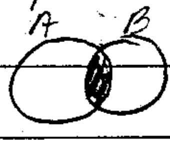
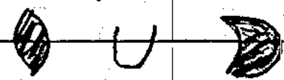
PreCalculus Solutions.

c 1  $(A\cap B)\cup(A'\cap B)$



c 2 $(6+9i+8i^2)(7-3i^5+9i^{11})$

$(6+9i+8(-1))\ (7-3i-9i)$

$(-2+9i)(7-12i) \longrightarrow -14+63i+24i-108i^2$

$-14 \quad +108$

$94+87i \qquad \frac{94+87}{181}$

b 3 $g(2)=\frac{4+5}{3}=3$

$\log_2\left(\frac{27+9+3+25}{2}\right)=\log_2\left(\frac{64}{2}\right)=\log_2(32)=5$

d 4 $\cos(r_1+r_2)=\cos r_1\cos r_2 - \sin r_1 \sin r_2$

$\frac{4}{5}\left(\frac{12}{13}\right)-\left(\frac{-3}{5}\right)\left(\frac{5}{13}\right) = \frac{48}{65}+\frac{15}{65}=\frac{63}{65}$

b 5 Center of circle 1 $(x^2-4x+4)+(y^2+2y+1)=9$ $\qquad x^2+y^2-6y+9=9$

$(x-2)^2+(y+1)^2=9 \qquad x^2+(y-3)^2$

Center $(2,-1)$ $\qquad$ Center $(0,3)$

distance $(2,-1)$ and $(0,3)$ $=\sqrt{4+16}=\sqrt{20}=2\sqrt{5}$

c 6 $\frac{52!}{50!\,2!}=\frac{52\cdot 51}{2}=\frac{2652}{2}=1326$

d 7

3 is not

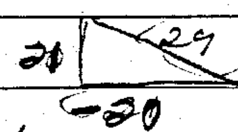
3	1	-12	70	-230	429	-338
		3	-27	86	-288	282
	1	-9	43	-144	141	

Using synthetic division

2 is

2	1	-12	70	-230	429	-338
		2	-20	100	-260	338
	1	-10	50	-130	169	

e 8 $\sin(x+45^\circ)=$ $\quad$ x is in quad II $\quad \tan x=\frac{21}{-20}$



$\sin(r_1+r_2)=\sin r_1\cos r_2+\cos r_1\sin r_2$

$\frac{21}{29}\left(\frac{+\sqrt{2}}{2}\right)+\left(\frac{-20}{29}\right)\left(\frac{\sqrt{2}}{2}\right)$

$\frac{+21\sqrt{2}}{58}+\frac{-20\sqrt{2}}{58}=\frac{+\sqrt{2}}{58}$

$\frac{\sqrt{2}}{58}$

Pre Calculus Indiv Solutions

b 9 This equals $(2x^2+y^3)^7$ $\quad {}_7C_5 = \frac{7\cdot6\cdot5\cdot4\cdot3}{5\cdot4\cdot3\cdot2} = 21$

$21(2x^2)^2(y^3)^5 = 21(4x^4)(y^{15}) = 84x^4y^{15}$

d 10 $\lim_{x\to1}\left(\frac{x^2(2x+3)-1(2x+3)}{x^2-1}\right) = \lim_{x\to1}\left(\frac{(x^2-1)(2x+3)}{x^2-1}\right)$

$\lim_{x\to1}(2x+3) = 5$

b 11 Vectors are perpendicular if dot products are 0.

$(-2\ 3\ 1)\cdot(5\ 1\ 7) = -10+3+7=0$

$(4,1,-3)\cdot(5\ 1\ 7 = 20+1-21=0$

d 12 $b = ma+k$ $\quad (a, ma+k)\ (c, mc+k)$ are points on the line

$d = mc+k$ $\quad \sqrt{(a-c)^2+(ma+k-mc-k)^2}$

$\sqrt{(a-c)^2+(ma-mc)^2}$

$\sqrt{a^2-2ac+c^2+m^2a^2-2m^2ac+m^2c^2}$

$\sqrt{(a^2-2ac+c^2)+m^2(a^2-2ac+c^2)}$

$\sqrt{(a-c)^2(1+m^2)}$

$|a-c|\sqrt{1+m^2}$

b 13 Since $y^2=16-x^2$ and $y^2+x^2=16$

This curve is a semicircle of radius 4 $\frac{1}{2}(\pi r^2) = 8\pi$

d 14 $f'(x) = 2x$ at $1 = 2(1) = 2$

b 15 $\cos\frac{3\pi}{2} = 0$ so the sum of the terms is 0

a 16 $9-x^2\geq0 \quad 9\geq x^2 \quad |x|\leq3$

a 17 The only 5 digit numbers with a sum of the digits being 43 consist of four 9's and a 7. Only one of them is divisible by 11. There are 5 possible positions for the 7. prob = 1/5 (The second

79999, 97999, 99,799, 99979 and 99997

PreCalculus individual solutions

b 18 The first derivative is $-\sin x$; the second is $-\cos x$ the third is $\sin x$ the fourth is $\cos x$ Thus the repetition $66 \div 4 = 16 \ R\, 2$ so $(-\cos x)$ is

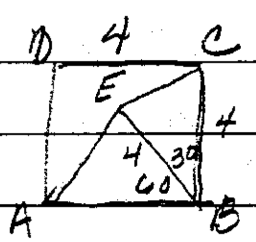
c 19 The distance from the center to the line is $6x + 8y = 14$

$$\frac{|6(-1)+8(5)-14|}{\sqrt{36+64}} = \frac{|20|}{10} = 2 \quad \text{radius is } 2$$

a 20
$$(e^{\ln(x-1)})(\ln e^{(x+5)}) = 3\ln e + e^{2\ln 2}$$
[illegible]
$$(x-1)(x+5) = 3 + 4$$
$$x^2+4x-5=7 \rightarrow x^2+4x-12=0$$
$$(x+6)(x-2)=0$$
so $x=2$

a 21 since $(2,5)$ is a point on $y=2x+1$
The distance between $(2,5)$ and $y=2x+5$

$$\frac{|2(2)-5+5|}{\sqrt{4+1}} = \frac{4}{\sqrt5} = \frac{4\sqrt5}{5}$$

a 23


$$x^2 = 4^2+4^2-2(4)(4)\cos 30$$
$$x^2 = 32 - 32\left(\frac{\sqrt3}{2}\right)$$
$$x^2 = 32 - 16\sqrt3$$
$$x = \sqrt{16(2-\sqrt3)}$$
$$x = 4\sqrt{2-\sqrt3}$$

e 22 none of these, the locus of points equidistant from 2 points is a plane

b 24
$$\sqrt{54x^5} + \sqrt[4]{36x^6}$$
$$\sqrt{9\cdot 6x^4x} + \sqrt{6x^3}$$
$$3x^2\sqrt{6x} + x\sqrt{6x} = (3x^2+x)\sqrt{6x}$$

PreCalculus individual solution

C 25 $y = \frac{1}{6}x^2$ is a parabola with vertex at (0,0)
$6y = x^2$ distance between the vertex and focus is $\frac{3}{2}$ Since axis is ∥ to y axis Focus is $(0, \frac{3}{2})$

C 26 $\frac{3}{4}\pi$ by def of an inverse function

d 27 $\frac{\tan^3 x \cos x}{\sec^2 x} + \frac{1+\cot^2 x}{\sec^2 x} + \frac{2+\tan^2 x}{1-\sec^4 x}$

$\frac{\tan^2 x \cos^3 x}{\sin^3 x} + \frac{\csc^2 x}{\sec^2 x} + \frac{1+\sec^2 x}{1-\sec^2 x}$

$\cot^2 x \quad \frac{1}{\sec^2 x - 1}$

$\cot^2 x - \cot^2 x = 0$

$\sin^3 x + 0 = \sin^3 x$

C 28 $\frac{119}{3}$ First of all the value of the expression would have a value of one if the exponent = 0

$3x^2 - 13x - 10 = 0$

$(3x+2)(x-5) = 0 \quad x = 5$ or $x = -\frac{2}{3}$ $\quad 125 + \frac{4}{9}$

The expression will also have a value of one if the base equals one

$6x^2 + 2x - 21 = 1$

$39\frac{2}{3} = \frac{119}{3}$ $\quad$ 117

$6x^2 + 2x - 22 = 0 \quad x = \frac{-1 \pm \sqrt{1-4(3)(-11)}}{6}$

$3x^2 + x - 11 = 0$

$\frac{-1 \pm \sqrt{133}}{6}$

squaring each you get

$\frac{134 - 2\sqrt{133}}{6}$ and $\frac{134 + 2\sqrt{133}}{6}$

The sum of these is $+\frac{67}{9}$

The value will also raise one when the base = −1 $+\frac{25}{9}$
and the exponent is even ↓ both yield even exp $+4$

$6x^2 + 2x - 21 = -1$

$3x^2 + x - 10 = 0 \quad x = -2$ or $x = \frac{5}{3}$ $\quad 29 + \frac{96}{9}$ $\quad \frac{32}{3}$

$(3x-5)(x+2)$ $\quad 29 + 10\frac{2}{3}$

a 29 $\cos 2\theta = \frac{A-C}{B} = \frac{2-1}{13} = \frac{\sqrt{3}}{3}$

$2\theta = \cot^{-1}\frac{\sqrt{3}}{3} = 60$

$\theta = 30$

b 30 $(x+1)\ln 2 = (x+2)\ln 7$

$x(\ln 2 - \ln 7) = 2\ln 7 - \ln 2$

$x = \frac{2\ln 7 - \ln 2}{\ln 2 - \ln 7}$

$\frac{\ln \frac{49}{2}}{\ln 2/7}$