Calculus ABC Test II—Version 3806 Name: Key

Lecture section: _____ **Student Number:** _____

PUT ANSWERS IN BOXES. NO BOOKS/NOTES/CALCULATORS. DO YOUR OWN WORK.
Simplify answers where possible. Include units where needed. All angles are in radians. $\log = \log_{10}$.

1. Find the equation of the line between the points $(1, 1)$ and $(2, 4)$ in *slope-intercept* form.

$y = 3x - 2$

2. Find the value of:

$$\arcsin\left(-\frac{\sqrt{3}}{2}\right)$$

arcsin range $[-\pi/2, \pi/2]$
arctan $r: (-\pi/2, \pi/2)$
arccos $r: [0, \pi]$
arccot $(0, \pi)$

$-\frac{\pi}{3}$ or ~~$\frac{4\pi}{3}$~~ or ~~$\frac{5\pi}{3}$~~

3. Solve for r:

$$\sqrt{r+3} - 8 = 0$$

$r = 61$

4. Rewrite by completing the square: $x^2 + 6x + 4$

$(x+3)^2 - 5$

5. Find the value of:

$$\arctan(-1)$$

$-\frac{\pi}{4}$ or ~~$\frac{3\pi}{4}$~~ or ~~$\frac{7\pi}{4}$~~

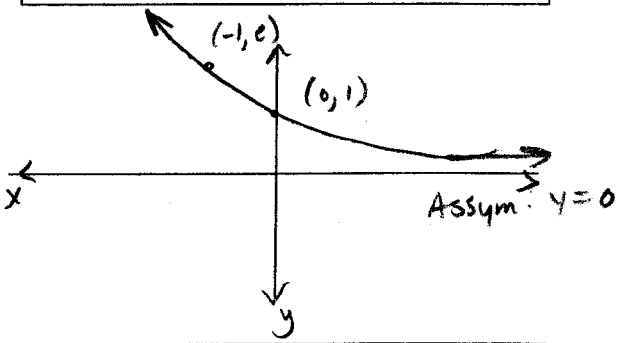
6. Solve for x:

$$2\ln(2x) - \ln(4x) = \ln(3)$$

$\ln(2x)^2 - \ln(4x) = \ln 3$
$\ln \frac{4x^2}{4x} = \ln 3$ $\ln x = \ln 3$
$x = 3$

$x = ~~6~~$ $x = 3$

7. Graph the function $y = e^{-x}$.
Label with the following values (if applicable): each intercept, location of each asymptote, and (x, y) coordinates of each min and max. Also include the coordinates of one other point.



8. Solve for x (write answer as a rational number):

$$16^x = \frac{1}{8}$$

$x = -\frac{3}{4}$ or ~~$x = \log_{16} \frac{1}{8}$~~

9. If $f(s) = 3s^4 - 5s^2 - 3s + 7$, find $f'(s)$.

$12s^3 - 10s - 3$

10. If $g(\theta) = \tan(\theta)$, find $g'(\theta)$.

$\sec^2\theta$

11. If $f(t) = \ln(3t^2)$, find $f'(t)$.

$\frac{1}{3t^2} \cdot 6t = \frac{6t}{3t^2} = \frac{6}{3t} = \frac{2}{t}$

12. If $g(\theta) = \cos(\theta^2 + \theta)$, find $g'(\theta)$.

$-\sin(\theta^2+\theta)(2\theta+1)$

13. Find the derivative of

$$F(x) = x^5 \ln(x)$$

$x^4 + 5x^4 \ln x$

14. Find the derivative of

$$g(x) = \frac{x^3 + 2}{\tan(x)}$$

$\frac{\tan(x)(3x^2) - (x^3+2)\sec^2(x)}{\tan^2(x)}$

15. Find the derivative of

$$h(x) = \frac{\cos(x)}{1 - x}$$

$\frac{(1-x)(-\sin(x)) + \cos(x)}{(1-x)^2}$

16. Find a function $f(t)$ whose derivative is:

$$f'(t) = 5t + e^t$$

$\frac{5}{2}t^2 + e^t + C$ — optional

17. Evaluate the indefinite integral:

$$\int \sin(3\theta + 2)\, d\theta$$

$-\frac{1}{3}\cos(3\theta+2) + C$

18. Evaluate the indefinite integral:

$$\int 2\theta \cos(\theta^2 + 5)\, d\theta$$

$\sin(\theta^2+5) + C$

19. Evaluate the definite integral:

$$\int_{-1}^{2} (3x - x^2)\, dx$$

$\frac{3}{2}$

20. Evaluate the definite integral:

$$\int_1^2 e^{-x}\, dx$$

$-e^{-2} + e^{-1} = -\frac{1}{e^2} + \frac{1}{e}$