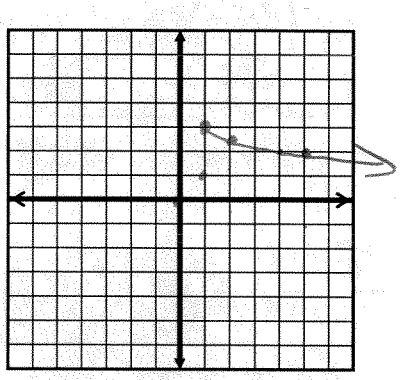
HW29
HPC A

Name key

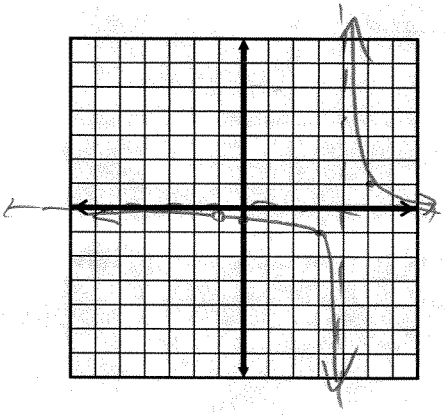
Cumulative Review C

Graph.

1) $f(x) = -\frac{1}{2}\sqrt{x-1}+3$



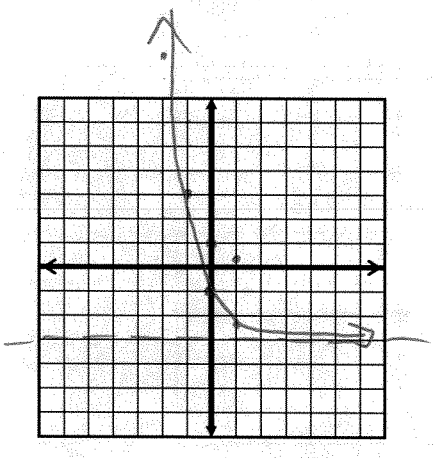
2) $f(x) = \frac{x+1}{x^2-3x-4} = \frac{x+1}{(x-4)(x+1)} = \frac{1}{x-4}$



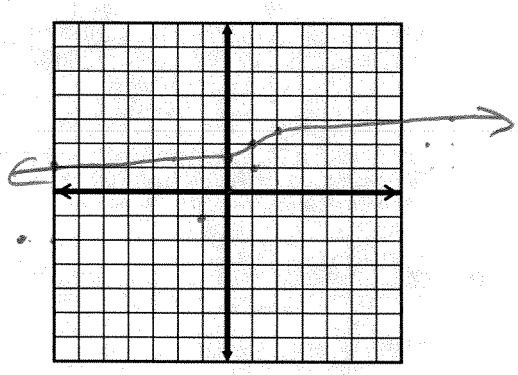
Hole @ $(-1, -\frac{1}{5})$
x-int.: none
y-int.: $-\frac{1}{4}$
VA: $x = 4$
HA: $y = 0$

x	y
3	-1
5	1

3) $f(x) = 2\left(\frac{1}{3}\right)^x - 3$



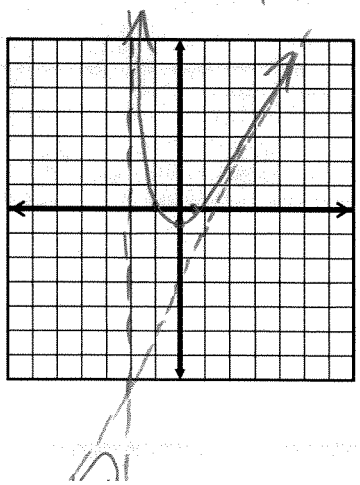
4) $f(x) = \frac{1}{2}(x-1)^3 + 2$



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

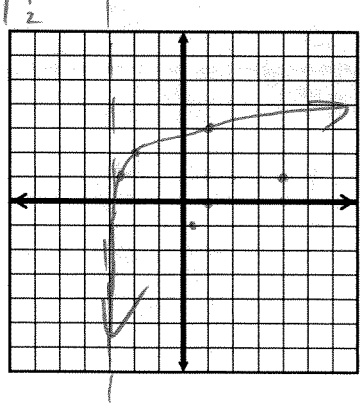
x-int.: $\frac{1}{2}, -1$
y-int.: $-\frac{1}{2}$
VA: $x = -2$
SA: $-2 \mid 2 \;\; 1 \;\; -1$ / $-4 \;\; 6$ / $2 \;\; -3 \;\; 5$

x	y
-3	-14



6) $f(x) = \log_4(x+3) + 2$

x	y
$\frac{1}{16}$	-2
$\frac{1}{4}$	-1
1	0
4	1
16	2



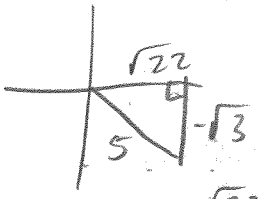
Find the exact value of the expression if possible. Do not use a calculator.

7) $\sin^{-1}\left[\tan\left(\frac{3\pi}{4}\right)\right]$

$\sin^{-1}(-1) =$

$-\frac{\pi}{2}$

8) $\cot\left[\sin^{-1}\left(-\frac{\sqrt{3}}{5}\right)\right]$



$\frac{\sqrt{22}}{-\sqrt{3}} = -\frac{\sqrt{66}}{3}$

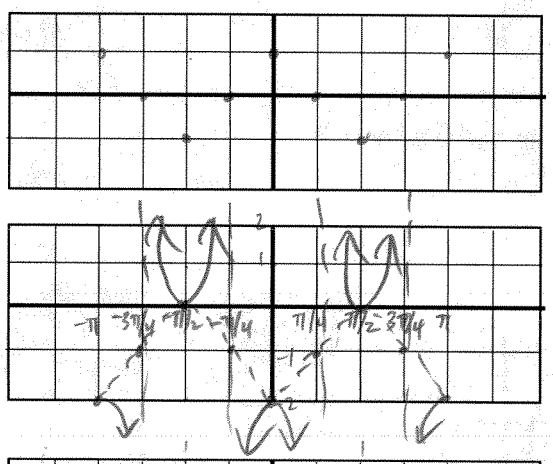
Graph one or more periods. Be sure to label all units.

9) $y = \sec(2x+\pi)-1$

amplitude = 1

period = π

shift = Left $\frac{\pi}{2}$ Down 1

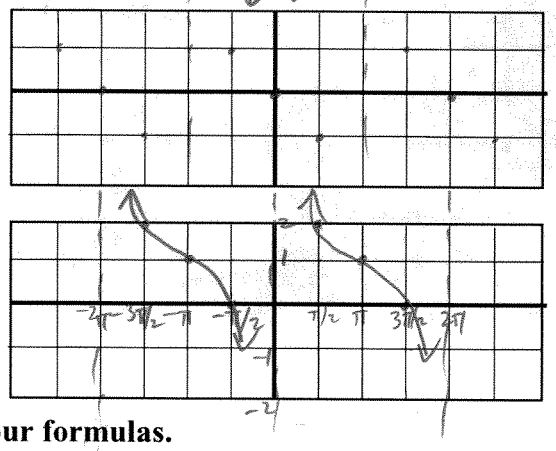


10) $y = -\tan\left(\frac{x}{2}-\frac{\pi}{2}\right)+1$

amplitude = 1

period = 2π

shift = right π, up 1



Find the exact value. You may use any of your formulas.

11) $\cos\frac{11\pi}{12} = \cos\left(\frac{3\pi}{12}+\frac{8\pi}{12}\right)$

$\cos\left(\frac{\pi}{4}+\frac{2\pi}{3}\right)$

$\cos\frac{\pi}{4}\cos\frac{2\pi}{3} - \sin\frac{\pi}{4}\sin\frac{2\pi}{3}$

$\frac{\sqrt{2}}{2}\left(-\frac{1}{2}\right) - \frac{\sqrt{2}}{2}\left(\frac{\sqrt{3}}{2}\right)$

$\frac{-\sqrt{2}-\sqrt{6}}{4}$

12) $\tan 157.5°$

$\frac{\sqrt{(1-\cos x)(1-\cos x)}}{\sqrt{(1+\cos x)(1-\cos x)}}$

$\frac{1-\cos x}{\sin x}$

$\tan\frac{315°}{2}$

$\frac{1-\cos 315°}{\sin 315°} = \frac{1-\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} =$

$\frac{2-\sqrt{2}}{-\sqrt{2}} = -\frac{2\sqrt{2}+2}{2}$

$\sqrt{2}+1$

Find all solutions in the interval $[0, 2\pi)$.

13) $2-2\cos^2 x = \sin x + 1$

$2-2(1-\sin^2 x) = \sin x + 1$

$2-2+2\sin^2 x - \sin x - 1 = 0$

$2\sin^2 x - \sin x - 1 = 0$

$(2\sin x + 1)(\sin x - 1) = 0$

$\sin x = -\frac{1}{2}$ $\quad \sin x = 1$

$\frac{\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

14) $4\cot x = \cot x \sin^2 x$

$4\cot x - \cot x \sin^2 x$

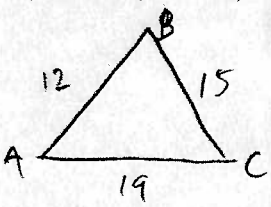
$\cot x(4 - \sin^2 x) = 0$

$\cot x = 0$ $\quad \sin x = \pm\sqrt{2}$ none

$\frac{\pi}{2}, \frac{3\pi}{2}$

Solve each triangle below. Round all side lengths to the nearest tenth and all angle measures to the nearest degree.

15) $a = 15,\ b = 19,\ c = 12$



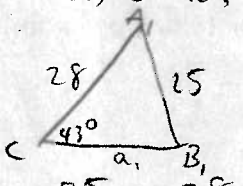
$144 = 225 + 361 - 2(15)(19)\cos C$

$C \approx 39°$ $\quad \frac{15}{\sin A} = \frac{12}{\sin 39°}$

$A \approx 52°$

$B \approx 89°$

16) $C = 43°,\ c = 25,\ b = 28$



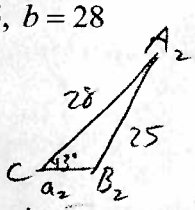
$\frac{25}{\sin 43°} = \frac{28}{\sin B_1}$

$B_1 = 50°$

$A_1 = 87°$

$\frac{25}{\sin 43°} = \frac{a_1}{\sin 87°}$

$a_1 \approx 36.6$



$B_2 = 130°$

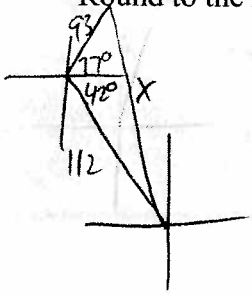
$A_2 = 7°$

$\frac{25}{\sin 43°} = \frac{a_2}{\sin 7°}$

$a_2 \approx 4.5$

Solve. Round answer to the nearest tenth of a mile and nearest degree.

17) A plane leaves an airport at a heading of N48°W for 112. It then changes course and heads N13°E for 93 miles and lands at a new airport. What is the distance from original airport to the new airport? Round to the nearest tenth of a mile.



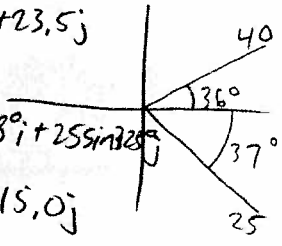
$x^2 = 93^2 + 112^2 - (2)(93)(112)\cos 119°$

176.9 miles

18) The magnitude and direction of two forces acting on an object are 40 pounds, N54°E, and 25 pounds, S53°E, respectively. Find the magnitude and the direction angle of the resultant force.

$F_1 = 40\cos 36°\,i + 40\sin 36°\,j$

$F_1 = 32.3i + 23.5j$



$F_2 = 25\cos 323°\,i + 25\sin 323°\,j$

$F_2 = 20.0i - 15.0j$

$F_3 = 52.3i + 8.5j$

$\|F_3\| = 53.016$ lbs.

$\tan\theta = \frac{8.5}{52.3} = 9.2°$

9°

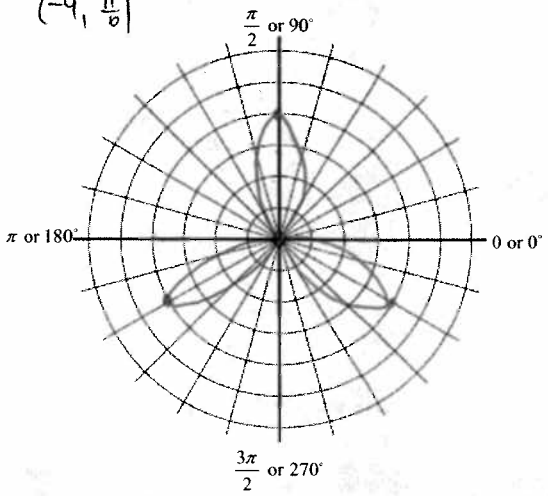
or

N81°E

Graph.

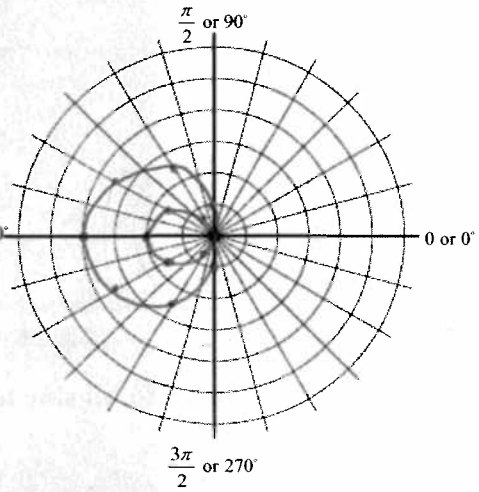
19) $r = -4\sin 3\theta$

$(-4, \frac{\pi}{6})$



20) $r = 1 - 3\cos\theta$

r	θ
-2	0
-1.6	π/6
-0.5	π/3
1	π/2
2.5	2π/3
3.6	5π/6
4	π



Find the indicated operations of the following complex numbers in polar form.

$$z_1 = 4\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right) \qquad z_2 = 3\left(\cos\frac{2\pi}{5} + i\sin\frac{2\pi}{5}\right)$$

21) $z_1 \bullet z_2$

$12\,\text{cis}\left(\frac{\pi}{3} + \frac{2\pi}{5}\right)$

$12\,\text{cis}\,\frac{11\pi}{15}$

22) $\sqrt[3]{z_2}$

$\sqrt[3]{3}\,\text{cis}\,\frac{2\pi}{15}$

$\sqrt[3]{3}\,\text{cis}\,\frac{4\pi}{5}$

$\sqrt[3]{3}\,\text{cis}\,\frac{22\pi}{15}$

Write the following complex numbers in their alternate form.

23) $7\left(\cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}\right)$ **to rectangular**

$-\frac{7\sqrt{3}}{2} + \frac{7}{2}i$

24) $-3 + 3i$ **to polar**

$r = 9 + 9$

$r = 3\sqrt{2}$

$\tan\theta = -1$

$\theta = \frac{3\pi}{4}$

$3\sqrt{2}\,\text{cis}\,\frac{3\pi}{4}$

Given u = 5i – 6j and v = 7i + 2j, find the following.

25) $\|2u - 3v\|$

$10i - 12j - 21i - 6j$

$\|-11i - 18j\| =$

$\sqrt{445}$

26) Find the angle between **u** and **v**.

$\cos\theta = \frac{u \cdot v}{\|u\|\|v\|} = \frac{23}{\sqrt{61}\cdot\sqrt{53}} =$

$66°$