Colorado Rocky Mountain School

NAME:_____ ENTERING GRADE:_____

MATH READINESS ASSESSMENT

This assessment is intended to determine the proper course level and help ensure that you are placed in the appropriate class. If, upon review of this assessment, we see any gaps in learning, we will call and discuss a plan for remediation.

Before you begin:

1. We recommend that an adult is present to proctor this assessment.
2. Ensure you have set aside plenty of time to complete the exam in a distraction-free environment.
3. **Remove any math text, notes, calculators or computers from the test space. This work should be done entirely on your own without support materials or help from others.**

Instructions:

1. Print out this assessment. **When you are finished, please scan & email your completed test to npadgett@crms.org**
2. Please complete this assessment on your own—in one sitting—and without the use of a calculator or any other resources.
3. You only need to complete the sections up to the course you are requesting placement into, you do not need to go further. (*Example: if you are seeking placement in Algebra 2, you only need to complete the Algebra 1 and Geometry sections.*)
4. Do your best to answer as much as you can. If you do not know, or have forgotten a concept, skip it. This lets us know what skills you need to learn or review.
5. **Write all fractional answers reduced and as improper fractions rather than mixed numbers.**
6. Time yourself and record the amount of time you spent in the space provided.
7. **Show all the calculations and procedures that lead to your answers.**

Pre-algebra section

1) $\frac{2}{5}+\frac{1}{3}=$

2) $\frac{5}{6}-4=$

3) $\frac{3}{2}\cdot 8=$

4) $\frac{7}{2}\cdot\frac{4}{3}=$

5) $12\cdot\frac{1}{6}=$

6) $-6+2=$

7) $-8-5=$

8) $10-13=$

9) $7+(-4)=$

10) $-3-(-4)=$

11) $4+2(1+5)=$

12) $1+7(3-8)=$

13) $4-(4+6)=$

14) $4-(9-11)=$

15) $\frac{10+4}{10}=$

16) $\frac{5-1}{5}=$

17) $2+3^2=$

18) $12-64\div 4-2(-2)^3=$

19) $5[(1+3)^2-7(1+2)]=$

20) Evaluate if x = 2 and y = 6: $\frac{2}{3}(y+6x)$

21) Evaluate if x = 3 and y = -4: $-x(\frac{2}{3}+\frac{3y}{6})$

Solve the following equations for x

22) $x + 1 = 7$

23) $4x = 3$

24) $\frac{x}{5} = 2$

25) $\frac{8x}{3} = 4$

26) $10x - 5 = 2$

27) $7 - 5x = 1$

28) $\frac{3}{x} = 2$

29) $\frac{4}{3x-1} = -5$

30) $6 - 4x = x$

Solve:

31) $\frac{3}{4} + \frac{1}{3} =$

32) $\frac{2}{7} - \frac{4}{3} =$

Order these fractions from largest to smallest:

33) $\frac{3}{8}, \frac{1}{4}, \frac{5}{16}, \frac{3}{7}, \frac{2}{5}$

STOP HERE IF YOU ARE ENROLLING IN ALGEBRA 1

Please record the amount of time you took to complete this Pre-Algebra section: _____

Algebra 1 Section

Solve the following equations for x

1) $120 = 78 - x$

2) $x - (-27) = 70$

3) $-17 = 6x + 3 - 2x$

4) $z + mx = yx$

5) $\frac{60}{15} = 6\frac{2}{15} + x$

6) $\frac{32}{24} = x - \left(-\frac{4}{5}\right)$

7) $\frac{2}{3} - 5x = \frac{1}{2}$

8) $5 - 3(x - 1) = 4$

9) $2x^2 - 5 = 50$

Simplify

10) $6\frac{2}{5} \div \frac{2}{3} =$

11) $7\frac{3}{6} \div 3\frac{4}{2} =$

12) $\frac{5}{8} \cdot \frac{4}{5} =$

13) Write an equation of a line with a slope of -4 and a y-intercept of 2.

14) Write an equation of a line with a slope of 7 that passes through the point $(-1,3)$.

15) Write an equation of a line that passes through the points $(3,2)$ and $(-2,5)$.

16) Find the equation of the line that passes through (4, 3) and is perpendicular to $y = -\frac{1}{2}x + 5$.

17) Solve the system of equations:

$2x + y = 7$

$x - y = 2$

18) Solve the system of equations:

$y = 2x - 3$

$3x + 2y = 8$

19) Factor the expression $x^2 + 7x + 6$

20) Expand the following expression:

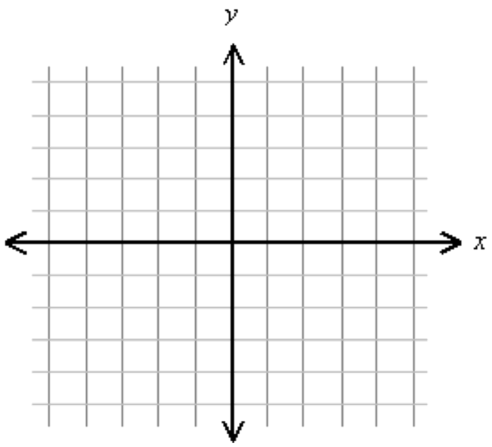
$(x + 3)(2x - 1)$

21) Given the function f(x) = - x + 3 find $f(x) = 17$.

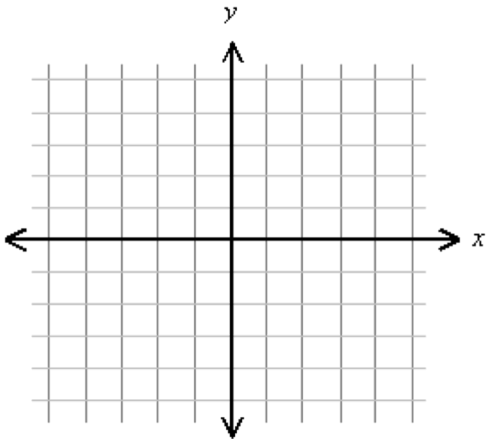
22) Given the function $f(x) = x^2 + 3$ find the value for x in which $f(-2)$.

On the axes provided graph the following functions:

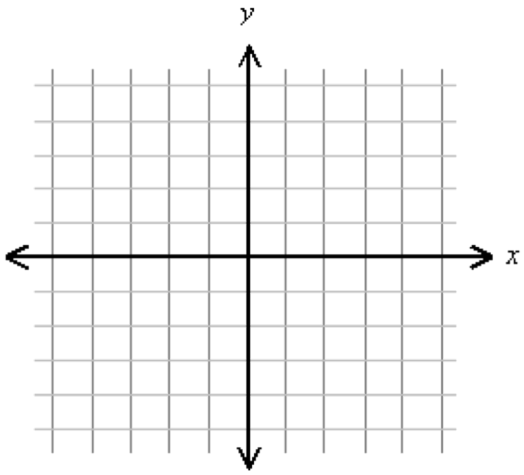
23) $y = -2x + 1$



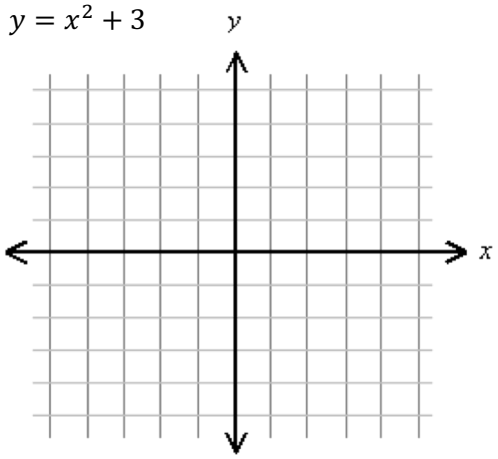
24) $x - 2y = -8$



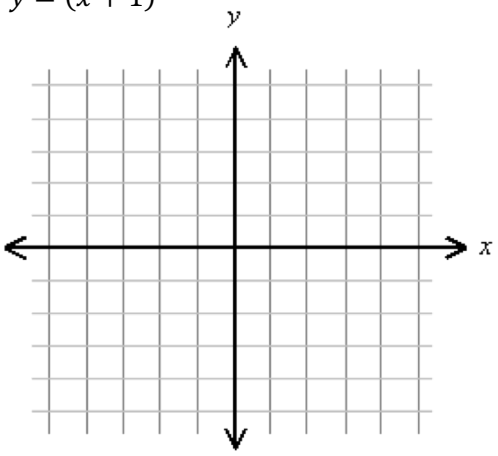
25) $y = -(x - 2) + 3$



26) $y = x^2 + 3$



27) $y = (x + 1)^2$



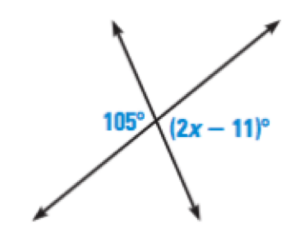
STOP HERE IF YOU ARE ENROLLING IN GEOMETRY

Please record the amount of time you took to complete this Algebra 1 section: _____

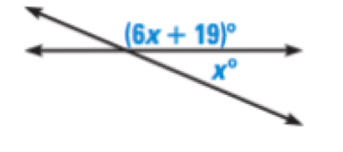
Geometry Section

- Please show all work on a separate sheet of paper in an organized and neat fashion.
- If it is helpful for you to draw diagrams, feel free to do so, but know that it is not required.
- Provide complete solutions with all steps for algebraic work.

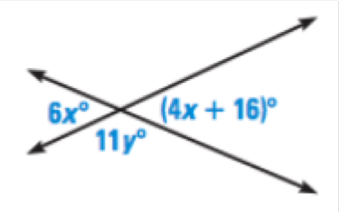
1. For the figure below, solve for the value of x.



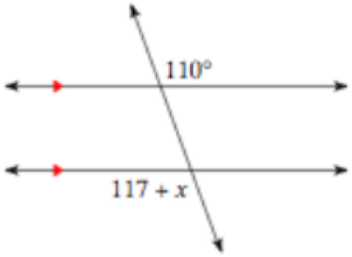
2. For the figure below, solve for the value of x.



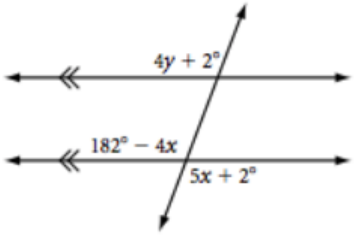
3. For the figure below, solve for the values of x and y.



4. For the figure below, solve for the value of x.

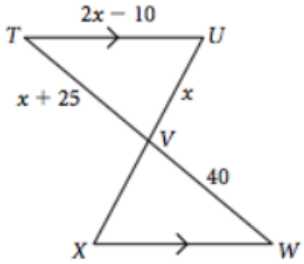


5. For the figure below, solve for the values of x and y.



6. Given the coordinates of two endpoints of a line segment, A(3,11) and B(-7,-5), find the midpoint of the segment.

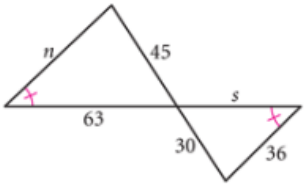
7. The perimeter of ΔTUV is 95 cm. Is $\Delta TUV \cong \Delta WXV$? Show algebraic work and give a brief written explanation why or why not.



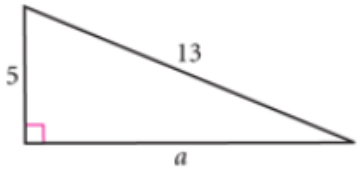
8. The measure of one internal angle in a regular polygon is 108°. How many sides does it have?

9. A regular polygon has a total interior angle measure of 1080°. What is the measure of one exterior angle?

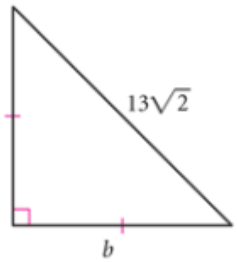
10. Are the following pair of triangles similar? If so, describe how you know and then find the values of s and n.



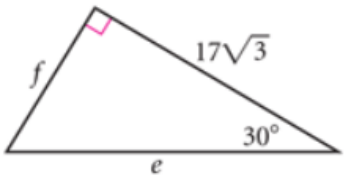
11. In the following triangle, solve for the value of a.



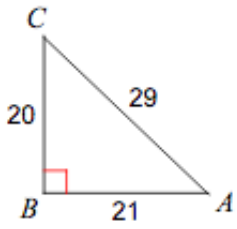
12. In the following triangle, solve for the value of b.



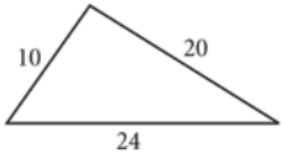
13. In the following triangle, solve for the value of e.



14. For the following three questions consider the below triangle and find the value of each trigonometric ratio.
    a. $Tan\ A$
    b. $Cos\ C$

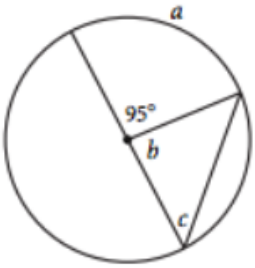


15. Is the following triangle a right triangle? Demonstrate why or why not.

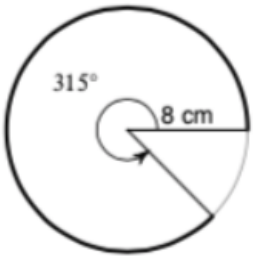


16. The point A(-3,4) represents the center of a circle and the point B(5,-6) lies on the circles circumference.
    a. What is the distance between points A and B? Round answer to nearest hundredth.
    b. Write an equation of a tangent line that touches the circle at point B.

15. For the following circle, find the measure of arc a, and the missing angles b and c.



18. For the following circle, find the arc length indicated by the dark line around the circle's circumference. Give exact answer.



19. Convert 218° into radians.

20. What is the volume of a cylinder whose height is 12cm and has a radius of 8cm?

STOP HERE IF YOU ARE ENROLLING IN ALGEBRA 2

Please record the amount of time you took to complete this Geometry section: _____

Algebra 2 Section

Write all fractional answers fully reduced.
Show all the calculations and procedures that lead to your answers.

Simplify the following expressions

1) $\sqrt[3]{27}$

2) $\sqrt[4]{16}$

3) $3^2 \cdot 3^3$

4) $8^{\frac{1}{3}} \cdot 9^{\frac{1}{2}}$

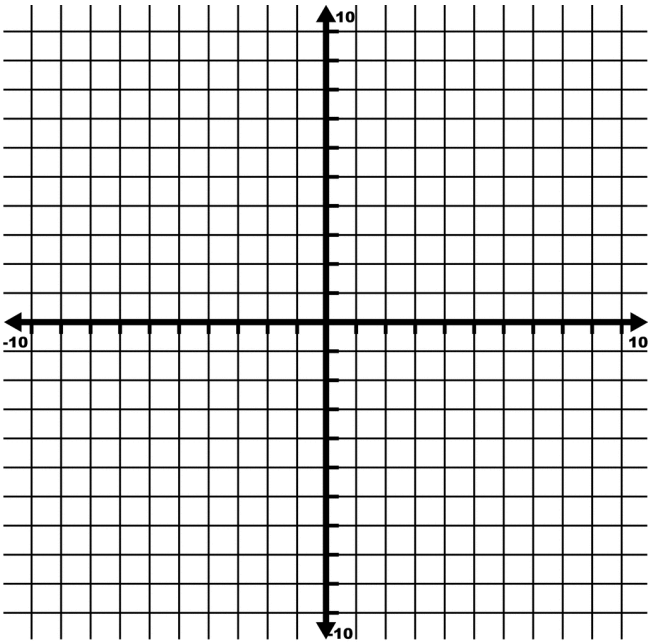
5) $\frac{6^9}{6^7}$

6) $\frac{2^{-3} \cdot 4^3}{-4^{\frac{1}{2}}}$

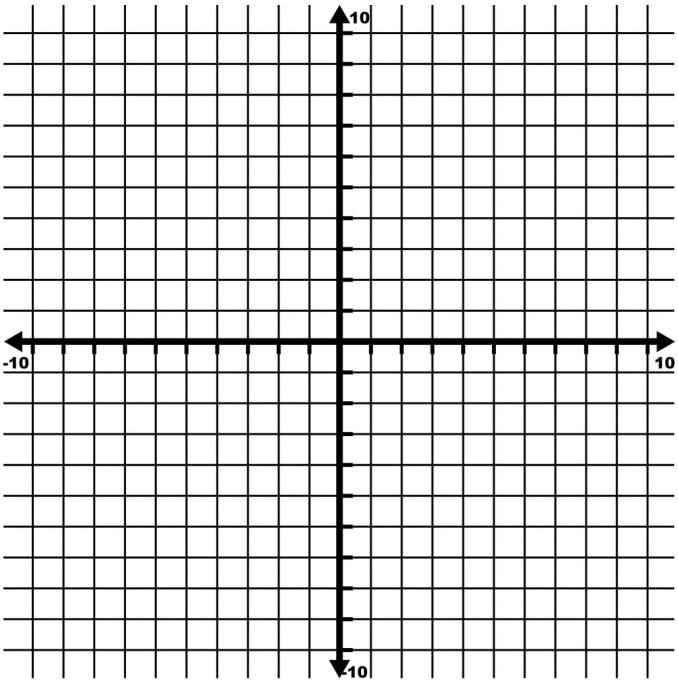
7) $\frac{a^4 b^{12} x^{-5}}{x^2 b^4} \cdot \frac{b^4 a^5}{x}$

Graph the equations with the correct intercepts and vertex

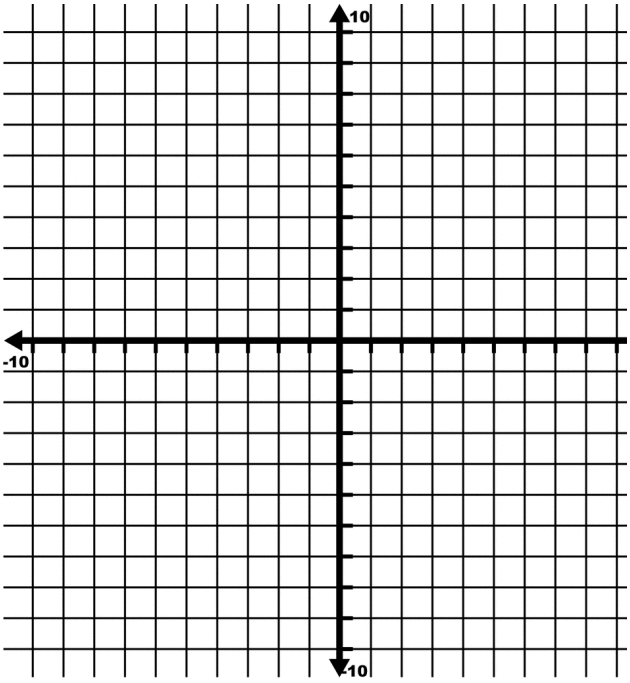
8) $y = -(x-1)^2 - 4$



9) $y = (x-3)(x-7)$



10) $y = x^2 + 8x + 15$



Find all real solutions to the equations

11) $7x - 6 = 4x + 9$

12) $2x^2 - 17x + 35 = (x - 5)^2$

13) $3x^2 + 4x + 1 = 0$

14) $2x^2 + 3x = 11$

15) $x^2 + 8x - 2 = 0$

16) Write the equation of the parabola that passes through the points $(-2, 0), (3, 0)$, and $(1, -48)$.

Write your answer in the form $y = a(x - p)(x - q)$, *where* a, p, *and* q *are integers, decimals, or simplified fractions.*

17) What are $(f + g)(x)$ *and* $(f \circ g)(x)$?
$f(x) = -x^2 + 6x$
$g(x) = x^2 - 4x$

18) Find $g(x)$, where $g(x)$ is the translation 6 units right and 8 units down of $f(x) = x^2$.

STOP HERE IF YOU ARE ENROLLING IN PRE-CALCULUS

Please record the amount of time you took to complete this Algebra 2 section: _____

19) If $f(x) = x^2 + 1$ and $g(x) = x - 3$ find:

a. $f \circ g$

b. $g \circ f$

c. $f(g(2))$

d. $g(f(2))$

20) Find the solution of the following equations. Round answers to two decimal places.

a. $2^{x-1} = 10$

b. $\log(2x + 2) = 3$

21) A function is given. Determine the average rate of change of the function between the given values of the variable.

a. $h(t) = t^2 + 2t;\ \ t = -1, t = 4$

b. $f(x) = x^3 - 4x^2;\ \ x = 0, x = 10$

22) Find the inverse of the function

a. $f(x) = 3x - 2$

b. $f(x) = (x + 1)^3$

23) Find the value of the following trig functions

a. $\sin\left(\frac{5\pi}{6}\right)$

b. $\cos\left(-\frac{\pi}{3}\right)$

c. $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$

d. $\cos^{-1}\left(-\frac{1}{2}\right)$

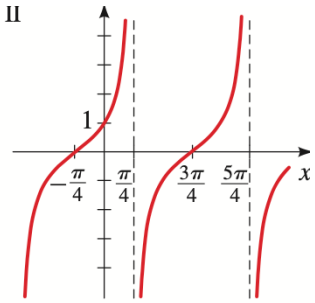
e. $\sin\left(\frac{13\pi}{3}\right)$

f. $\cos\left(\frac{7\pi}{4}\right)$

24) Use the trig function $y = \frac{1}{2}\cos 2(x)$

a. Find the amplitude, period, and phase shift of the function
b. *Sketch* a graph of the function

25) Write the equation for the given trig graph. You should use csc, sec, tan, or cot. Remember, there are multiple correct answers.



26) Find the measure of a central angle θ in a circle of radius 5 ft if the angle is subtended by an arc of length 7 ft.

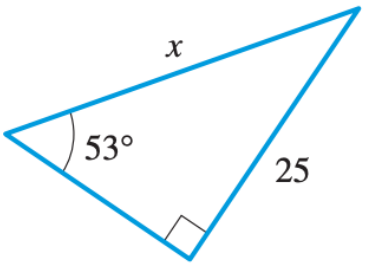
27) A circular arc of length 100 ft subtends a central angle of $70°$. Find the radius of the circle.

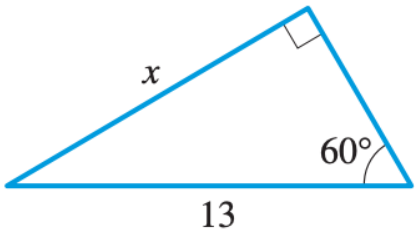
28) Solve each trig equation in the interval $[0, 2\pi)$ rounded to two decimal places.

a. $4 \sin \theta - 3 = 0$

b. $5 \cos \theta + 3 = 0$

29) Find the sides labeled x





30) Use the rational function, $r(x) = \frac{1}{x^2+7x+12}$

a. Find the x-intercepts.

b. Find the y-intercept.

c. Find the vertical asymptote(s)

d. Find the horizontal asymptote.

e. Determine the behavior of r(x) as x approaches the vertical asymptotes from the left and from the right

f. Sketch the graph.