MATH 115 Name________________________

Assignment R Sec. __

This review assignment is due the first day of class. If this assignment seems difficult, then consider refreshing your algebra and triangle trigonometry skills with either MATH 137 or the short online refresher courses Algebra Prep for Math 12 and Trig Prep for Math 12 at https://sites.google.com/site/mathchaircamosun/home/ALEKS-prep-courses

No calculators. Show all of your work in the space provided.

1. Simplify: $\dfrac{x^4-16}{x^2-10x+16} = \dfrac{(x^2-4)(x^2+4)}{(x-2)(x+8)} = \dfrac{\cancel{(x-2)}(x+2)(x^2+4)}{\cancel{(x-2)}(x+8)}$

$= \dfrac{(x+2)(x^2+4)}{x+8}$

$\dfrac{(x+2)(x^2+4)}{x+8}$

2. Combine: $\dfrac{1}{(x-1)^2} - \dfrac{1}{2(x-1)} = \dfrac{2}{2(x-1)^2} - \dfrac{(x-1)}{2(x-1)^2} =$

$= \dfrac{2-(x-1)}{2(x-1)^2} = \dfrac{2-x+1}{2(x-1)^2} = \dfrac{3-x}{2(x-1)}$

$\dfrac{3-x}{2(x-1)}$

3. Solve and graph your solution on the number line: $3x-(x-7)>4\left(x-\dfrac{20}{10}\right)$

$3x - x + 7 > 4x - 8$

$2x + 7 > 4x - 8$

$7 + 8 > 4x - 2x$

$15 > 2x$

$\dfrac{15}{2} > x$

$x < \dfrac{15}{2}$

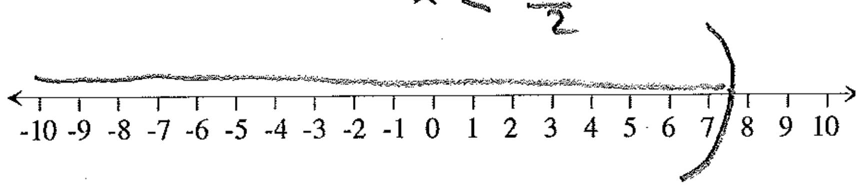
OR

$3x - x + 7 > 4x - 8$

$2x - 4x > -7 - 8$

$-2x > -15 \quad || \div -2$

$x < \dfrac{15}{2}$



x in $\left(-\infty, \dfrac{15}{2}\right)$

pg 1

Pg 2

6. Solve $\sqrt{4x^2-16x}=3$ and check your solutions.

$\left(\sqrt{4x^2-16x}\right)^2 = 3^2$ $\qquad 4x^2-16x=9$

$4x^2-16x-9=0$ $\qquad x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}=\dfrac{16\pm\sqrt{256+144}}{8}$

$x=\dfrac{16\pm 20}{8}$ $\quad \dfrac{36}{20}=\dfrac{9}{2}$ $\quad -\dfrac{4}{8}=-\dfrac{1}{2}$

CHECK $\quad x=\dfrac{9}{2}$

$\sqrt{4\cdot\frac{81}{4}-16\cdot\frac{9}{2}}=3$

$\sqrt{81-72}=3$ T

CHECK $\quad x=-\dfrac{1}{2}$ $\qquad \sqrt{4\cdot\frac{1}{4}+16\cdot\frac{1}{2}}=3,\ \sqrt{1+8}=3$ T

$x=\dfrac{9}{2}\quad x=-\dfrac{1}{2}$

7. Given $f(x)=-2(x-3)^2+4$, find the vertex and the exact x-intercepts and graph the function.

$x_V=3 \quad y_V=4 \quad$ as $f(x)=a(x-h)^2+k$

x intercepts $=?$ $\quad y=0 \rightarrow 0=-2(x-3)^2+4$

$2(x-3)^2=4,\ (x-3)^2=2 \qquad x-3=\pm\sqrt{2}$

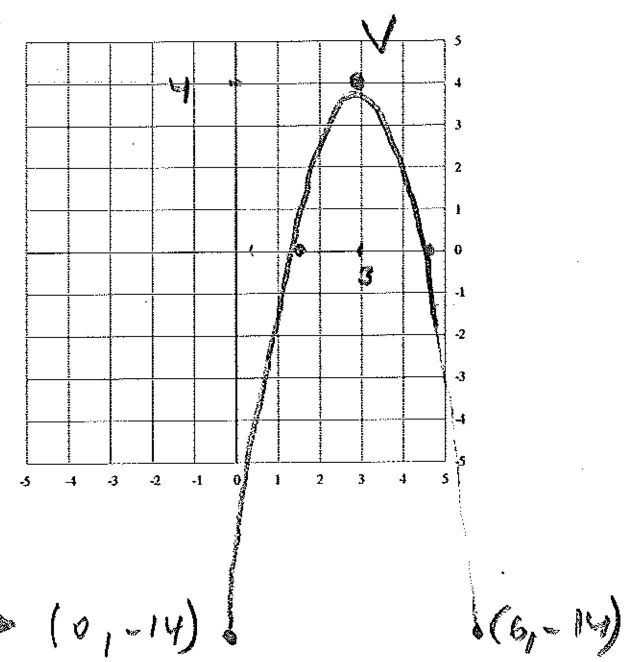
$x=3\pm\sqrt{2}$

$x_1=3+\sqrt{2}$ ← EXACT VALUE(S)

$x_2=3-\sqrt{2}$

$x_1=3+\sqrt{2}\simeq 4.41$

$x_2=3-\sqrt{2}\simeq 1.59$



$f(0)=-2\cdot 9+4=-14$ $\quad y$

OUT OF SCALE → $(0,-14)$

4. Solve $S = 2\pi r^2 + 2\pi rh$ for h. $\longrightarrow$ $S - 2\pi R^2 = 2\pi R h \quad \| \div 2\pi R$

$$h = \frac{S - 2\pi R^2}{2\pi R} = \frac{S}{2\pi R} - R$$

$\frac{S - 2\pi R^2}{2\pi R}$

5. Solve the following system of equations algebraically. Then graph the two equations and show the solution for the system on your graph.

$3x + 2y = -3 \quad | \otimes \cdot 2$

$-5x + 4y = 16$

$$\begin{array}{r} -6x - 4y = 6 \\ -5x + 4y = 16 \\ \hline -11x \quad = 22 \end{array} \quad \oplus \qquad x = -2$$

5EQ1 + 3EQ2 $\rightarrow$

$$\begin{array}{r} 15x + 10y = -15 \\ -15x + 12y = 48 \\ \hline 22y = 33 \end{array} \qquad y = \frac{3}{2}$$

$x = -2 \quad y = 3/2$

GRAPH

$3x + 2y = -3$

$x = 0 \quad y = -3/2$

$x = -1 \quad y = 0$

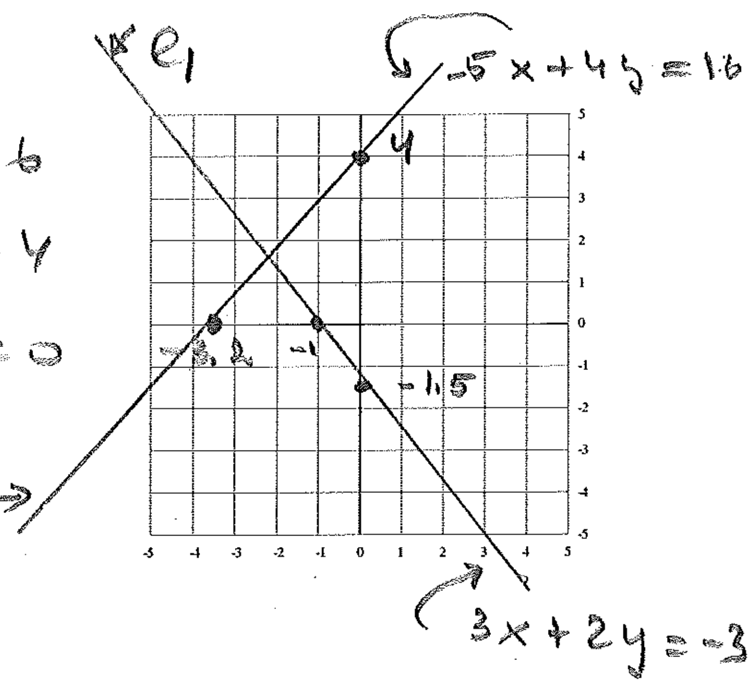
(l_1)

$-5x + 4y = 16$

$x = 0 \quad y = 4$

$x = -\frac{16}{5} \quad y = 0$

$(l_2) \rightarrow$



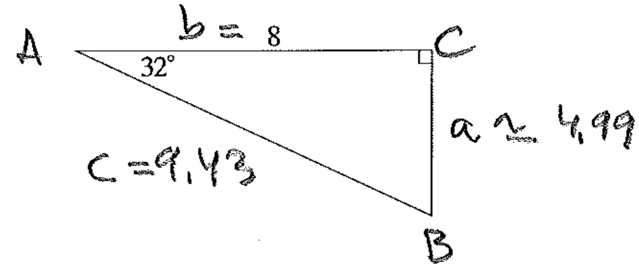
8. Simplify: $\dfrac{(9a^3)^{\frac{5}{2}}}{27a^{-\frac{1}{3}}} = \dfrac{(3^2 a^3)^{5/2}}{3^3 a^{-\frac{1}{3}}} = \dfrac{(3^2)^{\frac{5}{2}} (a^3)^{\frac{5}{2}}}{3^3 \ a^{-1/3}} =$

$= \dfrac{3^5 \ a^{\frac{15}{2}}}{3^3 \ a^{-\frac{1}{3}}} = 3^{5-3} \ a^{\frac{15}{2} - (-\frac{1}{3})} = 3^2 \ a^{\frac{47}{6}}$

$= 9 \ a^{\frac{47}{6}}$

$9a^{\frac{47}{6}}$

9. Solve the right triangle shown below; that is, find all missing sides and angles. (You will need a calculator for this question.)



$\tan 32^\circ = \dfrac{a}{8} \rightarrow a = 8 \tan 32^\circ$

$a \simeq 4.99$

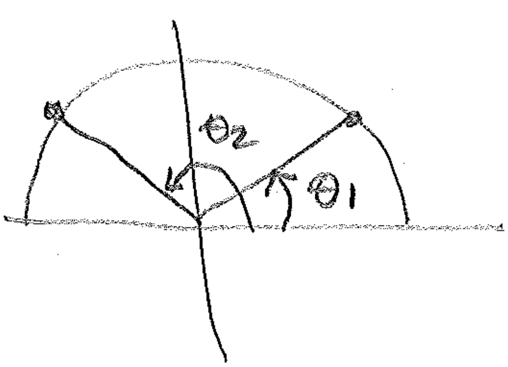
$\cos 32^\circ = \dfrac{8}{c} \rightarrow c = \dfrac{8}{\cos 32^\circ} \simeq 9.43$

or $c = \sqrt{a^2 + b^2} = \sqrt{4.99^2 + 8^2} \simeq 9.43$

$\measuredangle B = 90 - 32^\circ = 58^\circ$

$\measuredangle B = 58^\circ \quad a \simeq 4.99$
$c = 9.43$

10. Solve $\sin\theta = \dfrac{\sqrt{3}}{2}$, $0^\circ \le \theta < 360^\circ$ (Hint: There are two solutions.)



$\dfrac{\sqrt{3}}{2} \simeq 0.8\ldots$

$\theta_1 = \sin^{-1}\left(\dfrac{\sqrt{3}}{2}\right) = 60^\circ$

$\theta_2 = 180^\circ - \theta_1 = 120^\circ$

$60^\circ, 120^\circ$