

Timothy Christian School PreCalculus & College Math Summer Packet

Students with access to a Timothy Christian account must enter all answers into the FORMs Quiz links provided. In order to receive credit, **students must also turn in all of their work related to this packet.** Unless otherwise indicated by your teacher, this packet and the related forms quizzes are due by the first day of school. Students without access to their Timothy Christian account, may submit in paper form until access is provided.

PRACTICE SET 0: <https://forms.office.com/r/u9E4gfZcTc>

PRACTICE SET 1: <https://forms.office.com/r/yA0retxKAc>

PRACTICE SET 2: <https://forms.office.com/r/pzLZQMnEdZ>

PRACTICE SET 3: <https://forms.office.com/r/v2pcB848Vc>

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PRACTICE SET 10: <https://forms.office.com/r/qf8g84SXAd>

PRACTICE SET 11: <https://forms.office.com/r/E9m7d19C5b>

PRACTICE SET 12: <https://forms.office.com/r/TEGtjA7WjL>

PRACTICE SET 13: <https://forms.office.com/r/pNUvfB2NZT>

PRACTICE SET 14: <https://forms.office.com/r/CsKEeUS7Un>

PRACTICE SET 15: <https://forms.office.com/r/jMVHD6wY4K>

PRACTICE SET 16: <https://forms.office.com/r/XBPiiafsHp>

PRACTICE SET 17: <https://forms.office.com/r/ZcDXjy6U8H>

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PRACTICE SET Ø Simplification vs Solving. Multiplying Fractions vs Cross Multiplying. Enter the correct choice.

1. Key Concept: Solving means using an equation to discover the value or definition of a variable. It is impossible to solve an expression. It is like an incomplete sentence. Identify the only equation below that can be solved for x.
- a. 3 times x plus 2
 - b. 3 times x plus 2 is 20
 - c. 3 times x
 - d. 3

2. Key Concept: Solving means using an equation to discover the value or definition of a variable. To "solve" for a variable means to isolate it until it is defined explicitly. Example: $3x + 2 = 20$ means $x = (20 - 2)/3$ so x equals 6.

Solve the simple equation $2x + 5 = 30$.

- a. $x=25/2$
 - b. $x=23/2$
 - c. $x=27/2$
 - d. $x=2/25$
3. Key Concept: When we do not have an equation, we cannot solve for the variable. The best we can do is simplify it. "Simplify" means to perform all the operations that can be done to bring an expression down to its simplest form.

Simplify the expression $\frac{(3x)(2)}{6}$.

- a. x
 - b. 1
 - c. 3
 - d. 4
4. Find the equivalent to the expression $\frac{(3x)+(2)}{6}$.
- a. x
 - b. 1
 - c. $\frac{x}{2} + \frac{1}{3}$
 - d. $\frac{x+1}{4}$
 - e. $x + \frac{1}{6}$
 - f. $\frac{x+1}{3}$

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5. Simplify $\frac{3x^2}{6x}$

- a. $\frac{x}{2}$
- b. $\frac{x}{3}$
- c. $3x$
- d. $\frac{4x}{3}$

6. Find the expression that is NOT equal to the others

- a. $\frac{2x}{3}$
- b. $\frac{2}{3x}$
- c. $\frac{2}{3}x$
- d. $2x\left(\frac{1}{3}\right)$

7. Find the expression that is NOT equal to the others.

- a. $\frac{-2x}{3}$
- b. $-\frac{2x}{3}$
- c. $\frac{2x}{-3}$
- d. $\frac{-(2x)}{3}$
- e. $\frac{-2x}{-3}$

8. Key Concept: The fraction bar is like a parenthesis. If there is an addition operation, it must be done prior to the division. In the fraction $\frac{3}{6+3}$ you must not try to simplify 3/3 before doing 3+6. If you did, it would equal 1/6. But we know the correct answer is 3/9 which simplifies to 1/3.

Simplify $\frac{3x^2}{6+x^2}$ if possible.

- a. $\frac{1}{1+2} = \frac{1}{3}$
- b. $\frac{9x^2}{x^2+9}$
- c. $\frac{3x^2}{16x^2+5}$
- d. *cannot be simplified*

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9. Key Concept: That fraction bar is like a parenthesis. But we can distribute upward into the numerator. Never downward! The denominator divides INTO the numerator.

$$\frac{(20+8)}{4} = \frac{20}{4} + \frac{8}{4} = 7 \text{ and } \frac{(20+8)}{x+4} = \frac{20}{x+4} + \frac{8}{x+4}.$$

Distribute and simplify $\frac{(30x^3+x^2)}{x}$. Write work and final result in the space below.

Key Concept: When asked to solve a proportion you need two ratios set equal to each other. For example, $\frac{a}{b} = \frac{c}{d}$. You can solve for any of the parts of the proportion using inverse operations. Cross multiplying is used to solve for b or d in the proportion above. Never do this when just simplifying two factors in an expression.

10. Simplify $\frac{a}{b} \times \frac{3}{4}$

a. $\frac{3a}{4b}$

b. $(4a)(3b)$

11. Solve $\frac{a}{b} = \frac{3}{4}$ for b. (Your answer will be in terms of a).

12. Simplify $\frac{a}{b} \times \frac{5a}{10}$

a. $\frac{5a^2}{10b}$

b. $10a \times 5ab$

c. $\frac{1}{2b}$

d. $\frac{a^2}{2b}$

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PRACTICE SET 1

Simplify.

1. $8x - 9y + 16x + 12y$

6. $-(5x - 6)$

2. $147 + 22 - 15y^2 + 23y$

7. $3(18z - 4w) + 2(10z - 6w)$

3. $5n - (3 - 4n)$

8. $(8c + 3) + 12(4c - 10)$

4. $-2(11b - 3)$

9. $9(6x - 2) - 3(9x^2 - 3)$

5. $10q(16x + 11)$

10. $-(y - x) + 6(5x + 7)$

PRACTICE SET 2

Solve each equation. You must show all work.

1. $5x - 2 = 33$

6. $198 = 154 + 7x - 68$

2. $140 = 4x + 36$

7. $-131 = -5(3x - 8) + 6x$

3. $8(3x - 4) = 196$

8. $-7x - 10 = 18 + 3x$

4. $45x - 720 + 15x = 60$

9. $12x + 8 - 15 = -2(3x - 82)$

5. $132 = 4(12x - 9)$

10. $-(12x - 6) = 12x + 6$

PRACTICE SET 3

Solve each equation for the specified variable. You must show all work.

1. $y = v + w$, for v

4. $dx + t = 10$, for x

2. $9wr = 81$, for w

5. $p = 180(g - 9)$

Let $p = 18$, solve for g

3. $2d - 3f = 9$, for f

6. $4x + y - 5h = 10y + u$, for x

PRACTICE SET 4

Simplify each expression.

1. $(c^5)(c)(c^2)$

6. $\frac{45y^5z^{10}}{5y^3z}$

11. $(3m^2n)^4$

2. $\frac{m^{15}}{m^5}$

7. $(-t^7)^3$

12. $(12x^2y)^0$

3. $(k^4)^5$

8. $3f^3g^0$

13. $(-5a^2b)(2ab^2c)(-3b)$

4. d^5

9. $(4h^5k^3)(15k^2h^3)$

14. $4x(2x^2y)^0$

5. $(p^4q^2)(p^7q^5)$

10. $\frac{12a^4b^6}{36ab^2c}$

15. $(3x^4y)(2y^2)^5$

PRACTICE SET 5

Multiply. Write your answer in simplest form.

1. $(x + 10)(x - 9)$

6. $(-2x + 10)(-9x + 5)$

2. $(x + 7)(x - 12)$

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

3. $(x - 10)(x - 2)$

8. $(x + 10)^2$

4. $(x - 8)(x + 81)$

9. $(-x + 5)^2$

5. $(2x - 1)(4x + 3)$

10. $(2x - 3)^2$

PRACTICE SET 6

Factor each expression.

1. $3x^2 + 6$

6. $d^2 + 3d - 28$

2. $4a^2b^2 - 16ab^3 + 8ab^2c$

7. $z^2 - 7z - 30$

3. $x^2 - 25$

8. $m^2 + 18m + 81$

4. $n^2 + 8n + 15$

9. $4y^3 - 36y$

5. $g^2 - 9g + 20$

10. $5k^2 + 30k - 135$

PRACTICE SET 7

Solve for x by writing the quadratic equations in general form and then factoring.

Show all work.

1. $x^2 - 7x - 8 = 0$

5. $4x^2 - 16x + 16 = 0$

2. $x^2 - 5x + 6 = 0$

6. $2x^2 + 8x + 6 = 0$

3. $x^2 = 144$

7. $x^2 + 14x = 32$

4. $x^2 - 21x = 0$

8. $9x^2 + 6x + 1 = 0$

PRACTICE SET 8

Find the roots using the quadratic formula. Show all work.

1. $x^2 - 3x - 8 = 0$

4. $x^2 + 3x + 3 = 0$

2. $(x - 5)^2 + 12 = 0$

5. $x^2 - 5x + 10 = 0$

3. $2x^2 - 10x + 18 = 0$

PRACTICE SET 9

For each function, a) determine whether the graph opens upward or downward, b) find the axis of symmetry, c) find the vertex, and d) find the y-intercept.

1. $f(x) = x^2 - 4x + 3$

3. $g(x) = x^2 - 3x$

2. $g(x) = -x^2 + 2x + 3$

4. $f(x) = \frac{1}{2}x^2 - 2x + 4$

Find the minimum and maximum of each function.

1. $f(x) = x^2 + 2x + 6$

2. $g(x) = -2x^2 - 8x + 10$

PRACTICE SET 10

Simplify each radical.

1. $\sqrt{121}$

6. $2\sqrt{16}$

2. $\sqrt{90}$

7. $6\sqrt{500}$

3. $\sqrt{175}$

8. $3\sqrt{147}$

4. $\sqrt{288}$

9. $8\sqrt{475}$

5. $\sqrt{486}$

10. $\sqrt{\frac{125}{9}}$

PRACTICE SET 11

Find the slope of the line that contains each pair of points

1. $(-1, 4)$ and $(1, -2)$

4. $(2, -4)$ and $(6, -4)$

2. $(3, 5)$ and $(-3, 1)$

5. $(2, 1)$ and $(-2, -3)$

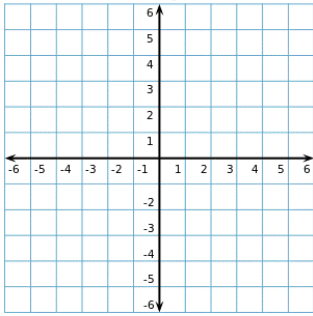
3. $(1, -3)$ and $(-1, -2)$

6. $(5, -2)$ and $(5, 7)$

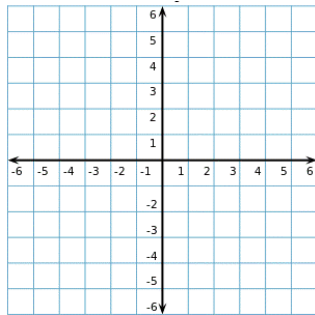
PRACTICE SET 12

State the slope and y-intercept of the lines defined by each equation, then graph the line on the grid for each provided on the grid provided.

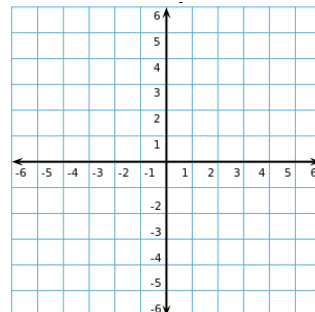
1. $y = 2x + 5$
slope = _____
y-int = _____



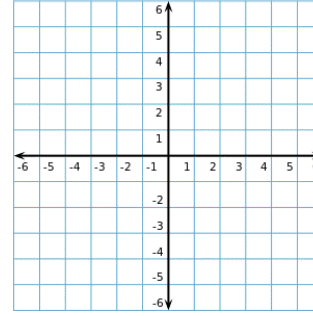
2. $y = \frac{1}{2}x - 3$
slope = _____
y-int = _____



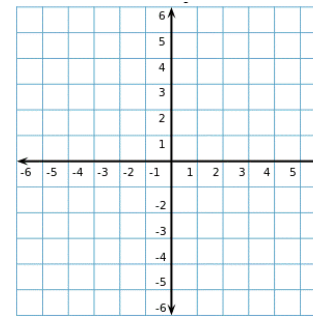
3. $y = -\frac{2}{5}x + 4$
slope = _____
y-int = _____



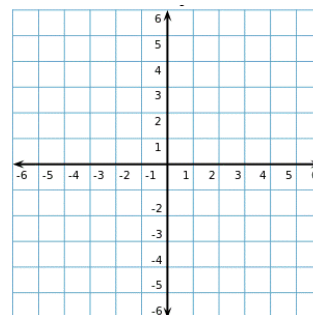
4. $y = -3x$
slope = _____
y-int = _____



5. $y = -x + 2$
slope = _____
y-int = _____



6. $y = x$
slope = _____
y-int = _____



PRACTICE SET 13

Solve each system of equations

$$1. \begin{cases} x - y = 0 \\ x + y = 2 \end{cases}$$

$$6. \begin{cases} x - y = 0 \\ 2x + 3y = 2 \end{cases}$$

$$2. \begin{cases} 3x + y = 1 \\ x + y = -3 \end{cases}$$

$$7. \begin{cases} 3x - y = 6 \\ y = 2x + 2 \end{cases}$$

$$3. \begin{cases} 3x - 3y = 4 \\ x + y = \frac{10}{3} \end{cases}$$

$$8. \begin{cases} 2x + 5y = 14 \\ y = 5 \end{cases}$$

$$4. \begin{cases} \frac{x+y}{3} = 1 \\ 2x - 3y = 2 \end{cases}$$

$$9. \begin{cases} -3x + 2y = 31 \\ x = 0.5y + 6 \end{cases}$$

$$5. \begin{cases} 4x - 6y = 1 \\ 3y - x = 2 \end{cases}$$

PRACTICE SET 14

Solve for x.

1. $\sqrt{x+1} = 4$

5. $\sqrt{7+x} = 0$

2. $\sqrt{2x-1} = 5$

6. $\sqrt{4x+4} = 2$

3. $\sqrt{1-x} = 3$

7. $\sqrt{3-2x} = 3$

4. $\sqrt{-6-5x} = 2$

8. $\sqrt{60-2x} = 8$

PRACTICE SET 15

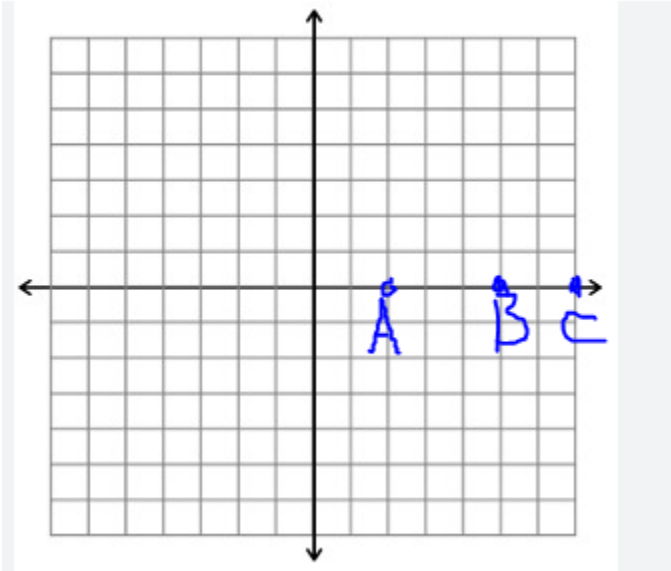
1. What is the quadratic formula?
2. What is the vertex formula?
3. Solve for h: $V = \pi r^2 h$
4. Solve for u: $u^2 - d = 1$
5. Suppose you invest \$12,000 in two funds paying 10.5% and 13% simple interest. The formula for simple interest is $I = Prt$ (P=principal amount, r=rate and t=time in years). If the investment in the first fund is for 12 years and the investment in the second fund is for 9 years, which investment has a better return value?
6. The dollar value of a product in 2011 is \$1430. The value of the product is expected to increase \$83 per year for the next five years. Write a linear equation that gives the dollar value V of the product in terms of year t.
7. During the first and second quarters of the year, a business has sales of \$150,000 and \$185,000, respectively. If the growth follows a linear pattern, what will the sales be during the fourth quarter?
8. If 3 pencils and 2 notepads cost \$1.30 while 5 pencils and 1 notepad cost \$1.00, what would be the cost of each pencil and each notepad?

PRACTICE SET 16

For the x-y axis shown, point A is at (4,0). What are the x-coordinates of

1) Point B ?

2) Point C ?



Now the scale has changed. Point A does not move but its coordinates change to (5,0). What are the new x coordinates of

3) Point B:

4) Point C:

5) If you were to graph the function $y = -3x^2 + 6x - 1$ on the graph shown, how would you divide the x-axis so that the vertex lies toward the center of the first quadrant?

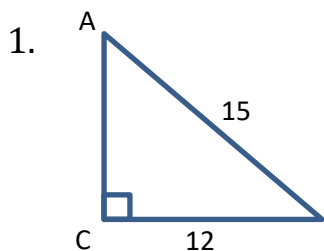
Each division should be equal _____ unit(s).

- a) 0.1
- b) 0.25
- c) 0.5
- d) 1
- e) 2

PRACTICE SET 17

Right Triangle Trigonometry

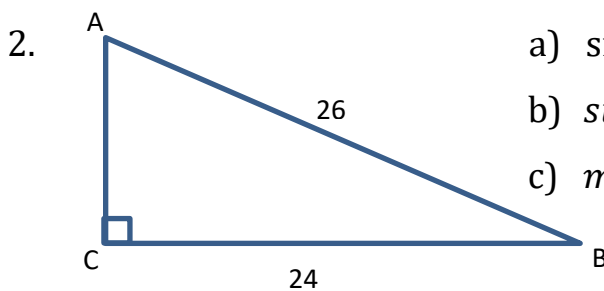
Calculate the specified values for the given right triangles.



a) side AC = _____

b) $\tan A =$ _____

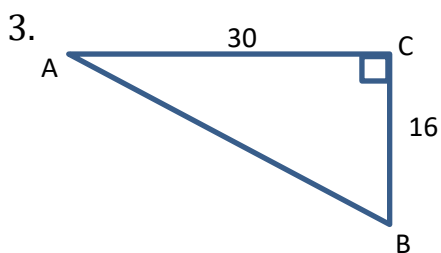
c) $m\angle A =$ _____



a) side AC = _____

b) $\sin A =$ _____

c) $m\angle A =$ _____



a) side AB _____

b) $m\angle A =$ _____

c) $m\angle B =$ _____