

Name: KEY

Date: _____

Precalculus

Cumulative Review #1

Due: _____

Directions: Show all work for full credit. Correct answers without supporting work will receive 1 credit only.

1. Solve $\sqrt[3]{6n+5} - 15 = -10$

$$\begin{aligned} \sqrt[3]{6n+5} &= -10 + 15 \\ \sqrt[3]{6n+5} &= 5 \\ 6n+5 &= 5^3 \end{aligned} \quad \left. \vphantom{\begin{aligned} \sqrt[3]{6n+5} &= -10 + 15 \\ \sqrt[3]{6n+5} &= 5 \\ 6n+5 &= 5^3 \end{aligned}} \right\} \begin{aligned} 6n+5 &= 125 \\ 6n &= 120 \\ n &= \frac{120}{6} \\ n &= 20 \end{aligned}$$

2. Use the remainder theorem to find the remainder if $x^3 + 8x + 1$ is divided by $x - 2$.

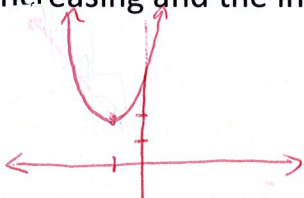
$$\begin{array}{r} 2 \overline{) 1 \ 0 \ 8 \ 1} \\ \underline{2 \ 4 \ 24} \\ 1 \ 2 \ 12 \ 25 \end{array}$$

$$x^2 + 2x + 12 + \frac{25}{x-2}$$

3. If r varies inversely as t and $r = 18$ when $t = -3$, write the variation as an equation then find r when $t = -11$.

$$\begin{aligned} r &= \frac{k}{t} & r &= \frac{-54}{t} \\ 18 &= \frac{k}{-3} & r &= \frac{-54}{-11} \\ k &= -54 & r &= \frac{-54}{-11} = \frac{54}{11} \end{aligned}$$

4. Graph $f(x) = |(x + 1)^2 + 2|$. Determine the interval(s) for which the function is increasing and the interval(s) for which the function is decreasing.



Dec $(-\infty, -1)$
Inc $(-1, \infty)$

5. Use the graph of the parent function $f(x) = \frac{1}{x}$ to describe the graph of the function $g(x) = \frac{3}{x} - 2$.

dilate by 3, down 2

6. Change 88.37° to degrees, minutes, and seconds.

$$88^\circ 22' 12''$$

7. Find the value of $\begin{vmatrix} 7 & -3 & 5 \\ 4 & 0 & -1 \\ 8 & 2 & 0 \end{vmatrix} = 7 \begin{vmatrix} 0 & -1 \\ 2 & 0 \end{vmatrix} + 3 \begin{vmatrix} 4 & -1 \\ 8 & 0 \end{vmatrix} + 5 \begin{vmatrix} 4 & 0 \\ 8 & 2 \end{vmatrix}$

$$= 7(2) + 3(8) + 5(8)$$

$$= 14 + 24 + 40 = 78$$

8. Solve $5 - \sqrt{b+2} = 0$

$$(5)^2 = (\sqrt{b+2})^2$$

$$25 = b+2$$

$$23 = b$$

Check:

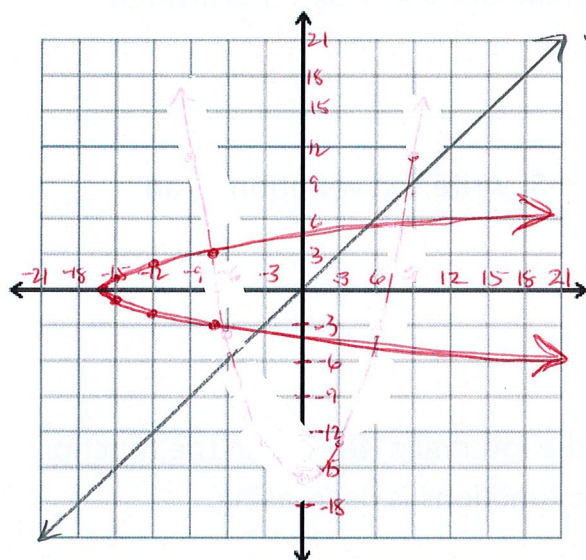
$$5 - \sqrt{23+2} = 0$$

$$5 - \sqrt{25} = 0$$

$$5 - 5 = 0$$

$$0 = 0 \checkmark$$

9. Graph the inverse of $f(x) = x^2 - 16$.



x	y
-7	-3
-12	-2
-15	-1
-16	0
-15	1
-12	2
-7	3

10. Find the multiplicative inverse of $\begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$.

$$\frac{1}{\begin{vmatrix} 2 & 1 \\ -3 & 2 \end{vmatrix}} \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix} = \frac{1}{7} \begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix} \quad \text{OR} \quad \begin{bmatrix} 2/7 & -1/7 \\ 3/7 & 2/7 \end{bmatrix}$$

11. Find the values of the six trigonometric functions for a $\frac{2\pi}{3}$ radian angle. $\frac{2(180)}{3} = 120^\circ$

$\sin 120^\circ = \sin 60^\circ$ in II



$$\sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$$

$$\tan \frac{2\pi}{3} = -\sqrt{3}$$

$$\sec \frac{2\pi}{3} = -2$$

$$\cos \frac{2\pi}{3} = -\frac{1}{2}$$

$$\csc \frac{2\pi}{3} = \frac{2\sqrt{3}}{3}$$

$$\cot \frac{2\pi}{3} = -\frac{\sqrt{3}}{3}$$

12. If y varies jointly as x and the cube of z and $y = 16$ when $x = 4$ and $z = 2$, find y when $x = -8$ and $z = -3$.

$$y = kxz^3$$

$$16 = k(4)(2)^3$$

$$16 = 32k$$

$$k = \frac{1}{2}$$

$$y = \frac{1}{2}xz^3$$

$$y = \frac{1}{2}(-8)(-3)^3$$

$$y = \frac{1}{2}(-8)(-27)$$

$$y = -4(-27)$$

$$y = 108$$