Calculus ABC Test II—Version 3241 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:

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

$\frac{5\pi}{6}$

3. Solve for x:

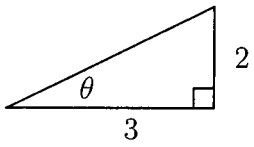
$$\frac{1}{x-1} + \frac{1}{x+2} = \frac{5}{4}$$

$x = -\frac{7}{5}, \; x = 2$

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

$(x+3)^2 - 5$

5. Find the value of $\csc(\theta)$:



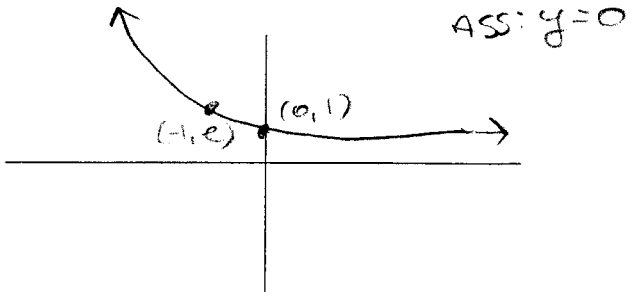
$\frac{\sqrt{13}}{2}$ or $\frac{13}{2\sqrt{13}}$

6. Solve for x:

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

$\frac{4}{3}$

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 y:

$$2^{4y-3} = 12$$

$\frac{\ln 12}{\ln 2} + 3$ or $\frac{\log_2 12 + 3}{4}$

9. If $f(x) = 2x^5 + 7x^3 - 8x + 17$, find $f'(x)$.

$10x^4 + 21x^2 - 8$

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

$\sec^2\theta$

11. If $h(x) = 5\sin(x^3)$, find $h'(x)$.

$15\cos(x^3)\cdot x^2$

12. If $f(x) = 3\cos(2x)$, find $f'(x)$.

$-6\sin(2x)$

13. Find the derivative of

$$f(y) = y^4 \ln(y)$$

$y^4 \cdot \frac{1}{y} + 4\ln y \cdot y^3$

14. Find the derivative of

$$f(x) = \frac{1+x}{\sqrt{x}}$$

$-\frac{1}{2}x^{-3/2} + \frac{1}{2}x^{-1/2}$

$\sqrt{x}\cdot 1 - \frac{1}{2}(1+x)x^{-1/2}$

x

15. Find the derivative of

$$f(t) = \frac{\cos(t)}{t}$$

$-\cos(t)\cdot t^{-2} + t^{-1}\sin(t)$

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

$$f'(t) = 3e^t + \sin(t)$$

$3e^t - \cos(t)$

17. Evaluate the indefinite integral:

$$\int \frac{2}{2r+1}\,dr$$

$\ln|2r+1| + C$

18. Evaluate the indefinite integral:

$$\int 2x\sqrt{x^2+5}\,dx$$

$\frac{2}{3}(x^2+5)^{3/2} + C$

19. Evaluate the definite integral:

$$\int_0^2 (2t^2+1)\,dt$$

$\frac{22}{3}$

20. Evaluate the definite integral:

$$\int_0^4 \sqrt{x}\,dx$$

$\frac{16}{3}$