

NAME: \_\_\_\_\_

**St. Francis High School**  
**Pre-Algebra Basic Skills**  
**Workbook**

**Use this workbook to help prepare for the Basic Skills test that will be given in the first week of school to all students enrolled in Algebra I or Algebra I, part 1.**

Samples of the types of problems on the test are included, but if you are having trouble with any section more problems can be found by searching the internet or in workbooks available in bookstores. The test will be taken WITHOUT calculators so do these problems without one unless otherwise indicated. Answers are provided at the back of the workbook. Work through the practice sections during the summer.

A sample test is included. Take this sample test the week before schools starts and brush up on any sections that you found difficult. You will be asked to do extra work on the skills you do not successfully master. Good luck.

**SKILL PA 1: DECIMALS**

- To Add or Subtract: line up the decimals and add or subtract
- To Multiply: Multiply the numbers as whole numbers and count the number of decimals places in each of the factors. Count off the same number of places in the product.
- To Divide: Move the decimal point in the divisor to make it a whole number. Move the decimal point in the dividend the same number of places. Place the decimal point in the quotient and divide as you would with whole numbers. (dividend  $\div$  divisor = quotient)

Work the following problems.

1. $4.5 + 12.45 + 102$	2. $0.09 + 1.56 + 1.2$	3. $12.32 + 3.006 + 21$	4. $100 + .09 + .01$
5. $1.2 + 3.4$	6. $7.3 - 4.92$	7. $6.32 - 2.45$	8. $109 - .012$
9. $30 + 26.1 - 4.2$	10. $6.12 + 3.001$	11. $5.71 - 4.2213$	12. $3.27 - 2.15$
13. $(4.8)(6.9)$	14. $(7.5)(1.2)$	15. $4.2(2)$	16. $1.89(56)$

17. $(7.5)(0.42)$	18. $8.37(2.1)$	19. $(4.3)(2.1)$	20. $(1.37)(0.2)$
21. $(4.1)(3)$	22. $(3.1)(0.34)$	23. $(12)(3.2)$	24. $3(.1)(2.4)$
25. $3.25 \div 0.5$	26. $16.04 \div 0.04$	27. $1.016 \div 0.08$	28. $0.024 \div 0.4$
29. $32.4 \div 0.3$	30. $8.4 \div 1.2$	31. $36 \div 0.06$	32. $0.24 \div 0.3$

## SKILL PA2: FACTORS AND PRIME NUMBERS

Factor each number to primes.

1. 72	2. 45	3. 120	4. 154
5. 126	6. 286	7. 378	8. 168

- To find the **Greatest Common Factor (GCF)** of a pair of numbers first factor each to primes then circle the factors that are the same in (common to) each number. The GCF is the product of the common factors.

Example: 8      and      12 $2 \cdot 2 \cdot 2$ $2 \cdot 2 \cdot 3$  The GCF is: $2 \cdot 2 = 4$	9. 35 and 14	10. 28 and 52	11. 36 and 30
12. 150 and 200	13. 48 and 84	14. 39 and 65	15. 121 and 132

16. The local reader's club has a set of 24 hardback books and a set of 36 paperback books. Each set can be divided equally among the club's members. What is the greatest possible number of members?

17. Mrs. Kolas has 18 cupcakes and 36 candy canes. What is the greatest number of people she can invite to her party if she wants each person to get an equal amount of each treat?

### SKILL PA3: FRACTIONS

- To Add or Subtract: It. The denominators must be equal. If they are not equal you must find the Least Common Denominator (LCD). The LCD is the smallest number all the denominators will divide into evenly. It is sometimes easier to change the mixed numbers to improper fractions. Add the numerators and keep the denominators.
- To multiply: Change to improper fractions, multiply the numerators and then the denominators.
- To divide: Change to improper fractions and MULTIPLY the first number by the RECIPROCAL of the second number.
- Always REDUCE, if possible.

Find the sum or difference and reduce if possible.

eg. $\frac{5}{8} + \frac{7}{12}$ $\frac{5}{8} = \frac{15}{24}$ $+ \frac{7}{12} = \frac{14}{24}$ <hr/> $\frac{29}{24} = 1\frac{5}{24}$	1. $\frac{2}{3} - \frac{3}{8}$	2. $\frac{1}{2} - \frac{7}{12}$	3. $\frac{7}{9} + \frac{4}{5}$
4. $\frac{3}{7} - \frac{1}{3}$	5. $\frac{3}{10} + \frac{7}{8}$	6. $\frac{11}{15} - \frac{2}{5}$	7. $\frac{1}{2} + \frac{1}{3} + \frac{1}{5}$
8. $\frac{3}{7} - \frac{2}{14}$	9. $\frac{3}{4} - \frac{1}{2} + \frac{5}{6}$	10. $\frac{16}{5} - \frac{27}{10}$	11. $\frac{18}{5} + \frac{2}{3}$
12. $\frac{1}{2} + 1\frac{1}{6}$	13. $2\frac{1}{3} - 1\frac{1}{6}$	14. $5\frac{2}{3} + 2\frac{1}{4}$	15. $4\frac{2}{3} - 2\frac{1}{2}$

16. $2\frac{3}{4} - 1\frac{1}{2}$	17. $3\frac{2}{9} - 1\frac{1}{6}$	18. $7\frac{6}{7} + 3\frac{4}{21}$	19. $1\frac{3}{10} - \frac{4}{15}$
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Multiply or divide as indicated and reduce, if possible.

20. $\frac{1}{4} \cdot \frac{4}{5}$	21. $\frac{3}{5} \cdot \frac{8}{9}$	22. $\frac{5}{6} \div \frac{4}{3}$	23. $1\frac{2}{5} \cdot 2\frac{2}{7}$
24. $\frac{4}{3} \div 2$	25. $\frac{4}{9} \div \frac{12}{15}$	26. $\frac{2}{3} \cdot \frac{5}{14} \div \frac{10}{21}$	27. $\left(2\frac{5}{6}\right)\left(3\frac{1}{3}\right)$
28. $\left(1\frac{3}{7}\right)\left(2\frac{4}{5}\right)\left(\frac{1}{2}\right)$	29. $\left(3\frac{1}{6}\right) \div \left(2\frac{5}{9}\right)$	30. $\left(2\frac{1}{5}\right)\left(1\frac{4}{11}\right)$	31. $\left(2\frac{2}{5}\right) \div \left(3\frac{3}{10}\right)$
32. A Tyrannosaurus Rex is $2\frac{2}{3}$ the length of a 15 foot Ankylosaurus. What is the length of the T-Rex?		33. Kevin worked $3\frac{1}{4}$ hours this morning and $2\frac{2}{3}$ hours this afternoon. How many hours did he work today?	

**SKILL PA4: ORDER OF OPERATIONS****PEMDAS: ORDER OF OPERATIONS** (Please Excuse My Dear Aunt Sadie)

P:	parenthesis	$4(2 + 1) = 4(3) = 12$
E:	exponents	$5 * 2^2 = 5 * 4 = 20$
MD:	Mult. & divide left to right	$18 \div 6 * 8 = 3 * 8 = 24$
AS:	Add & subtract left to right	$7 - 3 + 4 = 4 + 4 = 8$

Simplify the following expressions:

1. $3 * 8 + 2$	2. $3 + 8 * 2$	3. $12 \div 4 * 3$	4. $40 - 4^2 * 2$
5. $2 * 3^2$	6. $20 - 12 + 16$	7. $5 * 3 + 2^2$	8. $6 \div (17 - 11) * 14$
9. $20 - (3^2 \div 9) * 2$	10. $29 + 16 \div 8 * 25$	11. $8 - 4 + 2(5)$	12. $16 - 2(5+3)$
13. I have an 8 ft. square wall and a 9 ft. square wall. What is an expression for the area I would need to paint if I wanted to paint both walls?		14. If it costs \$1.50 per square ft. to paint the walls in #13, what will it cost me?	

**SKILL PA5: PROPORTIONAL REASONING**

- If  $\frac{2}{3} = \frac{4}{6} = \frac{?}{9}$ , what is the value of ? Since  $9 = 3 \cdot 3$ ,  $? = 2 \cdot 3 = 6$
- A proportion is made from equal ratios. To solve a proportion the product of the extremes (first and last number) equals the product of the means (middle two numbers)  $\frac{y}{16} = \frac{18}{24}$  means that  $24y = 18(16)$  so  $y = 12$
- Proportions are used to solve many problems especially scale model, unit cost, recipes, and ratio to name a few.

Solve the following problems.

1. $\frac{3}{5} = \frac{18}{x}$	2. $\frac{5}{4} = \frac{x}{12}$	3. $\frac{30}{x} = \frac{10}{24}$	4. $\frac{90}{81} = \frac{10}{3x}$
5. A Lemonade mix says to mix 8 tablespoons of mix to 2 quarts of water. How much mix should Sean use if he wants to make 7 quarts of lemonade?		6. The ratio of the width to the length of a rectangle is 3:7. The shorter side is 9 inches long. What is the longer side and also the area of the rectangle?	
7. In 4 games Michael Jordan scores 124 points. If he continues scoring at this rate, how many points will he score in the first six games of next season?		8. How high would a poster be if Mitch took a 3 in. wide by 5 in. long photo and enlarged it so it was 24 inches wide?	
9. A map has a scale of 1 inch: 60 miles. The distance between Chicago and Cincinnati is approximately 320 miles. How many inches is the map distance between Chicago and Cincinnati?		10. If it costs \$1.50 for a package of 50 paper plates, how much would a package of 180 paper plates cost at the same rate?	

**SKILL PA6: PERCENTS**

- Percents can be expressed as fractions, decimals, whole numbers or mixed numbers.

Change these percentages to fractions:

1. 25%	2. 72%	3. 15%	4. 48%	5. 300%
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Change these percentages to decimals.

6. 220%	7. 10%	8. $33\frac{1}{3}\%$	9. $54\frac{1}{2}\%$	10. $\frac{1}{2}\%$
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Change these to percents. Multiply the fraction times 100%

11. $\frac{1}{3}$	12. $\frac{7}{4}$	13. $\frac{5}{9}$	14. 2	15. $1\frac{1}{4}$
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Solve the following percent problems. Some are easier if you use a proportion.

16. What is 50% of 30?	17. What is 200% of 5?	18. What is 12.2% of 30	19. 2% of \$1000 = n
20. 14% of 32 = n	21. 30% of what number is 50?	22. 12.5 % of what number is 100?	23. 5% of n = 10

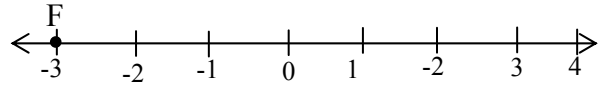
24. 15 is what % of 50	25. 32 is what % of 128	26. 18 is what % of 9	27. 15 is what % of 300
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Solve.

28. You took a test with 72 questions. You got 18 wrong. What percent did you get on the test? (You may use a calculator for this problem)	29. Darren is a salesman. He gets a commission of 8% on all sales he makes. His sales last week were \$3020. How much was his commission?
30. Dan paid 20% down on a \$5300 car. How much did he pay down?	31. Mary's score on a test was 90%. She had 72 questions right. How many problems were on the test? (You may use a calculator for this problem)
32. Helen made \$50,000 last year. This year she makes \$52,500. What was the percentage of her raise? (First find out how much money her raise was worth.) (You may use a calculator for this problem)	33. Pedro got 62 hits in 185 times at bat. What percent of the times at bat did Pedro get a hit? (You may use a calculator for this problem)

**SKILL PA7: NUMBER AWARENESS**

1. On a number line locate the following points:  
 A: 3.5, B: -1.75 C: -2 D: 1.5  
 For example point F: -3 has been graphed.



Circle the larger number (It will be farther to the right on the number line):

2. 3 or 8	3. -3 or 4	4. -2 or -2.3
5. $\frac{1}{2}$ or $\frac{1}{4}$	6. $1\frac{1}{2}$ or $1\frac{3}{4}$	7. $\frac{2}{3}$ or $\frac{3}{2}$
8. -3.2 or -2.5	9. $-\frac{1}{2}$ or $-\frac{1}{4}$	10. $\frac{3}{4}$ or $\frac{3}{5}$

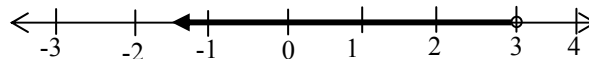
True or False. (The larger number is further to the right on the number line.)

11. $5 > 3$	12. $3.5 < 3$	13. $-1 > -2$
14. $4 < \frac{25}{6}$	15. $\frac{2}{3} < \frac{1}{4}$	16. $-2.5 < -1.5$

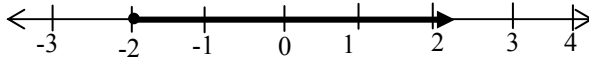
- A number line can be used to demonstrate which numbers belong to a given set. An open circle indicates that the number is not in the set, a closed circle indicates that the number is in the set. Arrows to the left are numbers less than the given number. Arrows to the right are numbers more than the given number.

For example:

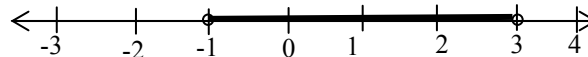
Numbers less than 3:



$x \geq -2$ :



Numbers between -1 and 3



17. Numbers greater than 2	
18. Numbers greater than -2 and less than 4	
19. Numbers between 0 and -3, including 0	
20. Numbers less than or equal to 0	
21. $-1 < x \leq 1$	
22. $x > 2$ or $x < -1$	

## PRE-ALGEBRA BASIC SKILLS PRACTICE TEST

The test you will take on the first day of school is very similar to this test; however, it will be a multiple choice test. You are not expected to get 100%, but you should get most problems in each skill correct. Practice for this and you will start your year off right.

### SKILL PA 1: DECIMALS

1. Find $3.022 + 0.04$	2. Find $0.5 - 0.19$	3. What is the product of 2.76 and 1.2?
4. Eight Algebra books cost \$64.24. How much does each book cost?		

### SKILL PA 2: FACTORS AND PRIME NUMBERS

5. What number has the prime factorizations of $2 \times 3 \times 3 \times 5$ ?	6. What is the prime factorization of 168?	7. What is the greatest common factor of 12 and 18?
8. McBurger sent 84 burgers and 56 fries to the math team. If each member received an equal amount of each item, what is the greatest possible number of members?		

### SKILL PA 3: FRACTIONS

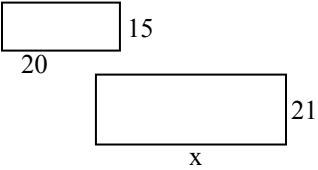
Work each problem:

9. $\frac{5}{6} + \frac{3}{10}$	10. $2\frac{3}{4} - 1\frac{5}{8}$	11. What is the product of $\frac{6}{7}$ and $2\frac{1}{10}$ ?	12. $\frac{5}{16} \div \frac{3}{8}$
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### SKILL PA 4: EXPONENTS

13. Simplify $(5 - 3)^2$	14. Write the expression for $(3)(3)(3)(3)$	15. Simplify $(-3)^3$	16. Simplify $6 - 3(-2) \div 2$
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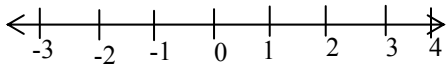
**SKILL PA 5: PROPORTIONAL REASONING**

17. Circle the ratio that is NOT equivalent to the others.  $20:45$ $4:9$ $2:3$ $8:18$	18. If 5 candy bars cost \$5.50, how much would 9 candy bars cost?
19. Below are two similar figures. Find x.  	20. What is the missing term in the proportion:  $\frac{x}{12} = \frac{24}{16}$

**SKILL PA 6: PERCENTS**

21. Convert $\frac{5}{6}$ to a percent to the nearest percent.	22. Which group does NOT consist of equivalent numbers a. $\frac{3}{4}$ , 0.75, 75% b. $\frac{5}{4}$ , 1.25, 12.5% c. $\frac{3}{8}$ , 0.375, 37.5%	23. If the tax rate is 7%, how much tax would be charged for an item priced at \$40.00?
24. 18 is 45% of what number?	25. What number is 32% of 50?	26. I worked 32 hours of my 40 hour shift. What percent of my work shift did I work?

**SKILL PA 7: NUMBER AWARENESS**

27. Circle the true statements.  $-5 < 5$ $0 < -3$  $-2 > -1$ $-7 < -2$	28. The temperature of Mercury ranges between $-270^\circ$ and $800^\circ$ . Circle the temperature(s) that are NOT likely to be measured on Mercury.  $-300^\circ$ $-250^\circ$ $750^\circ$ $900^\circ$	29. Order the integers $-5, 0, -2, 4, 9$ from least to greatest.
30. What is the opposite of $-4$ ?	31. Which is smaller: $\frac{-2}{3}$ or $\frac{-1}{3}$	32. Graph $x \geq -2$ on the number line.  

# ANSWERS TO ST. FRANCIS HIGH SCHOOL'S PRE-ALGEBRA BASIC SKILLS WORKBOOK

## SKILL PA1: DECIMALS

1. 118.95	2. 2.85	3. 36.326	4. 100.1	5. 4.6	6. 2.38
7. 3.87	8. 108.988	9. 51.9	10. 9.121	11. 1.4887	12. 1.12
13. 33.12	14. 9	15. 8.4	16. 105.84	17. 3.15	18. 17.577
19. 9.03	20. 0.274	21. 12.3	22. 1.054	23. 38.4	24. 0.72
25. 6.5	26. 401	27. 12.7	28. 0.06	29. 108	30. 7
31. 600	32. 0.8				

## SKILL PA 2: FACTORS AND PRIME NUMBERS

1. $3 \cdot 3 \cdot 2 \cdot 2 \cdot 2$	2. $5 \cdot 3 \cdot 3$	3. $2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$	4. $2 \cdot 7 \cdot 11$	5. $2 \cdot 3 \cdot 3 \cdot 7$	6. $2 \cdot 11 \cdot 13$
7. $2 \cdot 3 \cdot 3 \cdot 3 \cdot 7$	8. $2 \cdot 2 \cdot 2 \cdot 7 \cdot 3$	9. 7	10. 4	11. 6	12. 50
13. 12	14. 13	15. 11	16. 12	17. 18	

## SKILL PA 3: FRACTIONS

1. $\frac{7}{24}$	2. $\frac{-1}{12}$	3. $\frac{71}{45}$ or $1\frac{26}{45}$	4. $\frac{2}{21}$	5. $\frac{47}{40}$ or $1\frac{7}{40}$	6. $\frac{1}{3}$
7. $\frac{31}{30}$ or $1\frac{1}{30}$	8. $\frac{2}{7}$	9. $\frac{13}{12}$ or $1\frac{1}{12}$	10. $\frac{1}{2}$	11. $\frac{64}{15}$ or $4\frac{4}{15}$	12. $\frac{5}{3}$ or $1\frac{2}{3}$
13. $\frac{7}{6}$ or $1\frac{1}{6}$	14. $\frac{95}{12}$ or $7\frac{11}{12}$	15. $\frac{13}{6}$ or $2\frac{1}{6}$	16. $\frac{5}{4}$ or $1\frac{1}{4}$	17. $\frac{37}{18}$ or $2\frac{1}{18}$	18. $\frac{232}{21}$ or $11\frac{1}{21}$
19. $\frac{31}{30}$ or $1\frac{1}{30}$	20. $\frac{1}{5}$	21. $\frac{8}{15}$	22. $\frac{5}{8}$	23. $\frac{16}{5}$ or $3\frac{1}{5}$	24. $\frac{2}{3}$
25. $\frac{5}{9}$	26. $\frac{1}{2}$	27. $\frac{85}{9}$ or $9\frac{4}{9}$	28. 2	29. $\frac{57}{46}$	30. 3
31. $\frac{8}{11}$	32. 40	33. $\frac{71}{12}$ or $5\frac{11}{12}$			

## SKILL PA 4: EXPONENTS AND ORDER OF OPERATIONS

1. 26	2. 19	3. 9	4. 8	5. 18	6. 24
7. 19	8. 14	9. 18	10. 79	11. 14	12. 0
13. 145	14. \$217.50				

## SKILL PA 5: PROPORTION

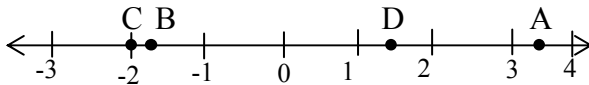
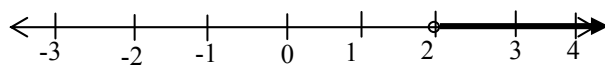
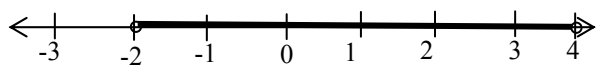
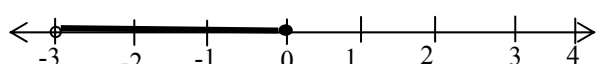
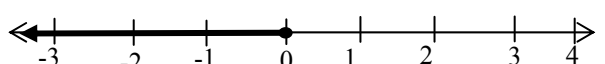
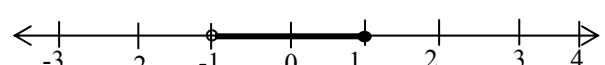
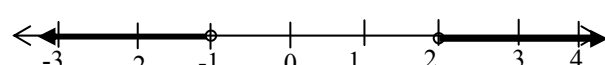
1. 30	2. 15	3. 72	4. 3	5. 28	6. 21, 189
7. 186	8. 40	9. $5\frac{1}{3}$	10. \$5.40		

## SKILL PA 6: PERCENT

1. $\frac{1}{4}$	2. $\frac{18}{25}$	3. $\frac{3}{20}$	4. $\frac{12}{25}$	5. 3	6. 2.20
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7. .10	8. $.33\bar{3}$	9. .545	10. 0.005	11. $33.\bar{3}\%$	12. 175%
13. $55.\bar{5}\%$	14. 200%	15. 125%	16. 15	17. 10	18. 3.66
19. \$20	20. 4.48	21. $166.\bar{6}$	22. 800	23. 200	24. 30%
25. 25%	26. 200%	27. 5%	28. 75%	29. \$241.60	30. \$1060
31. 80	32. 5%	33. 33.5%			

### SKILL PA 7: NUMBER AWARENESS

1. 	2. 8	3. 4	4. -2
5. $\frac{1}{2}$	6. $1\frac{3}{4}$	7. $\frac{3}{2}$	8. -2.5
9. $-\frac{1}{4}$	10. $\frac{3}{4}$	11. True	12. False
13. True	14. True	15. False	16. True
17. 	18. 		
19. 	20. 		
21. 	22. 		

### PA Test Answers:

1. 3.062	2. .31	3. 3.312	4. \$8.03	5. 90	6. $2*2*2*3*7$
7. 6	8. 28	9. $\frac{17}{15}$ or $1\frac{2}{15}$	10. $\frac{9}{8}$ or $1\frac{1}{8}$	11. $\frac{9}{5}$ or $1\frac{4}{5}$	12. $\frac{5}{6}$
13. 4	14. 81	15. -27	16. 9	17. 2:3	18. \$9.90
19. 28	20. 18	21. 83%	22. b	23. \$2.80	24. 40
25. 16	26. 80%	27. $-5 < 5, -7 < -2$	28. $-300^\circ, 900^\circ$	29. -5, -2, 0, 4, 9	30. 4
31. $-\frac{2}{3}$	32. 