Gateway Test 1A **Name** _____ **Date** _____

Algebra **Class** _____ **Section** _____

1. Factor and simplify. Express the answer as a fraction without negative exponents.

$$x(x-1)^{-1/2} + 2(x-1)^{1/2}$$

2. Express as a simple fraction.

$$\frac{\frac{1}{y-k} - \frac{1}{y}}{k}$$

3. Multiply.

$$\left(x^{3/2} + \frac{2}{\sqrt{3}}\right)^2$$

4. Solve for x.

$$x^2 - x = 5$$

5. Find the smallest value of x that satisfies the equation.

$$|x + 5| = 3$$

6. Write the general form of the equation of the line passing through the point $(3, -1)$ with slope $\frac{5}{2}$.

7. Solve for y'.

$$xy' + y = 1 + y'$$

8. Write the equation of the circle in standard form and give the center and radius.

$$2x^2 + 2y^2 + 4x - 12y + 11 = 0$$

9. Solve for x.

$$2(x-5)^{-1} + \frac{1}{x} = 0$$

10. Find the domain of f.

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

Gateway Test 2A
The Exponential and Logarithmic Functions

Name _____ **Date** _____

Class _____ **Section** _____

1. Solve for x.

$$\ln(e^{7x}) = 15$$

2. Solve for x.

$$\frac{e^{x+5}}{e^5} = 3$$

3. Solve for x.

$$(e^3)^{2x} = e^3e^{2x}$$

4. Solve for x.

$$e^{[2\ln x - \ln(x^2+x-3)]} = 1$$

5. Solve for x.

$$3^{2x} - 2 \cdot 3^{(x+5)} + 3^{10} = 0$$

6. Sketch the graph of the function.

$$f(x) = e^x$$

7. Find the x-intercept for the graph of the function.

$$f(x) = \ln x + 2$$

8. Use the properties of logarithms to expand the expression.

$$\ln\frac{(4x^5 - x - 1)\sqrt{x - 7}}{(x^2 + 1)^3}$$

9. Solve for x.

$$\ln x - \ln(x + 1) = 1$$

10. Find the domain of the function.

$$f(x) = \ln(3x + 2)$$

Gateway Test 3A **Name** _____ **Date** _____

Trigonometry **Class** _____ **Section** _____

1. If $\csc \theta = \frac{13}{5}$ and θ is in the second quadrant, find $\sec \theta$.

2. Find all θ in the interval $[0, 2\pi)$ that satisfy the equation.

   $\sin 2\theta = 0$

3. Write the expression $\sqrt{x^2 + 4}$ in terms of θ when $x = 2 \tan \theta$.

4. Simplify $\dfrac{\cot \theta}{\csc \theta}$.

5. Find $\sin 2A$ if $\sin A = \dfrac{1}{4}$ and $0 \leq A \leq \dfrac{\pi}{2}$.

6. Find all θ in the interval $[0, 2\pi)$ that satisfy the equation.

   $2 \cos \theta \tan \theta + \tan \theta = 0$

7. If $\cos 2\theta = \frac{1}{3}$ and $0 \leq 2\theta \leq \pi$, find $\cos \theta$.

8. Rewrite the given equation using the substitutions $x = r \cos \theta$ and $y = r \sin \theta$. Simplify your answer.

   $x^2 + y^2 + 3x = 0$

9. Write the given expression in algebraic form.

   $\tan\left(\arccos \dfrac{x}{3}\right)$

10. Compute $\arcsin\left(-\frac{1}{2}\right)$.