Mathematics 101 Test #2A **Name:** _____

Instructor: George Ballinger **Section:** _____
Term: Winter, 2016

The Sharp EL-531 calculator may be used on this test.
Show all of your work in the space provided.
The number of marks for each question is indicated in brackets.
Give exact answers (no decimals) unless told otherwise.

Mark: $\frac{\quad}{25}$

1. Integrate $\int \frac{1+\sin\theta}{\cos^2\theta}\,d\theta$.

[3]

2. Find $\int \sqrt{e^{2x}-1}\,dx$ by using the integration formula $\int \frac{\sqrt{u^2-a^2}}{u}\,du = \sqrt{u^2-a^2} - \text{arcsec}\frac{|u|}{a} + C$ for $a>0$.

[3]

3. Use partial fractions to integrate $\int \frac{3x+1}{(x-1)(x^2+1)}\,dx$.

[5]

4. Use a trigonometric substitution to integrate $\int \frac{\sqrt{x^2-16}}{x}\,dx$.

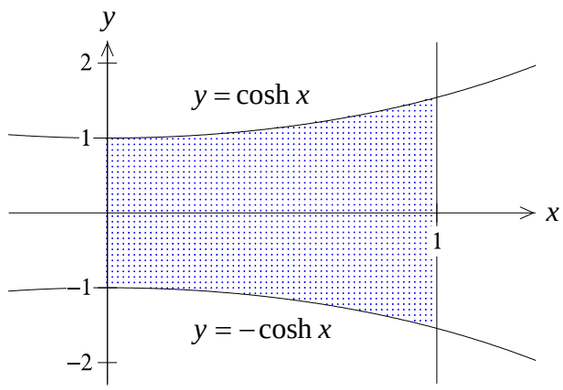
[5]

5. Evaluate the **improper** integral, or if it diverges, then determine whether it diverges to infinity, to negative infinity, or neither. Be sure to convert the integral to limits.

$$\int_{-1}^{1} \frac{1}{x^2}\,dx$$

[4]

6. Find the centroid of the region bounded by the curves $y = \cosh x$, $y = -\cosh x$, $x = 0$ and $x = 1$. Round your answer to four decimal places.



[5]