Name:

Precalculus (Math 1045)
Practice Test for Exam II

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The examination contains ten problems which are worth 10 points each, and an additional to extra credit problems worth 10 points each.

Additional study suggestions:

(a) repeat assigned homework and similar homework

(b) read all the notes on the web site

(c) complete practice worksheet 4

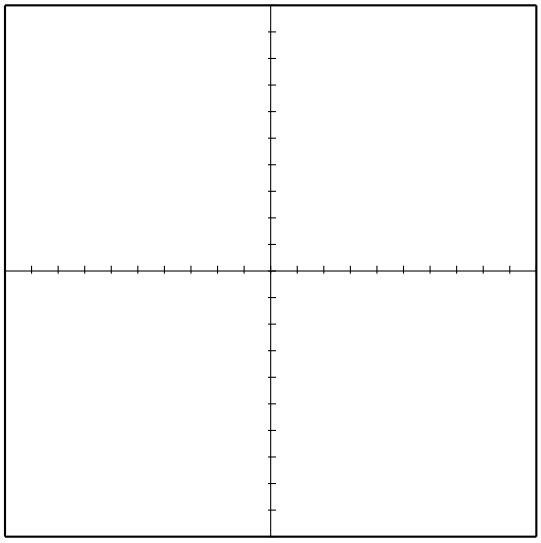
(d) invent problems similar to those on this practice test, and solve them

P 1	P 2	P 3	P 4	P 5	P 6	P 7	P 8	P 9	P 10	P 11	P 12	Total

Problem 1. Analyze the rational function

$$f(x) = \frac{x^2 - 3x + 10}{x - 2}$$

by filling in the table below, and using this information to sketch the graph.



Equation: $y = \dfrac{x^2 - 3x + 10}{x - 2}$

Degree:

Zeros:

Poles:

y-intercept:

x-intercepts:

Vertical Asymptotes:

Polynomial Asymptote:

Problem 2. A triangle has angle α, β, and γ, with opposites sides of length a, b, and c. Let $b = 5$, $\beta = 75^\circ$ and $\gamma = 90^\circ$. Find b, c, and α.

Problem 3. A triangle has angle α, β, and γ, with opposites sides of length a, b, and c. Let $a = 10$, $b = 7$, and $\gamma = 75^\circ$. Find c, α, and β.

Problem 4. Find all solutions in the interval $[0, 2\pi)$ to the equation $\sin 5x = 1$.

Problem 5. Find all solutions in the interval $[0, 2\pi)$ to the equation $\cos 2x = 2\cos x$.

Problem 6. Compute precisely $\cos 66^\circ$.

Problem 7. Find the exact value of $\tan(\arcsin(1/2) + \arccos(\sqrt{3}/2))$.

Problem 8. Find an algebraic expression of the function $f(x) = \cos(\arctan(x^2))$.

Problem 9. Let $\vec{v} = \langle 2, 5\rangle$. Find a vector $\vec{w}$ such that $|\vec{w}| = |\vec{v}|$ and $\angle(\vec{v}, \vec{w}) = 60^\circ$.

Problem 10. Find all complex solutions to the equation $z^3 = i$.

Problem 11. (Extra Credit)
Find the *exact* angle between the hands of a clock at 1:20 pm (hint: it isn't 90°)

Problem 12. (Extra Credit)
Consider an isosceles triangle with one angle of 108° and an area of 1. Compute the other two angles and the lengths of the sides.

$\deg(\theta)$	$\mathrm{rad}(\theta)$	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$	$\cot(\theta)$	$\sec(\theta)$	$\csc(\theta)$
0°	0	0	1	0	∞	1	∞
15°	$\frac{\pi}{12}$	$\frac{\sqrt{6}-\sqrt{2}}{4}$	$\frac{\sqrt{6}+\sqrt{2}}{4}$	$\frac{2-\sqrt{3}}{2}$	$\frac{2+\sqrt{3}}{2}$	$\sqrt{6}-\sqrt{2}$	$\sqrt{6}+\sqrt{2}$
18°	$\frac{\pi}{10}$	$\frac{\sqrt{5}-1}{4}$	$\frac{\sqrt{10+2\sqrt{5}}}{4}$	$\frac{5-2\sqrt{5}}{2}$	$\sqrt{5+2\sqrt{5}}$	$\sqrt{2\sqrt{5}-5}$	$\sqrt{5}+1$
	$\frac{\pi}{8}$	$\frac{\sqrt{2-\sqrt{2}}}{2}$	$\frac{\sqrt{2+\sqrt{2}}}{2}$	$\sqrt{3-2\sqrt{2}}$	$\sqrt{3+2\sqrt{2}}$	$\sqrt{4-2\sqrt{2}}$	$\sqrt{4+2\sqrt{2}}$
30°	$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$	$\frac{2\sqrt{3}}{3}$	2
36°	$\frac{\pi}{5}$	$\frac{\sqrt{10-2\sqrt{5}}}{4}$	$\frac{1+\sqrt{5}}{4}$	$\sqrt{5-2\sqrt{5}}$	$\frac{\sqrt{25+10\sqrt{5}}}{5}$	$\sqrt{5}-1$	$\frac{10+2\sqrt{5}}{5}$
45°	$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	1	$\sqrt{2}$	$\sqrt{2}$
54°	$\frac{3\pi}{10}$	$\frac{1+\sqrt{5}}{4}$	$\frac{\sqrt{10-2\sqrt{5}}}{4}$	$\frac{\sqrt{25+10\sqrt{5}}}{5}$	$\sqrt{5-2\sqrt{5}}$	$\frac{10+2\sqrt{5}}{5}$	$\sqrt{5}-1$
60°	$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2\sqrt{3}}{3}$
	$\frac{3\pi}{8}$	$\frac{\sqrt{2+\sqrt{2}}}{2}$	$\frac{\sqrt{2-\sqrt{2}}}{2}$	$\sqrt{3+2\sqrt{2}}$	$\sqrt{3-2\sqrt{2}}$	$\sqrt{4+2\sqrt{2}}$	$\sqrt{4-2\sqrt{2}}$
72°	$\frac{2\pi}{5}$	$\frac{\sqrt{10+2\sqrt{5}}}{4}$	$\frac{\sqrt{5}-1}{4}$	$\sqrt{5+2\sqrt{5}}$	$\frac{5-2\sqrt{5}}{2}$	$\sqrt{5}+1$	$\sqrt{2\sqrt{5}-5}$
75°	$\frac{5\pi}{12}$	$\frac{\sqrt{6}+\sqrt{2}}{4}$	$\frac{\sqrt{6}-\sqrt{2}}{4}$	$\frac{2+\sqrt{3}}{2}$	$\frac{2-\sqrt{3}}{2}$	$\sqrt{6}+\sqrt{2}$	$\sqrt{6}-\sqrt{2}$
90°	$\frac{\pi}{2}$	1	0	∞	0	∞	1