Name: _Key_  Per:_____

# Algebra Integration Semester *Practice* Final 2016-17

## Please note:

- Absolutely <u>no cell phones</u> out during the test.
- You may borrow a calculator from the teacher, but you may <u>not</u> use a calculator another student is using for the test.
- All work must be shown for each problem to receive full credit.
- Round all answers to the nearest hundredth (0.01)

Important Equations from the first semester:

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*Linear Equations*

Slope Intercept Form:   y = mx + b

<u>m</u> is the slope  &  <u>b</u> is the y-intercept

Standard Form:  Ax+By=C

Slope formula :   $m = \dfrac{y_2 - y_1}{x_2 - x_1}$

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**Unit 1: Linear Equations**

| Solve Equations | Score (out of 10): |
|---|---|

**Questions**

**Answers:**

1. $16 = -8 - x$ → $\dfrac{24}{-1} = \dfrac{-1x}{-1}$
   $+8 \quad +8$

   a. $x = -8$      b. $x = 8$

   c. $x = 24$      d. $x = -24$ (circled)

1. Circle one:   a   b   c   **d** (circled)

2. $\frac{1}{4}x = 13 \cdot 4$    (4 written above)

2. $X = 52$

3. $5x + 2 = 8x + 16$
   $-5x \quad -5x$
   $2 = 3x + 16$
   $-16 \qquad -16$
   $-14 = 3x$ → $\dfrac{-14}{3} = x$

3. $-4.67$

4. $\frac{2}{5}x = \frac{1}{17}$

   $\dfrac{5}{2} \cdot \dfrac{2}{5} x = \dfrac{1}{17} \to \dfrac{5}{2}$

   $x = \frac{5}{34}$

4. $0.15$

5. $32 = x + 3(x - 2)$
   $32 = x + 3x - 6$
   $32 = 4x - 6$
   $+6 \qquad +6$
   $38 = 4x$ → $\dfrac{38}{4} = x$

5. $9.5$

6. Stan's solution to an equation is shown below:

   → Given: $n + 3(n + 10) = 90$
   → Step 1: $n + 3n + 10 = 90$
   → Step 2: $4n + 10 = 90 - 10$
   → Step 3: $4n = 90 - 10$
   → Step 4: $4n = 80$
   → Step 5: $\frac{4n}{4} = \frac{80}{4}$
   → Step 6: $n = 20$

6. Circle one:   a   **b** (circled)   c   d

**Which statement about Stan's solution is true?**

| A   Stan's solution is correct. | B   Stan made a mistake in Step 1. |
|---|---|
| C   Stan made a mistake in Step 3. | D   Stand made a mistake in Step 5. |

7. Solve for x: $\frac{8}{6} = \frac{x}{10}$ • 10    (annotation: 10.)

$$\frac{80}{6} = x$$

7. $\underline{13.33}$

8. Which equation is equivalent to $2x - 3(6x + 2) = 13x$ ?

    (handwritten work:)
    $2x - 18x - 6 = 13x$
    $-16x - 6 = 13x$
    $+6 \mid +6$ (te | te)
    $-16x = 13x + 6$

    A  $-16x + 6 = 13x$    B  $-16x + 2 = 13x$

    Ⓒ  $-16x = 13x + 6$    D  $13x - 6 = -16x$

8. Circle one:  a    b    Ⓒ    d

| Percent Word Problems | Score (out of 10): |
|---|---|

**Solve for x:**

9. Which of the following equations is NOT a correct method to find the answer to: **7 is 30% of what number?**

    (handwritten:) $\frac{is}{of} = \frac{\%}{100}$

    $\frac{7}{x} = \frac{30}{100}$

    A  $7 = \frac{30}{100}x$    Ⓑ  $\frac{30}{100} = \frac{x}{7}$

    C  $\frac{30}{100} = \frac{7}{x}$    D  $0.3x = 7$

9. Circle one:  a    Ⓑ    c    d

10. 45% of people in Oregon have blood type O blood. Out of 9000 people, how many would you expect to have type O blood?

    $$\frac{x}{9000} = \frac{45}{100} \rightarrow 45(9000) = 100x$$
    $$\frac{40500}{100} = \frac{100x}{100}$$

10. $\underline{4,050}$

11. 15 is what percentage of 70?

    $$\frac{15}{70} = \frac{x}{100} \rightarrow 15(100) = 70x$$
    $$\frac{1500}{70} = \frac{70x}{70}$$

11. $\underline{21.43}$

12. Find 62% of 67.

    $$\frac{x}{67} = \frac{62}{100} \rightarrow 62(67) = 100x$$
    $$\frac{4154}{100} = \frac{100x}{100}$$

12. $\underline{41.54}$

| Literal Equations | Score (out of 10): |
|---|---|

13. Solve for $t$: $2s = r - 4t$

$\dfrac{-r \quad -r}{}$

$\dfrac{2s - r}{-4} = \dfrac{-4t}{-4}$

13. $\dfrac{2s - r}{-4} = t$

14. Solve for $a$: $5a - b = x$

5 to to

a. $a = \frac{x+b}{5}$ ⟵ (circled)

b. $a = \frac{2+x}{5}$

c. $b = x + 5a$

d. $a = \frac{x}{5} + b$

14. Circle one: (a)   b   c   d

15. Which equation is **not** equivalent to
$mx + x = y$? → $m(x+1) = y$

a. $y - x = mx$

b. $x(m+1) = y$

c. $m(x) = y$ (circled)

d. $y - mx = x$

15. Circle one: a   b   (c)   d

## Unit 2: Right Triangle Trigonometry

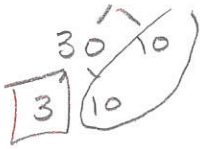| Simplify Radicals | Score (out of 10): |
|---|---|

*Simplify each radical completely. For credit you MUST show ALL work - NO DECIMALS!*

16. $\sqrt{63}$   Index = 2

3   21
3   7

16. $\quad 3\sqrt{7}$
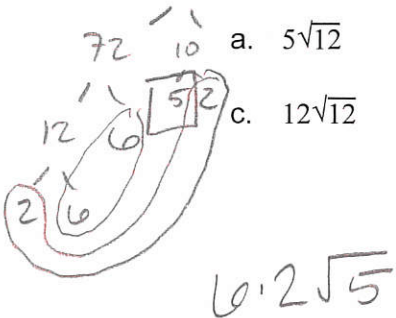
17. $\sqrt{300}$

30   10
3   10

17. $\quad 10\sqrt{3}$

18. $\sqrt{720}$

72   10
12   6   5   2
2   6

a. $5\sqrt{12}$

b. $12\sqrt{5}$ (circled)

c. $12\sqrt{12}$

d. $6\sqrt{10}$

$6 \cdot 2\sqrt{5}$
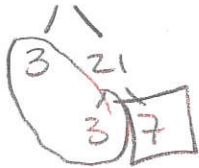
18. Circle one: a   (b)   c   d

| Pythagorean Theorem | Score (out of 10): |
|---|---|

19. John leaves school to go home. He walks 4 blocks South and then 7 blocks East. How far is John from the school?
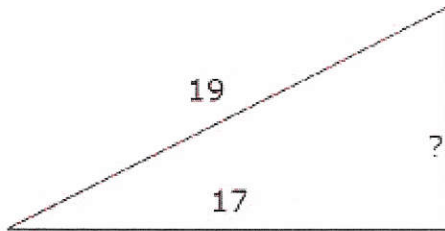
N
W —+— E
S
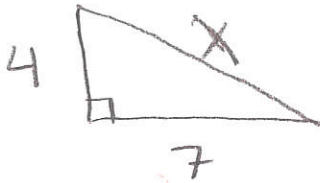
19. $8.06$ blocks

$4^2 + 7^2 = x^2$
$16 + 49 = x^2$
$65 = x^2$

$\sqrt{65} = x$

20. What is the length of the leg in the right triangle below?

20. $8.49$

19

? X

17

$17^2 + x^2 = 19^2$
$289 + x^2 = 361$
$X \quad -289 \qquad -289$
$\overline{\phantom{xxxxxxxxxxxx}}$
$x^2 = 72$
$x = \sqrt{72}$

| Trigonometric Ratios  (Fraction) | Score (out of 10): |
|---|---|

SOH - CAH - TOA

21. Find the cos (A) in the following triangle. Write your answer as a reduced fraction

A

Adj 8

17 Hyp

C ——— B
  15
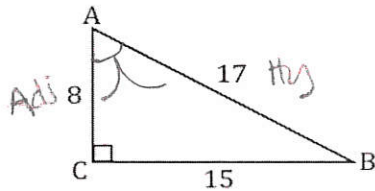
21. Circle one:

a. $\frac{8}{15}$

b. $\frac{15}{8}$

c. $\frac{8}{17}$

d. $\frac{15}{17}$

22. Find sin Z

Y
opp
6
X

8

10 Hyp

Z
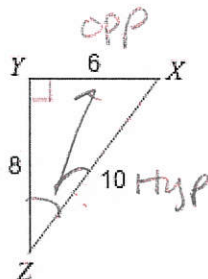
22. $\frac{6}{10} = \frac{3}{5}$

| Inverse Trigonometric Functions | Score (out of 10): |
|---|---|

SoH · CAH · TOA

23.

Find the measure of x in the right triangle.
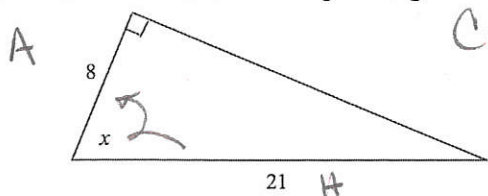
$\cos^{-1}(8/21) = x$



a.  22.4°          b.  67.6°          c.  20.9°

23. Circle one:   a   (b)   c   d

24. Find the measure of the missing angle to the nearest degree.
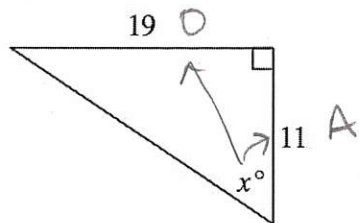


$\tan^{-1}(19/11) = x$

24.  ___59.93°___

| Basic Trigonometry | Score (out of 10): |
|---|---|

25. Find the length of side x in the triangle below.
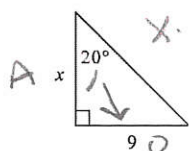


Not drawn to scale

$x \cdot \tan(20) = \frac{9}{x} \cdot x$

$\frac{x \tan(20)}{\tan(20)} = \frac{9}{\tan(20)}$

a.  3.3          b.  3.1          c.  24.7

25. Circle one:   a   b   (c)   d

26. The angle of elevation from a sailboat to the top of a 175 ft. lighthouse on shore is 12 degrees. How far from shore, rounded to the nearest whole foot, is the ship. (Draw a picture)
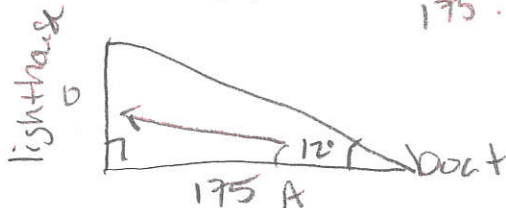


$175 \cdot \tan(12) = \frac{x}{175} \cdot 175$

26.  ___37.20 feet___

Unit 3: Linear Relationships

| Slope-intercept & standard form equations | Score (out of 10): |
|---|---|

27. Ryan is planning a dinner for 17 people. He spent $25 on other groceries and it cost $1.15 per pound for Potatoes. Which function can represent the situation?
    a. $y= 17p+1.15$
    b. $y= 1.15p+17$
    c. $y= 1.15p+25$
    d. $y= 1.15+25p$

27. Circle one:   a    b    (c)    d

28. Which equation represents $10x - 5y = 17$ in slope intercept form?

    $\to$ $-5y = -10x + 17$
    $-10x \qquad -10x$
    $\dfrac{-5y}{-5} = \dfrac{-10x}{-5} + \dfrac{17}{-5}$
    $y = 2x - \dfrac{17}{5}$

    a. $y = 2x + \frac{17}{5}$
    b. $y = 2x - \frac{17}{5}$
    c. $y = \frac{1}{2}x + \frac{17}{5}$
    d. $y = -\frac{1}{2}x + \frac{17}{5}$

28. Circle one:   a    (b)    c    d

29. Find the y-intercept of $y = 2x + 9$.   $x=0$   $y = 2(0)+9$
    a. $(0, 2)$
    b. $(2, 0)$
    c. $(0, 9)$
    d. $(9, 0)$

29. Circle one:   a    b    (c)    d

30. Find the x-intercept of $5x + 2y = 10$.   $y=0$
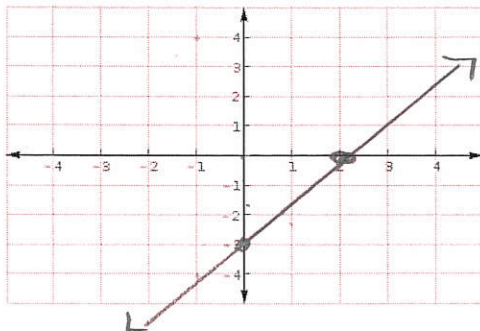
    $5x + 2(0) = 10$
    $\dfrac{5x}{5} = \dfrac{10}{5}$   $x = 2$

30. $(2, 0)$

31. Graph the equations on the coordinate grids provided to the right.

up 3
right 2 ↘   start @ $y = -3$
    a. $y = \frac{3}{2}x - 3$
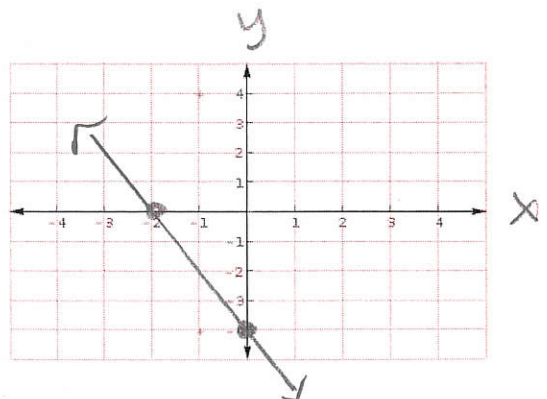


    b. $4x + 2y = -8$
    x-int $y=0$
    $\dfrac{4x + 2(0)}{4} = \dfrac{-8}{4}$
    $x = -2$

    y-int $x=0$
    $\dfrac{4(0) + 2y}{2} = \dfrac{-8}{2}$
    $y = -4$

32. The Chess Club is selling crossword puzzles and sudoku puzzles to raise money for a tournament. Crossword puzzles cost $2.50 and sudoku puzzles cost $3. The club needs to raise $330. Write an equation to represent the situation

32. $2.50x + 3y = 330$

Crossword $= x$
Sudoku $= y$

33. What is the slope of the linear equation $y = -\frac{2}{5}x - 12$?

33. $-\frac{2}{5}$

34. Find the slope of the equation $12x + 6y = 13$.

$-12x \qquad -12x$

$\frac{6y}{6} = \frac{-12x}{6} + \frac{13}{6}$

$y = -2x + \frac{13}{6}$

$\boxed{Slope = -2}$

34. Circle one:  a   b   c   d

   a.  12                 b.  $-\frac{1}{2}$

   c.  13                 d.  $\frac{1}{2}$

35. If a line has a negaitve slope, it goes _____ (fill in the blank) as it goes to the right.

35. Circle one:  a  ⓑ  c  d

   **A** up                 **B** down

   **C** at an angle        **D** horizontal

36. Find the slope of the line that passes through the point (-55, 20) and (-55, 11)

$\underset{x_1 \; y_1}{} \qquad \underset{x_2 \; y_2}{}$

$m = \frac{11-20}{-55(-55)}$

$m = \frac{-9}{-55+55} \rightarrow \frac{-9}{0}$

36. Undefined

| Identifying Linear Transformations | Score (out of 10): |
|---|---|

37. Which statement is true for $f(x) = 2x-7$ and $g(x) = 8x + 4$?

   a.  f(x) and g(x) have the same y-intercept.
   b.  f(x) is steeper than g(x).
   c.  g(x) is steeper than f(x).
   d.  f(x) and g(x) have the same slope.

37. Circle one:  a   b   ⓒ  d

38. How do you know if the slope of a line is reflected when compared to its parent function $y = x$?

38. the slope becomes Negative.

| Creating Linear Equations | Score (out of 10): |
|---|---|

39. If $y$ represents a number, which equation is the correct translation of the sentence: **Forty subtracted from eight times a number is 6**.

    **A** $40 - 8y = 6$    **B** $8(y - 40) = 6$

    **C** $8y - 40 = 6$    **D** $8(40 - y) = 6$

39. Circle one:   a    b    (c)    d

40. To which of the following situations can the equation $y = 6x + 12$ be best applied?

| **A** The number of miles a person walks if he walks for 6 hours at the rate of 12 miles per hour. | **B** The total weight on a scale if 6 pounds is placed there initially and a series of 12-pound weights are added to it. |
|---|---|
| **C** The total wages earned by a waiter who is paid $6 per hour and earns $12 in tips. | **D** The combined length of 6 boards, each 12 feet longer than the width of a doorway. |

40. Circle one:   a    b    (c)    (d)

41. The equation of a line that passes through the points (3, -1) and (0, 3) is:

    $x_1$ $y_1$    $x_2$ $y_2$

    **A** $y = 2x + 3$    **B** $y = \frac{1}{2}x + 3$

    **C** $y = -\frac{1}{2}x + 3$    **D** $y = -2x - 3$

$$m = \frac{3-(-1)}{0-3}$$

$$m = \frac{4}{-3}$$

41. Circle one: ~~a~~ ~~b~~ ~~c~~ ~~d~~

$y = mx + b$

$3 = -\frac{4}{3}(0) + b$

$$\boxed{y = -\frac{4}{3}x + 3}$$

42. What is the linear equation in slope intercept form if the slope is -3 and contains a point of (3,12)?   $m = -3$

$x$ $y$

$y = mx + b$

$12 = -3(3) + b$

$12 = -9 + b$

$+9 \qquad +9$

$\boxed{21 = b}$

42. $\underline{y = -3x + 21}$

| Solve a System of Linear Equations Using Any Method | Score (out of 10): |
|---|---|

43. Which of the following **best** describes the graph of this system of equations?

$y = -x + 3$

$-x + 3 = -\frac{5}{4}x + \frac{15}{4}$

$4y = -5x + 15$

$\frac{4}{4} \quad \frac{}{4} \quad \frac{}{4}$

**A** two identical lines     **B** two parallel lines

**C** two intersecting at exactly 1 point     **D** two lines intersecting in exactly 2 points

43. Circle one:   a    b    c    (d)

44. What is the solution to the system below? (Use any method - show all your work)

$5 \, ( 2x + 8y = 6 )$

$2 \, ( -5x - 20y = -15 )$

$\rightarrow$

$10x + 40y = 30$

$-10x - 40y = -30$

$0 = 0$

44. ___Infinite sol^n's___

45. What is the solution to the system below?

$-3x + 3y = 4$

$-3 \, ( -x + y = 3 )$

$\rightarrow$

$-3x + 3y = 4$

$3x - 3y = -12$

$0 \neq -8$

45. ___No sol^n___

| Modeling Systems of Linear Equations | Score (out of 10): |
|---|---|

46. An ice skating arena charges an admission fee for each child plus a rental fee for each pair of ice skates. John paid the admission fees for his six nephews and rented five pairs of ice skates. He was charged $32.00. Juanita paid the admission fees for her seven grandchildren and rented five pairs of ice skates. She was charged $35.25. If a represents the amount of the admission fee and r represents the skate rental fee, which of the following systems of equations can be used to represent this situation.

46. Circle one:   a   b   (c)   d

$a = $ admission fee
$r = $ rental
John: $6a + 5r = 32$
Juanita: $7a + 5r = 35.25$

A   $32.00a + 5r = 5$
    $35.25a + 5r = 7$

B   $5a + 6r = 32.00$
    $5a + 7r = 35.00$

(C)   $6a + 5r = 32.00$
      $7a + 5r = 35.25$

D   $8a + 5r = 32.00$
    $7a + 7r = 35.00$

47. The school that Stefan goes to is selling tickets to a choral performance. On the first day of ticket sales the school sold 3 senior citizen tickets and 1 child ticket for a total of $38. The school took in $52 on the second day by selling 3 senior citizen tickets and 2 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.

47. _____

Day 1: $(3s + 1c = 38)(-2) \rightarrow -6s - 2c = -76$

Day 2: $3s + 2c = 52$

$$+ \quad 3s + 2c = 52$$
$$\frac{-3s}{-3} \quad\quad = \frac{-24}{-3}$$

$s = 8 \rightarrow 3(8) + c = 38$
$\quad\quad\quad\quad -24 \quad\quad -24$
$\quad\quad\quad\quad\quad c = 14$

| Senior: $8.00 |
| Child: $14.00 |