# BRONX COMMUNITY COLLEGE <br> of the City University of New York 

## DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

MATH 06
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Exam 2
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Name: $\qquad$

Directions: Write your answers in the provided space. To get full credit you must show all your work. Simplify your answers whenever possible. Be certain to indicate your final answer clearly. Each problem is worth 5 points

1. In a triangle $A B C$ we have $B=90^{\circ}, a=\sqrt{7}$, and $b=\sqrt{13}$. Find $c$.
2. The sum of the lengths of the legs of a right triangle is 6 cm . The hypotenuse is $4 \sqrt{2}$ cm long. Find the lengths of the two legs.
3. Simplify: $5 \sqrt{44}+2 \sqrt{99}-15 \sqrt{11}$
4. Simplify: $(\sqrt{15}-3)(\sqrt{3}+\sqrt{5})$
5. Simplify: $(5-\sqrt{5})^{2}-30+10 \sqrt{5}$
6. Simplify, assuming all variables represent positive numbers: $\sqrt{\frac{49 a^{5} b^{4}}{18 c^{6}}}$
7. Simplify assuming all variables represent positive numbers. The answer should contain only positive integers as exponents.

$$
\left(\frac{x^{10} y^{-5}}{z^{\frac{20}{3}}}\right)^{\frac{3}{5}}
$$

8. Solve: $x-\sqrt{x-4}=10$
9. Solve: $\sqrt{x+5}-\sqrt{x}=1$
10. Multiply. Express your answer in the form $a+b i$ where $a$ and $b$ are real numbers.

$$
(2+5 i)(-2+3 i)
$$

11. Divide. Express your answer in the form $a+b i$ where $a$ and $b$ are real numbers.

$$
\frac{2-4 i}{1-i}
$$

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12. Evaluate $\frac{z^{2}+1+2 i}{z}$ when $z=2-i$. Express your answer in the form $a+b i$ where $a$ and $b$ are real numbers.
13. Simplify: $\frac{x^{2}+2 x-15}{x^{2}-10 x+21}$
14. Divide : $\frac{x^{2}-3 x+2}{x+3} \div \frac{x^{2}-2 x+1}{x^{2}+5 x+6}$. Simplify the result as much as possible.
15. Find the area of the following triangle. Give an exact answer.


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16. The angle of depression of a ship observed from the window of a lighthouse 200 ft above the sea level is $5^{\circ}$. How far is the ship?
17. Find the sine, cosine, tangent, and cotangent of $990^{\circ}$. Give exact answers.
18. For an angle $\theta$ in the third quadrant we have $\tan \theta=\frac{3}{4}$. Find $\sin \theta$.
19. A point $P$ is at distance 4 from the origin $(0,0)$ and has angle of reference $143.1301^{\circ}$. Find the coordinates of $P$.
20. Find the angle $\theta$.


Table of trigonometric values

$$
\begin{array}{ccccc}
\theta & \sin \theta & \cos \theta & \tan \theta & \cot \theta \\
\hline 0^{\circ} & 0 & 1 & 0 & \text { und } \\
30^{\circ} & \frac{1}{2} & \frac{\sqrt{3}}{2} & \frac{\sqrt{3}}{3} & \sqrt{3} \\
45^{\circ} & \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} & 1 & 1 \\
60^{\circ} & \frac{\sqrt{3}}{2} & \frac{1}{2} & \sqrt{3} & \frac{\sqrt{3}}{3} \\
90^{\circ} & 1 & 0 & \text { und } & 0
\end{array}
$$

