For questions 1-2, perform the given operation. Leave your answers as factored as possible.

1. $\frac{6x^2+5x-4}{2x^2-17x+8} \cdot \frac{x^2-4x-32}{12x^2-5x-2}$

$\frac{(3x+4)(2x-1)}{(2x-1)(x-8)} \cdot \frac{(x-8)(x+4)}{(4x+1)(3x-2)}$

$\boxed{\frac{(3x+4)(x+4)}{(4x+1)(3x-2)}}$

2. $\frac{3}{x+2}+\frac{4}{x^2-4}-\frac{1}{x^2-x-2}$

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

$\frac{3x^2-3x-6+4x+4=x-2}{(x-2)(x+2)(x+1)}$

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

For questions 3-5, find all the zeros (real & imaginary) of each function.

3. $f(x)=2x^3-3x^2-11x+6$

$\frac{6}{2} = \frac{1,2,3,6}{1,2} = \pm\frac{1}{2}, \pm1, \pm2, \pm3, \pm\frac{3}{2}, \pm6$

$f(-2) = -16-12+22+6 = 0$ ✓

$x+2 \overline{)\,2x^3-3x^2-11x+6}$

$-(2x^3+4x^2)$

$-7x^2-11x$

$-(-7x^2-14x)$

$3x+6$

$3x+6$

0

$(x+2)(2x^2-7x+3)$

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

$\boxed{x=-2,\ x=\frac{1}{2},\ x=3}$

4. $f(x)=x^4-2x^3-5x^2+8x+4$

$\frac{4}{1} = \frac{1,2,4}{1} = \pm1, \pm2, \pm4$

$f(2) = 16-16-20+16+4 = 0$ ✓

$x-2 \overline{)\,x^4-2x^3-5x^2+8x+4}$ $\quad x^3-5x-2$

$-(x^4-2x^3)$

$-5x^2+8x$

$-(-5x^2+10x)$

$-2x+4$

$-2x+4$

0

$f(x)=x^3-5x-2 \quad \frac{2}{1} = \frac{1,2}{1} = \pm1, \pm2$

$f(-2) = -8+10-2 = 0$ ✓

5. $f(x)=x^3+7x^2+x+7$

$x^2(x+7)+1(x+7)$

$(x^2+1)(x+7)$

$x^2+1=0$ $\quad \boxed{x=-7}$

$x^2=-1$

$\boxed{x=\pm i}$

$x+2 \overline{)\,x^3-5x-2}$ $\quad x^2-2x-1$

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

$-2x^2-5x$

$-(-2x^2-4x)$

$-x-2$

$-x-2$

0

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

$\boxed{x=-2,\ x=2}$

$x=\frac{2\pm\sqrt{4-4(1)(-1)}}{2(1)}$

$x=\frac{2\pm2\sqrt{2}}{2}$

$\boxed{x=1\pm\sqrt{2}}$

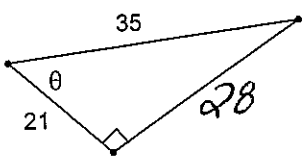
6. Write the polynomial function of least degree & with integer coefficients if the zeros occur at 6 and -5 + 2*i*.

$(x-6)(x+5-2i)(x+5+2i)$

$(x-6)(x^2+10x+29)$

$\boxed{x^3+4x^2-31x-174}$

7. Find the value of each of the six trig functions of θ.



$\sin\theta = \frac{28}{35} = \frac{4}{5}$

$\cos\theta = \frac{21}{35} = \frac{3}{5}$

$\tan\theta = \frac{28}{21} = \frac{4}{3}$

8. Find the values of the missing trig functions given $\sin\theta = -\frac{8}{17}$ and $\cos\theta = \frac{15}{17}$.

$\csc\theta = -\frac{17}{8}$

$\sec\theta = \frac{17}{15}$

$\cot\theta = -\frac{15}{8}$

$\tan\theta = \frac{-\frac{8}{17}}{\frac{15}{17}} = -\frac{8}{15}$

For questions 9-15, find the exact value of each expression.

9. $\tan\frac{9\pi}{2}$ undefined

10. $\sec\frac{-11\pi}{4}$ $\sec\frac{\pi}{4} = -\sqrt{2}$

11. $\sin\frac{-35\pi}{6}$ $\sin\frac{\pi}{6} = \frac{1}{2}$

12. $\cot\frac{19\pi}{6}$ $\cot\frac{\pi}{6} = \frac{\sqrt{3}}{3}$

13. $\sec 510°$ $\sec(30) = -\frac{2\sqrt{3}}{3}$

14. $\sin\frac{3\pi}{2}\tan\left(-\frac{8\pi}{3}\right)+\cos\left(-\frac{5\pi}{6}\right)$

$\tan\left(\frac{\pi}{3}\right)+\cos\frac{\pi}{6}$

$-1+\sqrt{3}+-\frac{\sqrt{3}}{2}$

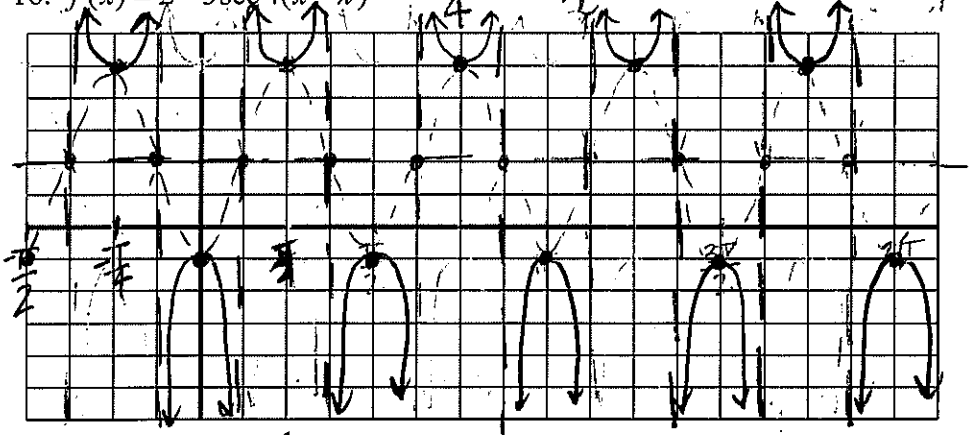
$-\frac{2}{2}+\frac{2\sqrt{3}}{2}-\frac{\sqrt{3}}{2} = \frac{-2+\sqrt{3}}{2}$

15. $\frac{\tan 150°\csc 240°}{\cos 135°-\sin 300°}$

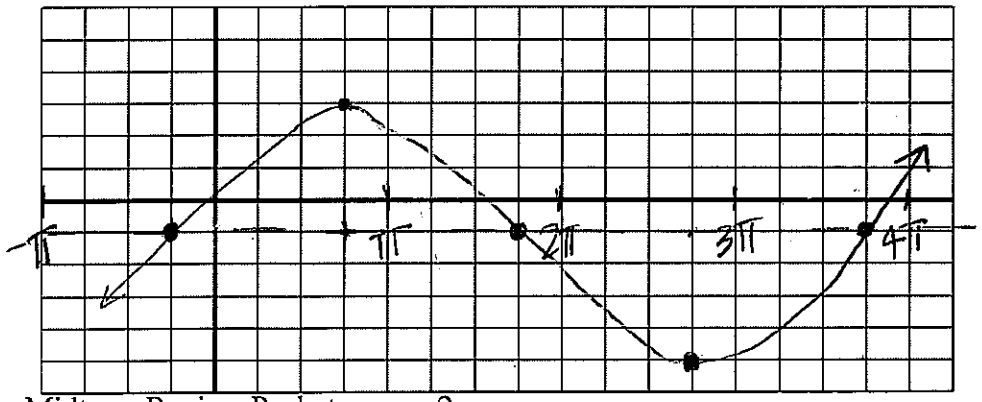
$\frac{\left(-\frac{\sqrt{3}}{3}\right)\left(-\frac{\sqrt{3}}{2}\right)}{\left(-\frac{\sqrt{2}}{2}\right)-\left(-\frac{\sqrt{3}}{2}\right)} = \frac{\frac{3}{6}}{\frac{\sqrt{3}-\sqrt{2}}{2}} = \frac{3(2)}{6(\sqrt{3}-\sqrt{2})} = \frac{1}{\sqrt{3}-\sqrt{2}}$

For questions 16-19, graph one period of each function. Fully label your axes!! Use color for your final function!

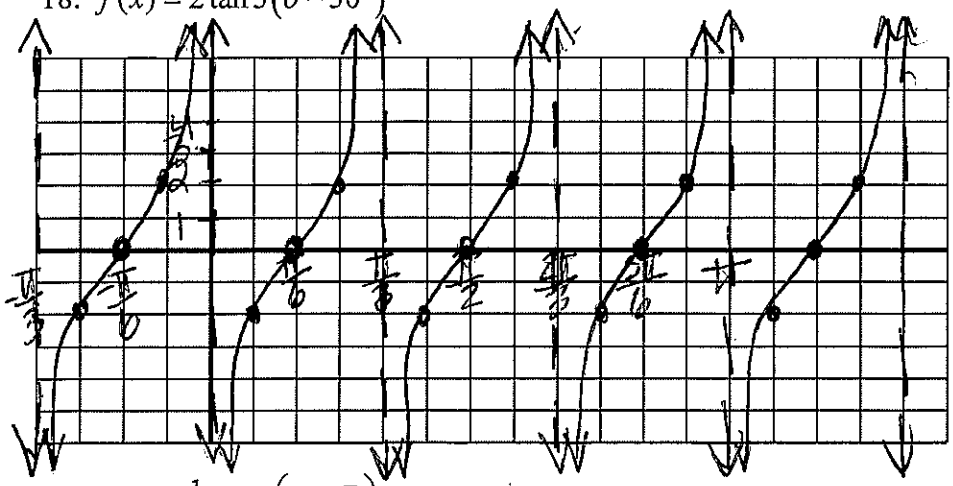
16. $f(x) = 2-3\sec 4(x-\pi)$ Period $\frac{2\pi}{4} = \frac{\pi}{2}$, $\frac{1}{4}\cdot\frac{\pi}{2} = \frac{\pi}{8}$ Phase shift π



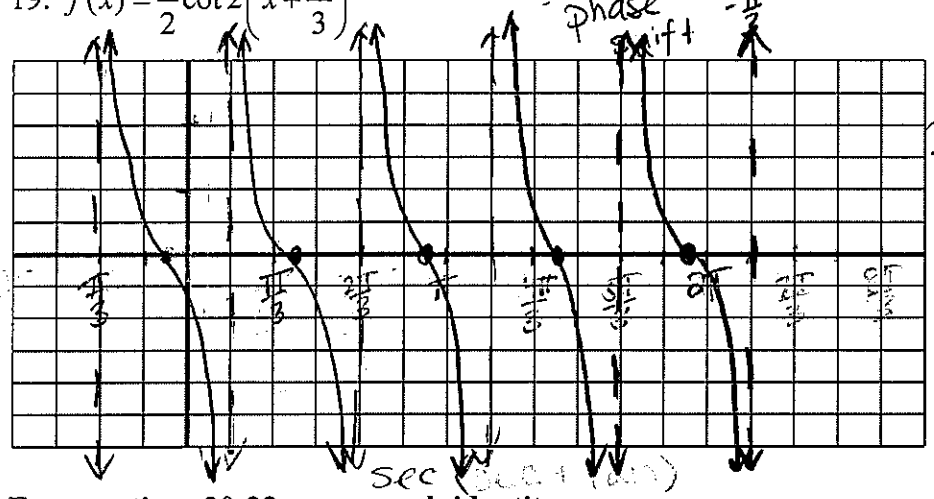
17. $f(x) = -1+4\sin\frac{1}{2}(\theta+45°)$ $\frac{2\pi}{\frac{1}{2}} = 4\pi$



18. $f(x) = 2\tan 3(\theta - 30°)$



19. $f(x) = \frac{1}{2}\cot 2\left(x + \frac{\pi}{3}\right)$

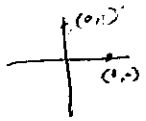


$2\left(x + \frac{\pi}{3}\right) = 0$ $\quad 2\left(x + \frac{\pi}{3}\right) = \pi$

$x = -\frac{\pi}{3}$ $\quad x = \frac{\pi}{2} - \frac{\pi}{3}$

$x = \frac{\pi}{6}$

$\frac{2\pi}{2} = \frac{\pi}{4}$



$\cot = \frac{\cos}{\sin}$

For questions 20-23, prove each identity.

20. $\frac{1}{1-\sin x} = \sec^2 x + \sec x \tan x$

$\frac{1}{\cos}\left(\frac{1}{\cos} + \frac{\sin}{\cos}\right)$

$= 1 + \tan^2 x + \left(\frac{1}{\cos x}\right)\left(\frac{\sin x}{\cos x}\right)$

$= \frac{\cos^2}{\cos^2} + \frac{\sin^2}{\cos^2} + \frac{\sin x}{\cos^2}$

$= \frac{\cos^2 + \sin^2 + \sin x}{\cos^2}$

✓ $= \frac{1 + \sin x}{1 - \sin^2 x}$

$= \frac{1 + \sin x}{(1 + \sin x)(1 - \sin x)}$

$= \boxed{\frac{1}{1 - \sin x}}$

$\sin^2 + \cos^2 =$

21. $\frac{\sec^3 x - \cos^3 x}{\sec x - \cos x} = \sec^2 x + 1 + \cos^2 x$

$\frac{(\sec - \cos)(\sec^2 + \cos\sec\cdot + \cos^2)}{(\sec - \cos)}$

$\sec^2 + \cos\sec\cdot + \cos^2$

$\sec^2 + \cos\frac{1}{\cos} + \cos^2$

$\sec^2 + 1 + \cos^2 x =$ ✓

$1 + \tan^2 = \sec^2$ $\quad 1 + \cot^2 = \csc^2$

Need to work both sides

22. $\tan\left(x+\frac{\pi}{4}\right)+1=\sqrt{2}\cos x\sec\left(x+\frac{\pi}{4}\right)$

$\frac{\tan x+\tan\frac{\pi}{4}}{1-\tan x\tan\frac{\pi}{4}}+1=\sqrt{2}\cos x\frac{1}{\cos\left(x+\frac{\pi}{4}\right)}$

$\frac{\tan x+1}{1-\tan x}+\frac{1-\tan x}{1-\tan x}$

$\sqrt{2}\cos x\left(\frac{1}{\cos x\cos\frac{\pi}{4}-\sin x\sin\frac{\pi}{4}}\right)$

$\frac{2}{1-\tan x}$

$\sqrt{2}\cos x\left(\frac{1}{\frac{\sqrt{2}}{2}(\cos x-\sin x)}\right)$

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

$\frac{2\cos x}{\cos x-\sin x}$ ✓

23. $(1+\tan x)\tan 2x=\frac{2\tan x}{1-\tan x}$

$(1+\tan x)\left(\frac{2\tan}{1-\tan^2}\right)$

$1+\tan x\left(\frac{2\tan x}{(1+\tan x)(1-\tan x)}\right)$

$\frac{2+\tan x}{1-\tan x}=$ ✓

For questions 24-27, solve each equation in the indicated domain.

24. $2\cot^2 x+2\cot x=0$, Domain: $(-\infty,\infty)$

$2\cot x(\cot x+1)=0$

$2\cot x=0 \quad \cot x=-1$

$\cot x=0$

$x=\pi+2\pi n$	$x=\frac{3\pi}{4}+2\pi n$
$x=0+2\pi n$	$x=\frac{7\pi}{4}+2\pi n$

25. $4\csc^2\theta+4\csc\theta+1=0$, Domain: $[0°,360°)$

$(2\csc+1)(2\csc+1)$

$2\csc+1=0$

$\csc=-\frac{1}{2}$

undefined

26. $(1-\cos\theta)^2=(-\sin\theta)^2$ Domain: $[-180°,180°)$

$1-2\cos\theta+\cos^2\theta=\sin^2\theta$

$1-2\cos\theta+\cos^2\theta=1-\cos^2\theta$

$-2\cos\theta+2\cos^2\theta=0$

$2\cos\theta(-1+\cos\theta)=0$

$2\cos\theta=0 \quad -1+\cos\theta=0$

$\cos\theta=0 \quad \cos\theta=1$

$\theta=90°,-90°$ $\theta=0°$

27. $\frac{\tan 10\theta+\tan 50°}{1-\tan 10\theta\tan 50°}=\frac{\sqrt{3}}{3}$, Domain: $(0°,90°)$

$\tan(10\theta+50)=\frac{\sqrt{3}}{3}$

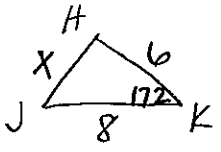
$10\theta+50°=30°$ $10\theta+50=210$

$10\theta=-20°$ $10\theta=160$

$\theta=-2$ $\theta=16$

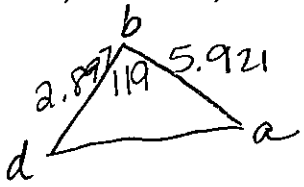
For triangle questions 28-31, find the specified side or angle. Round your answers to 2 decimal places.

28. In $\Delta HJK, h = 8, j = 6, m\angle K = 172°, find\ k.$



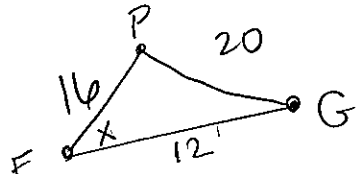
$k^2 = 6^2 + 8^2 - 2(6)(8)\cos 172$
$k^2 = 100 + 95.06573346$
$k = 13.96659$
$\boxed{k = 13.97}$

29. In $\Delta BAD, a = 2.897, d = 5.921, m\angle B = 119°, find\ b.$



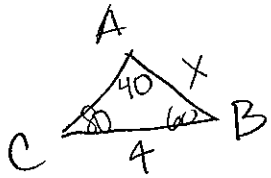
$b^2 = 2.897 + 5.921 - 2(2.897)(5.921)\cos(119)$
$b^2 = 8.818 + 16.63201167$
$\sqrt{b^2} = \sqrt{25.45001167}$
$\boxed{b = 5.04}$

30. In $\Delta PEG, p = 12, e = 20, g = 16, find\ m\angle E.$



$20^2 = 12^2 + 16^2 - 2(12)(16)\cos x$
$400 = 400 - 384\cos x$
$0 = \cos x$
$\boxed{x = 90°}$

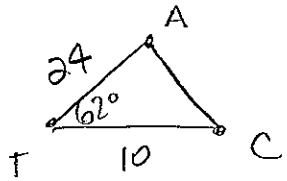
31. In $\Delta ABC, m\angle A = 40°, m\angle B = 60°, a = 4, find\ c.$



$\frac{\sin 80}{x} = \frac{\sin 40}{4}$
$\frac{4\sin 80}{\sin 40} = \frac{x\sin 40}{\sin 40}$
$\boxed{x = 6.13}$

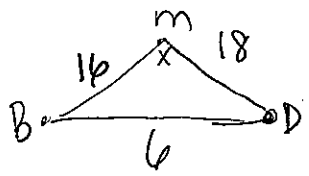
For questions 32-33, find the area of each triangle. Round your answers to 2 decimal places.

32. c = 24 meters, a = 10 meters, T = 62°



$\frac{1}{2}(24)(10)\sin 62$
$\boxed{105.95}$

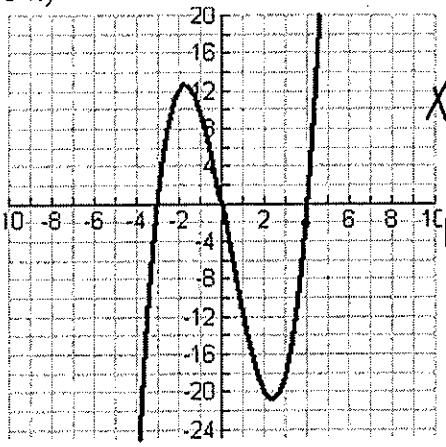
33. m = 6 feet, d = 16 feet, and b = 18 feet.



$6^2 = 16^2 + 18^2 - 2(16)(18)\cos x$
$36 = 580 - 576\cos x$
$\boxed{x = 19.19}$

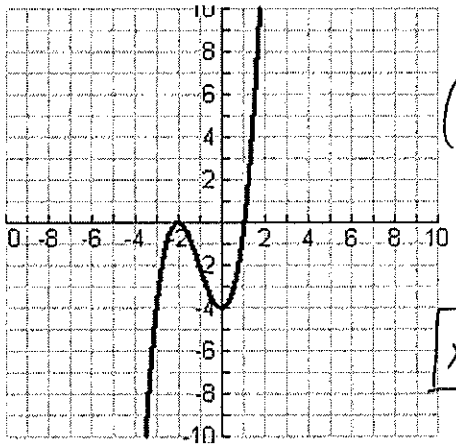
For #34-35, write the equation of the polynomial function graphed with lowest degree possible and leading coefficient of 1.

34.)



$x(x+3)(x-4)$
$x(x^2 - x - 12)$
$\boxed{x^3 - x^2 - 12x}$

35.)



$(x+2)^2(x-1)$
$(x^2 + 4x + 4)(x-1)$
$x^3 + 4x^2 + 4x - x^2 - 4x - 4$
$\boxed{x^3 + 3x^2 - 4}$

For questions 36-40, find all the zeros of the polynomial function.

36. $f(x) = 2x^3 - 2x^2 + 16x + 120$

$2(x^3 - x^2 + 8x + 60)$

$f(-3) = -27 - 9 - 24 + 60$

$-60 + 60 = 0$

$2x^2 - 8x + 40 = 2(x^2 - 4x + 20)$

$x+3 \;|\; 2x^3 - 2x^2 + 16x + 120$

$-2x^3 + 6x^2$

$-8x^2 + 16x$

$-(-8x^2 - 24x)$

$40x + 120$

$40x + 120$

0

$(x-2)^2 = -20 + 4$

$(x-2)^2 = -16$

$x - 2 = \pm 4i$

$x = 2 \pm 4i$

$x = -3$

37. $f(x) = x^4 - 3x^3 - 2x^2 - 6x - 8$

$f(-1) = 0$

$x^2(x-4) + 2(x-4)$

$x+1 \;|\; x^4 - 3x^3 - 2x^2 - 6x - 8$

$x^3 - 4x^2 + 2x - 8$

$-(x^4 + x^3)$

$-4x^3 - 2x^2$

$-(-4x^3 - 4x^2)$

$2x^2 - 6x$

$-(2x^2 + 2x)$

$-8x - 8$

$-8x - 8$

0

$x = -1, 4, \pm i\sqrt{2}$

38. $f(x) = 216x^3 + 64$

$8(27x^3 + 8)$

$8(3x+2)(9x^2 - 6x + 4)$

$x = -\frac{2}{3}$

$x = \frac{6 \pm \sqrt{36 - 4(9)(4)}}{2(9)}$

$= \frac{6 \pm \sqrt{-108}}{18}$

$= \frac{6 \pm i6\sqrt{3}}{18}$

$= \frac{1 \pm i\sqrt{3}}{3}$

39. $f(x) = x^3 + 12x^2 + 21x + 10$

$f(-1) = -1 + 12 - 21 + 10$

$x+1 \;|\; x^3 + 12x^2 + 21x + 10$

$x^2 + 11x + 10$

$x^3 + x^2$

$11x^2 + 21x$

$+(11x^2 + 11x)$

$10x + 10$

$10x + 10$

0

$(x+1)(x+10)(x+1)$

$x = -1, -10$

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

$f(-2) = 0 \quad f(1) = 0$

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

$x^2 - x - 2 \;|\; x^4 + x^3 - x^2 + x - 2$

$x^2 + 1$

$-(x^4 - x^3 - 2x^2)$

$x^2 + x - 2$

$x^2 - x - 2$

0

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

$x = -2, x = 1, x = \pm i$

Write a rational function with the given characteristics.

41. There are no zeros, a hole exists at $x = -3/2$, vertical asymptote is at $x = 1$, and horizontal asymptote is at $y = 0$.

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

42. There is a zero at 6, a hole exists at $x = -3$, no vertical asymptotes, and horizontal asymptote at $y = x - 6$.

$$f(x) = \frac{(x-6)(x+3)}{(x+3)}$$

43. The zeros are at -1 and 3 and the vertical asymptote is at $x = 0$.

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

$$x+1\overline{)x^2+4x-5}$$

$x+3$

x^2+x

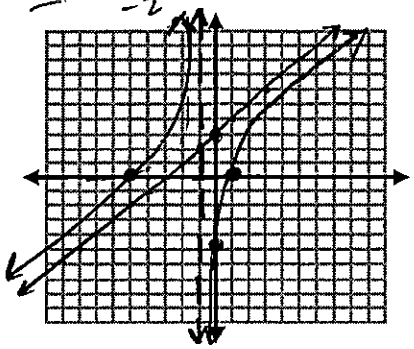
$3x-5$

$3x+3$

-2

Graph the function and label the following information. Horizontal Asymptotes can include slant asymptotes.

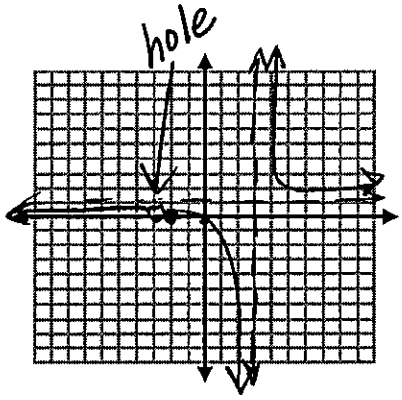
44. $y=\dfrac{x^2+4x-5}{x+1}$ $(x+5)(x-1)$



Zeros:	$x=-5, x=1$
Vertical Asymptotes:	$x=-1$
Horizontal Asymptotes:	none
Holes:	none
Y-Intercept(s):	$(0,-5)$
Domain:	$(-\infty,-1)\cup(-1,\infty)$
range	$(-\infty,\infty)$

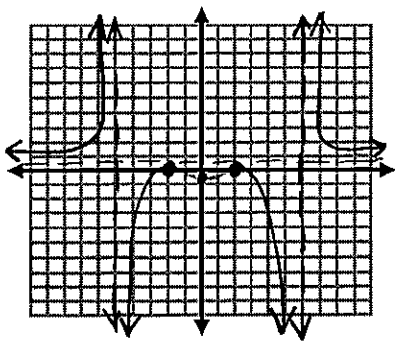
slant asymptote $y=x+3$

45. $y=\dfrac{x^2+5x+6}{x^2-9}$ $(x+3)(x+2)$ $(x+3)(x-3)$



Zeros:	$x=-2$
Vertical Asymptotes:	$x=3$
Horizontal Asymptotes:	$y=1$
Holes:	$x=-3$
Y-Intercept(s):	$(0,-\frac{2}{3})$
Domain:	$(-\infty,3)\cup(3,\infty)$
range	$(-\infty,\infty)$

46 $y=\dfrac{x^2-4}{3x^2-15x+18}$ $(x+2)(x-2)$ $3(x^2-5x+6)$ $3(x-6)(x+5)$



Zeros:	$x=-2, x=2$
Vertical Asymptotes:	$x=6, x=-5$
Horizontal Asymptotes:	$y=\frac{1}{3}$
Holes:	none
Y-Intercept(s):	$(0,-\frac{2}{9})$
Domain:	$(-\infty,-5)\cup(-5,6)\cup(6,\infty)$
range	$(-\infty,\infty)$

47. Find the volume of the solid formed when the rectangle shown is rotated about

Volume of rectange rotated about

a. x=-3 $V_F + V_F - V_F$

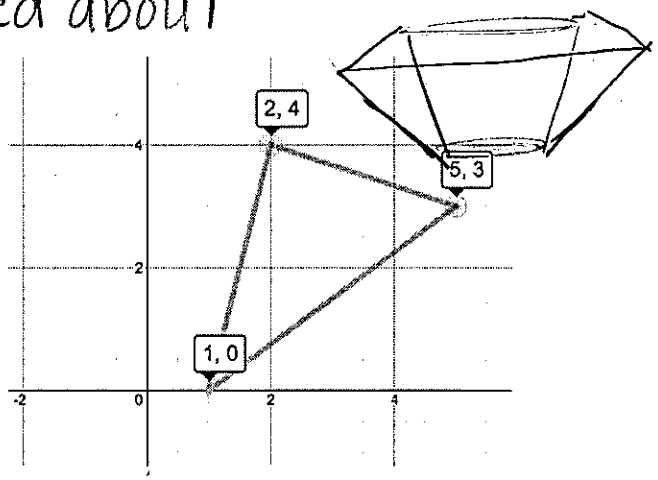
$V_F = \frac{\pi}{3}(6^2+48+8^2) = \frac{1488\pi}{3}$

b. y=-2

$V_F = \frac{\pi}{3}(3)(4^2+32+8^2) = 122\pi$

$V_F = \frac{\pi}{3}(4)(4^2+20+5^2) = \frac{244\pi}{3}$

90π



48. Find the volume of the solid formed when the triangle is rotated about $V_F + V_F - V_F - V_F$ $91\pi - 19\pi = 72\pi$

a. x= -1.

$V_F = \frac{\pi}{3}(2)(2^2+5(2)+5^2) = \frac{2\pi}{3}(39) = 26\pi$ $V_F = \frac{\pi}{3}(3)(2^2+6+3^2) = 19\pi$

$V_F = \frac{\pi}{3}(3)(5^2+30+36) = \pi(91) = 91\pi$ $V_F = \frac{\pi}{3}(2)(2^2+10+25) = 26\pi$

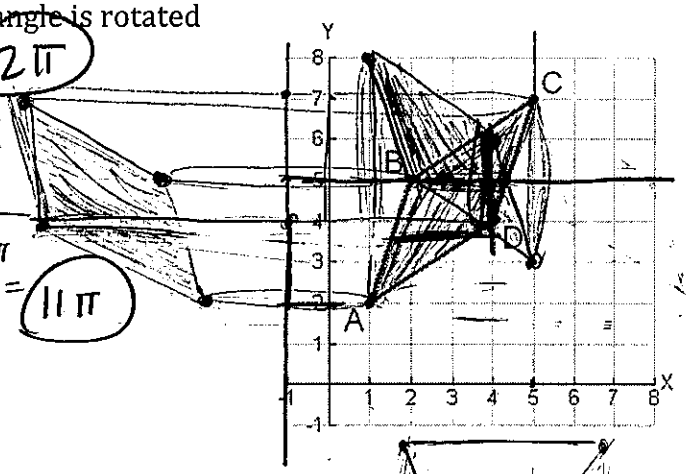
b. y = 5.

$V_{F_1} + V_{C_1} + V_{F_2} - V_{C_2}$ $(13\pi - 3\pi) + (\frac{7\pi}{3} - \frac{4\pi}{3}) = 10\pi + \pi$

$= 11\pi$

$V_{F_1} = \frac{\pi}{3}(3)(3^2+3\cdot1+1^2) = 13\pi$ $V_{F_2} = \frac{\pi}{3}(2^2+2+1) = \frac{7\pi}{3}$

$V_{C_1} = \frac{1}{3}(\pi 9) = 3\pi$ $V_{C_2} = \frac{1}{3}(\pi 4) = \frac{4\pi}{3}$



49. Find the volume of the solid formed when the trapezoid is rotated about

a. y=4 $V_{cyl} - V_f - V_f = \pi(4)^2(5) - \frac{1}{3}\pi(1)(4^2+4+1^2)$

$- \frac{1}{3}\pi(2)(4^2+4+1^2)$

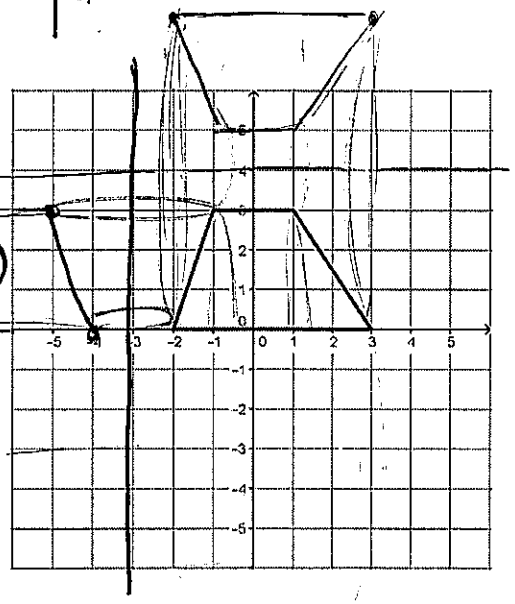
$= 80\pi - 7\pi - 14\pi = 59\pi$

b. x= -3

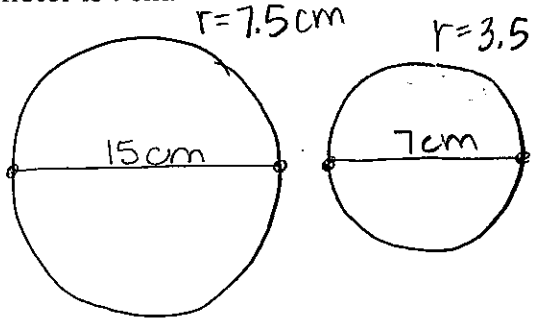
$V_f - V_f$

$= \frac{1}{3}\pi(3)(6^2+24+4^2) - \frac{1}{3}\pi(3)(2^2+2+1)$

69π



50. Find the volume of a hollow sphere, where the outter diameter is 15cm and the length of the inner diameter is 7cm.



$\frac{4}{3}\pi(\frac{15}{2})^3$ $\frac{4}{3}\pi(\frac{7}{2})^3$

$\frac{4}{3}\pi(\frac{3375}{8_2})$ $\frac{4}{3}\pi(\frac{343}{8_2})$

$\frac{3375\pi}{6} - \frac{343\pi}{6} = \frac{3032\pi}{6} = \frac{1516\pi}{3}$

51. Find the volume of the frustum with $r_1 = x + 3$, $r_2 = 2x - 1$, and $h = 4x$.

$\frac{\pi}{3}h(R^2 + rR + r^2) \Rightarrow \frac{\pi}{3}(4x)\left((2x-1)^2 + (x+3)(2x-1) + (x+3)^2\right)$

$\frac{4x\pi}{3}(4x^2 - 4x + 1 + 2x^2 + 5x - 3 + x^2 + 6x + 9)$

$\frac{4x\pi}{3}(7x^2 + 7x + 7) = \boxed{\frac{28x\pi}{3}(x^2 + x + 1)}$

52. Is $3 - i$ a zero to the function $g(x) = x^3 - 10x^2 + 34x - 40$?

$g(3-i) = (3-i)^3 - 10(3-i)^2 + 34(3-i) - 40$

$24 - 28i - 100 + 60i + 102 - 34i - 40$

$= -62i + 60i + 126 - 140$ (NO)

$i^2 = -(+1) = 1$

$(3-i)(3-i)$

$9 - 6i + 1$

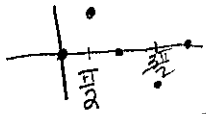
$(10 - 6i)(3-i)$

$30 - 10i - 18i - 6$

$24 - 28$

53. At 1:00pm (13:00) high tide was at 4 feet, at 8:00 pm (20:00) low tide was -1 feet. Find the period of the trigonometric function that would model the tides.

hours past midnight (13,4) max (20,-1) min



Period: $20 - 13 = 7 \cdot 2 = \boxed{14}$

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

(sub x's) · 2

54. Simplify

$\dfrac{3 + \frac{x}{2-x}}{\frac{1}{x} - 4}$

$\dfrac{\frac{3(2-x) + x}{2-x}}{\frac{1}{x} - \frac{4x}{x}} = \frac{6 - 3x + x}{3(2-x) + x} \cdot \frac{x}{2-x} \cdot \frac{x}{1-4x} = \boxed{\frac{(6-2x)x}{(2-x)(1-4x)} = \frac{6x - 2x^2}{2 - 9x + 4x^2}}$

55. Factor the following polynomial: $125x^3 - 8y^6$

$(5x - 2y^2)(25x^2 + 10xy^2 + 4y^4)$

56. Expand the binomial: $(5y - x^3)^5$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

$(1)(5y)^5 - (5)(5y)^4(x^3) + (10)(5y)^3(x^3)^2$

$- (10)(5y)^2(x^3)^3 + (5)(5y)(x^3)^4 - (1)(x^3)^5$

$\boxed{3125y^5 - 3125y^4x^3 + 1250y^3x^6 - 250y^2x^9 + 25yx^{12} - x^{15}}$

57. Divide using long division or unboxing method:

$\frac{2x^3 - 4x + 5 12x^3 - 11x^2 + 22x - 15}{x^2 - 4x + 5}$

$\boxed{514x + 2045 + \frac{5628x - 10240}{x^2 - 4x + 5}}$

$x^2 - 4x + 5 \overline{)\, 514x^3 - 11x^2 + 18x - 15}$

$514x + 2045$

$-(514x^3 - 2056x^2 + 2570x)$

$2045x^2 - 2552x - 15$

$-(2045x^2 - 8180x + 10225)$

$5628x - 10240$