24.) $-20 - 5x > 10$

25.) $-4 + \frac{x}{5} < -3$

Answer _____



Answer _____



For problems 1-3: Write your answers using positive exponents and in simplified form.

1. $2^3 \cdot 2 \cdot 2^5$

2. $\frac{2^2}{2^3}$

3. 3^{-3}

4. Explain why $2^0 = 1$

For problems 5-8, write each number in scientific notation.

5. 95,645

6. 0.00164

7. 0.000003

8. 9,850,000,000

For problems 9-12, write each number in standard notation.

9. 5×10^{-3}

10. 2.445×10^5

11. 4.31×10^4

12. 1.25×10^{-3}

13. Multiply $(4.2 \times 10^5)(2 \times 10^{-3})$. Write your answer in scientific notation.

Answer: _____

14. Divide $\frac{(2.5 \times 10^{-4})}{(2 \times 10^{-3})}$. Write your answer in scientific notation.

Answer: _____

Solutions

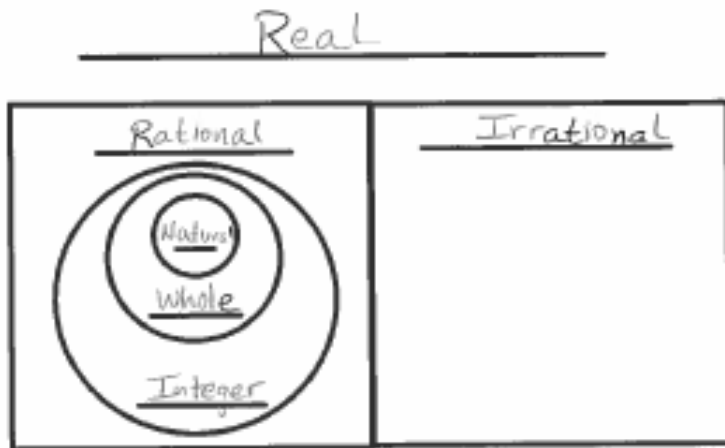
Student Name: _____

Middle School Attended: _____

Summer Mathematics Review: 8th Grade to Algebra 1

- 1.) Complete the diagram by filling in the following words in the appropriate spot:

Natural Integer Real
Irrational Rational Whole



- 2.) Complete the chart. Make a check in the box if the number is a member of the set described, leave it blank if it is not.

	Natural	Whole	Integer	Rational	Irrational	Real
13				✓		✓
-5			✓	✓		✓
8	✓	✓	✓	✓		✓
$5\frac{1}{2}$				✓		✓
$\sqrt{13}$					✓	✓
$-\sqrt{25}$			✓	✓		✓

- 3.) Explain why all integers are also rational numbers. Use a negative integer, zero, and a positive integer as examples to justify your response.

All integers can be written in the form $\frac{a}{b}$, where a and b are integers; $b \neq 0$.

examples: $-3 = \frac{-3}{1}$; $0 = \frac{0}{8}$; $7 = \frac{14}{2}$

- 4.) Give the name of the set of real numbers that is not rational. Describe the two characteristics of such numbers. Then provide two numerical examples.

Real numbers that are not rational are irrational. They are non-repeating, non-terminating decimals.

$\sqrt{2}$ and π are two such numbers.

5.) $\sqrt{130}$ is between which two consecutive integers?

Since $121 < 130 < 144$,

$\sqrt{130}$ is between 11 and 12.

6.) Put a point on the number line for an approximate value of $\sqrt{15}$.



Simplify:

7.) $13 - \sqrt{9+16}$
 $13 - \sqrt{25}$
 $13 - 5$

8

8.) $\sqrt{144} + 3 \cdot \sqrt{16}$
 $12 + 3 \cdot 4$
 $12 + 12$

24

9.) $-36 + \sqrt{15(5)+3}$
 $-36 + \sqrt{75+3}$
 $-36 + \sqrt{78}$
 $-36 + 5$

-31

10.) Find the side length of a square with an area of 169 square meters. Label your answer.

Work:



$x^2 = 169$
 $x = 13$

Answer: 13 meters

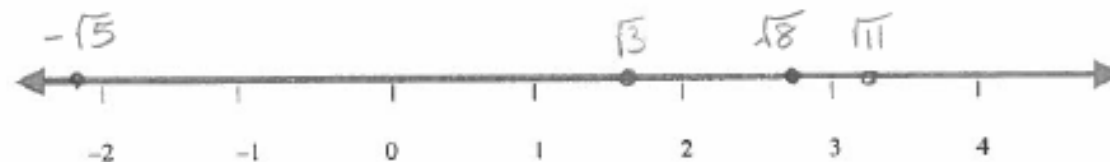
For Problems 11 – 14: Show your work to estimate (approximate) the square roots of the following numbers. Then plot the points on the given line to show their relative positions.

11.) $\sqrt{5} \approx 2.2$
 $-\sqrt{5} \approx -2.2$

12.) $\sqrt{11} \approx 3.3$

13.) $+\sqrt{8} \approx +2.8$

14.) $\sqrt{3} \approx 1.7$



make $\sqrt{7} \rightarrow -\sqrt{7}$ and $\sqrt{8} \rightarrow \sqrt{8}$

For Problems 15 and 16: Calculate the approximate square root (showing all your work):

15.) Estimate $\sqrt{19}$ to the nearest hundredth. Show your iterative process.

Answer: 4.36

16.) Estimate $\sqrt{50}$ to the nearest tenth. Show your iterative process.

Answer: 7.1

For Problems 17 and 18: Solve the following equations:

17.) $y^2 = 484$

$y = \pm \sqrt{484} = \pm \sqrt{4 \cdot 121}$

$y = \pm 2 \cdot 11$

$y = \pm 22$

18.) $t^3 = 42 - 6 \cdot 4 + 18$

$t^3 = 42 - 24 + 18$

$t^3 = 36$

$t = \pm 6$

- 19.) The period of a pendulum is the time that it takes to swing from one side to the other and back. A pendulum's period P (in seconds) and its length l (in feet) are related by the equation $P = 1.1\sqrt{l}$. If a pendulum has a length of 42 feet, what is the approximate time of its period?

$$P = (1.1)\sqrt{42}$$

$$P \approx (1.1)(6.5)$$

Answer: ≈ 7.1 sec

- 20.) One attraction at an amusement park ride is a free-fall drop ride. The equation $d = 16t^2$ can be used to determine the time, t , (in seconds) that it takes a dropped object to fall a distance of d feet. How far do you fall if the time of free-fall is $\frac{5}{2}$ seconds?

$$d = 16\left(\frac{5}{2}\right)^2$$

$$= \frac{16 \cdot 25}{1} = 400 \text{ ft}$$

Answer: 100 ft

- 21.) Convert each of the following into their equivalent decimal form:

a.) $\frac{5}{8} = \underline{0.625}$

b.) $\frac{2}{3} = \underline{0.\overline{6}}$

- 22.) Express each of the following decimal numbers as the ratio of two integers in lowest terms.

a.) $-0.625 = \underline{-\frac{5}{8}}$

b.) $0.\overline{4} = \underline{\frac{4}{9}}$

c.) $0.\overline{24} = \underline{\frac{8}{33}}$

$$\begin{array}{r} 100 \overline{) 24.24} \\ \underline{24} \\ 0. \overline{24} \\ \underline{99 \overline{) 24}} \\ 24 \\ \underline{24} \\ 0 \end{array}$$

$$N = \frac{24}{99} = \frac{8}{33}$$

For Problems 1 – 4, write the equivalent fraction (simplified), decimal, and/or percent.

	Fraction	Decimal	Percent
1.)	$\frac{17}{2500}$	0.0068	0.68%
2.)	$\frac{5}{8}$	0.625	62.5%
3.)	$\frac{28}{5}$	5.6	560%
4.)	$\frac{1}{6}$	$0.\overline{16}$	$16.\overline{6}\%$

For Problems 5 – 7, use a proportion to solve the percent problem.

- 5.) What percent of 125 is 15?

$$\frac{x}{100} = \frac{15}{125}$$

$$\frac{x}{100} \cdot (125) = \frac{15}{125} \cdot (125)$$

$$x = 12$$

- 6.) What is 50% of 78?

$$x = \frac{50}{100} \cdot 78$$

$$x = \frac{1}{2}(78) = 39$$

- 7.) 15 is 20% of what number?

$$15 = \frac{20}{100} \cdot x$$

$$15 = \frac{1}{5}x$$

$$x = 75$$

In problems 9 - 11, use an equation to solve the percent problem.

8.) What percent of 78 is 26?

$$\frac{x}{100} \cdot 78 = 26$$
$$x = \frac{26 \cdot 100}{78} = \frac{1300}{39} = \frac{100}{3} = 33\frac{1}{3}\%$$

9.) What is 7% of \$56.00?

$$\frac{7}{100} \cdot 56 = x$$
$$x = \frac{98}{25} = \$3.92$$

10.) 23 is $\frac{1}{6}$ of what number?

$$23 = \frac{1}{6} \cdot x$$

$$6(23) = x$$

$$x = 138$$

Show all work to show how you solved the following problems:

11.) From 1980 to 1990, the population of Cook County, Illinois increased from 5,000,000 to 5,300,000. By what percent did the population change from 1980 to 1990? Show all work!

$$\frac{5,300,000}{5,000,000} = \frac{53}{50} = 106\% \text{ of previous population}$$

or a 6% increase.

12.) We are currently feeding our country on 920 million acres of farmland. This is about 40% of the nation's total land mass. What is the total number of acres of land in the United States?

$$920 = 0.4x$$

$$920 = \frac{2}{5}x$$

$$x = \frac{5(920)}{2} = 5(460)$$

$$x = 2300$$

2,300,000,000 acres

13.) The average ant weighs 0.3 grams and can carry up to 15 grams. What percent of its own body weight can the average ant carry?

$$\frac{x}{100} (0.3) = 15$$

$$x = \frac{1500}{0.3}$$

$$x = \frac{15000}{3} = 5000$$

5000%

14.) Explain (in words), why the percent change from 1 to 2 is not equal to the percent change from 2 to 1.

Because from 1 to 2 is doubling or a
100% increase, and from 2 to 1 is halving
or a 50% decrease (reduction).

- 15.) Use the given information to find the total cost. Round up to the nearest cent.
 Food bill: \$65 Sales tax: 8% Tip: 20% (on food bill only)

$$65 + (0.08)(65) + (0.2)(65)$$

$$65 + 5.20 + 13 = \text{\$ } 83.20$$

- 16.) a.) A salesperson makes \$11.00/hr. After a training period, the worker will receive a 5% increase on his/her hourly wage. If the person then works 35 hrs per week, how much should the worker be paid per week?

$$1.05(11.00) = 11.55$$

$$35 \times 11.55 = \text{\$ } 404.25$$

- b.) If the government withholds 20% of the paycheck for tax purposes, how much should the worker actually receive in their paycheck?

$$(404.25)(0.80) = \text{\$ } 323.40$$

- 17.) The iPhone6s Plus is on sale for 15% off the original price. The sale price is \$901. What was the original price? (Hint: The sale price is always a part of the whole).

$$x - (0.15x) = 901$$

$$0.85x = 901$$

$$x = \text{\$ } 1060$$

- 18.) Suppose you deposit \$600 into an account that earns simple annual interest of 5%. After 2 years, what is the account balance?

$$\begin{array}{r} 600 \\ \times 0.05 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 630 \\ \times 0.05 \\ \hline 31.50 \end{array}$$

$$\begin{array}{r} 1 \text{ yr} \left\{ \begin{array}{l} 600 \\ + 30 \\ \hline 630 \end{array} \right. \\ 2 \text{ yr} \left\{ \begin{array}{l} 630 \\ + 31.50 \\ \hline 661.50 \end{array} \right. \end{array}$$

$$\text{\$ } 661.50$$

1.) $84 + [(19-16) \cdot 2]$
 $= 84 + [3 \cdot 2]$
 $= 84 + 6$
 $= 90$

$$\underline{90}$$

2.) $4 + \left(\frac{2}{3} - \frac{4}{5} \cdot \frac{3}{4} \right) + 0.7$
 $= 4 + \left(\frac{2}{3} - \frac{12}{20} \right) + 0.7$
 $= 4 + \left(\frac{2}{3} - \frac{3}{5} \right) + 0.7$
 $= 4 + \left(\frac{10}{15} - \frac{9}{15} \right) + 0.7$
 $= 4 + \left(\frac{1}{15} \right) + 0.7$
 $= 4 + \frac{1}{15} + \frac{7}{10}$
 $= 4 + \frac{2}{3} = \frac{14}{3} = \frac{27}{3}$

$$\underline{\frac{27}{3}}$$

3.) $(8-4)^2 + (5-1)^2 + 6$
 $= 4^2 + (5-1)^2 + 6$
 $= 16 + 16 + 6 = 38$

$$\underline{38}$$

$$\begin{aligned}
 4.) \quad & 3 \cdot (11 \cdot 9 - 6^2) + 17 \\
 & = 3 \cdot (99 - 36) + 17 \\
 & = 3 \cdot (63) + 17 \\
 & = 189 + 17 = 206
 \end{aligned}$$

206

$$\begin{aligned}
 5.) \quad & (22 + 14 - 4) \div 4 + 5^2 \\
 & = (36 - 4) \div 4 + 25 \\
 & = 32 \div 4 + 25 \\
 & = 8 + 25 = 33
 \end{aligned}$$

33

$$\begin{aligned}
 6.) \quad & \sqrt{16+9} - 3 \\
 & = \sqrt{25} - 3 \\
 & = 5 - 3 = 2
 \end{aligned}$$

2

$$\begin{aligned}
 7.) \quad & 3^3 + (4-2)^2 \\
 & = 9 + (2)^2 \\
 & = 9 + 4 = 12
 \end{aligned}$$

12

$$\begin{aligned}
 8.) \quad & 3^3 + (4-2^3) \\
 & = 9 + (4-4) \\
 & = 9 + 0 = 9
 \end{aligned}$$

9

$$\begin{aligned}
 9.) \quad & \sqrt{(7)^2} + 2 \cdot \sqrt{169} \\
 & = 7 + 2 \cdot 13 \\
 & = 7 + 26 = 33
 \end{aligned}$$

33

10.) Find the length of each side of a square whose area is 81 cm^2 .

$$A = s^2 \rightarrow \sqrt{81} = s^2 \rightarrow s = 9 \text{ cm}$$

Answer: 9 cm

11.) Find the perimeter of the square whose area is 144 in^2 .

$$\begin{aligned}
 P &= 4s \rightarrow P = 4(12) = 48 \text{ in} \\
 A &= s^2 \rightarrow \sqrt{s^2} = \sqrt{144} \rightarrow s = 12 \text{ in}
 \end{aligned}$$

Answer: 48 in

For Problems 12 - 17, solve each equation for the variable x , showing all work:

$$\begin{aligned}
 12.) \quad & 3x - 9 = 6 \\
 & \quad +9 \quad +9 \\
 & \frac{3x}{3} = \frac{15}{3} \\
 & x = 5
 \end{aligned}$$

x = 5

$$\begin{aligned}
 13.) \quad & 5 - 6x = -61 \\
 & \quad -5 \quad -5 \\
 & \frac{-6x}{-6} = \frac{-66}{-6} \\
 & x = 11
 \end{aligned}$$

x = 11

$$\begin{aligned}
 14.) \quad & 19 = 7 - 3x \\
 & \quad -7 \quad -7 \\
 & \frac{12}{-3} = \frac{-3x}{-3} \\
 & -4 = x
 \end{aligned}$$

x = -4

$$\begin{aligned}
 15.) \quad & 1 = 5 + \frac{1}{2}x \\
 & \quad -5 \quad -5 \\
 & 2 \cdot (-4) = (2x) \cdot 2 \\
 & -8 = x
 \end{aligned}$$

x = -8

$$\begin{aligned}
 16.) \quad & -0.3 + 0.8x = -0.5 \\
 & \quad +0.3 \quad +0.3 \\
 & \frac{0.8x}{0.8} = \frac{-0.2}{0.8} \quad \cdot \frac{10}{10} \cdot \frac{10}{x} \\
 & x = -0.25
 \end{aligned}$$

x = -0.25

$$\begin{aligned}
 17.) \quad & \frac{3}{5}x - 5 = 25 \\
 & \quad +5 \quad +5 \\
 & \frac{3}{5}x = 30 \quad \cdot \frac{5}{3} \quad \cdot \frac{5}{5} \\
 & x = 50
 \end{aligned}$$

x = 50

18.) Solve; then list the property you used.
Then check your solution.

$$\begin{array}{r} 3x + 15 = 48 \\ -15 \quad -15 \\ \hline 3x = 33 \end{array}$$

Property

Addition/Subtraction
Property of Equality

$$\begin{array}{r} 3x = 33 \\ \div 3 \quad \div 3 \\ \hline x = 11 \end{array}$$

Multiplication/Division
Property of Equality

Check:

$$\begin{array}{r} 3(11) + 15 = 48 \\ 33 + 15 = 48 \\ 48 = 48 \checkmark \end{array}$$

19.) Solve; then list the property you used.
Then check your solution.

$$\begin{array}{r} 16 = \frac{2}{5}x - 24 \\ +24 \quad +24 \\ \hline \left(\frac{5}{2}\right)40 = \left(\frac{2}{5}x\right)\frac{5}{2} \end{array}$$

Property

Add/Subtract
Prop. of Equality

$$100 = x$$

Mult./Division
Property of Equality

Check:

$$\begin{array}{r} 16 = \frac{2}{5}(100) - 24 \\ 16 = 40 - 24 \\ 16 = 16 \checkmark \end{array}$$

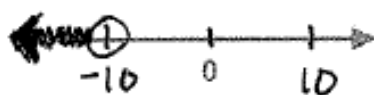
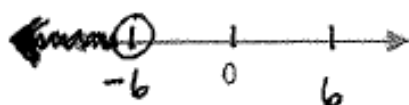
For Problems 20 – 25, solve each inequality, then graph its solution set on the number line provided.

$$\begin{array}{r} 20.) \quad -x + x < -14 \\ +8 \quad +8 \\ \hline x < -6 \end{array}$$

$$\begin{array}{r} 21.) \quad \frac{x}{5} < -2.5 \\ \times 5 \quad \times 5 \\ \hline x < -10 \end{array}$$

Answer: $x < -6$

Answer: $x < -10$

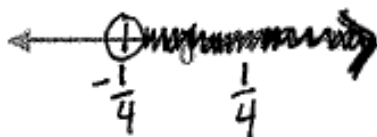
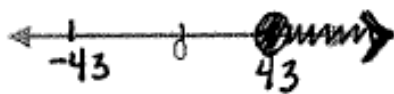


$$\begin{array}{r} 22.) \quad \frac{x-7}{8} \geq 12 \cdot 3 \\ \times 8 \quad \times 8 \\ \hline x - 7 \geq 36 \\ +7 \quad +7 \\ \hline x \geq 43 \end{array}$$

$$\begin{array}{r} 23.) \quad -2 > -8x \\ +4 \quad +4 \\ \hline 2 > -8x \\ \div -8 \quad \div -8 \\ \hline -\frac{1}{4} < x \end{array}$$

Answer $x \geq 43$

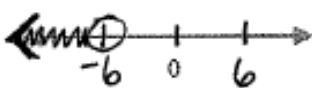
Answer $x > -\frac{1}{4}$



$$24.) \quad -30 - 5x > 10$$

$$\begin{array}{r} +20 \quad +20 \\ \hline -5x > 30 \\ x < -6 \end{array}$$

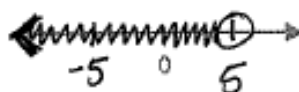
Answer $x < -6$



$$25.) \quad \frac{1}{4} + \frac{x}{5} < -3$$

$$\begin{array}{r} +4 \quad +4 \\ \hline \frac{x}{5} < -1.5 \\ x < -7.5 \end{array}$$

Answer $x < 5$



For problems 1-3: Write your answers using positive exponents and in simplified form.

$$1. \quad 2^3 \cdot 2^1 \cdot 2^5 = \boxed{2^9}$$

$$= \boxed{512}$$

$$2. \quad \frac{2^2}{2^3} = 2^{-1}$$

$$= \boxed{2^1}$$

$$= \boxed{2}$$

$$3. \quad 3^{-3} = \boxed{\frac{1}{3^3}}$$

$$= \boxed{\frac{1}{27}}$$

4. Explain why $2^0 = 1$

$$\frac{2^3}{2^3} = \frac{8}{8} = 1 \quad ; \quad \frac{2^3}{2^3} = 2^{3-3} = 2^0 \quad ; \quad \text{Therefore } 2^0 = 1$$

For problems 5-8, write each number in scientific notation.

5. 95,645

6. 0.00164

7. 0.000003

8. 9,850,000,000

9.5645×10^4

1.64×10^{-3}

3×10^{-6}

9.85×10^9

For problems 9-12, write each number in standard notation.

9. 5×10^{-3}

10. 2.445×10^5

11. 4.31×10^3

12. 1.25×10^{-3}

.005

244,500

4,310

.00125

13. Multiply $(4.2 \times 10^5)(2 \times 10^{-3})$. Write your answer in scientific notation.

$$(4.2)(2) = 8.4$$

$$(10^5)(10^{-3}) = 10^{5+(-3)} = 10^2$$

Answer: 8.4×10^2

14. Divide $\frac{(2.5 \times 10^{-4})}{(2 \times 10^{-3})}$. Write your answer in scientific notation.

$$\frac{2.5}{2} = 1.25$$

Answer: 1.25×10^{-1}

$$\frac{10^{-4}}{10^{-3}} = 10^{-4+(+3)} = 10^{-1}$$