Calculus ABC Test II—Version 7774 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 through the point (-2,4) with slope -2 in *slope-intercept* form.

$y - 4 = -2(x+2)$
$y = -2x - 4 + 4 = -2x$

$y = -2x$ ✓

2. Find the value of:

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

$\frac{3}{4}\pi$ ✓

3. Solve for t:

$$2t^2 = 5t$$

$t = 0, \ t = \frac{5}{2}$ ✓

4. Rewrite by completing the square: $t^2 - 6t + 3$

$(t-3)^2 = t^2 - 6t + 9$
$(t-3)^2 - 6 = t^2 - 6t + 9 - 6 = t^2 - 6t + 3$

$(t-3)^2 - 6$ ✓

5. Find the value of:

$$\cos\left(\frac{4\pi}{3}\right)$$

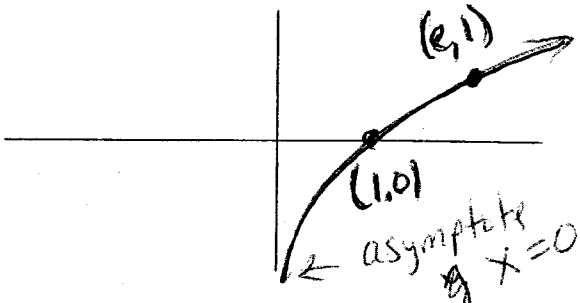
$-\frac{1}{2}$ ✓

6. Solve for t:

$$2e^{4t} = 3$$

$\frac{\ln \frac{3}{2}}{4}$ ✓

7. Graph the function $y = \ln(x)$.
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 z:

$$7^{z+2} = 3$$

$\log_7 3 - 2$ ✓

9. If $f(t) = 6t^5 - 2t^4 + 8t^3 + 9$, find $f'(t)$.

$30t^4 - 8t^3 + 24t^2$

10. If $g(t) = \frac{1}{t}$, find $g'(t)$.

t^{-1}

$-t^{-2}$ ✓

11. If $g(\theta) = 5\cos(\theta^2 + 1)$, find $g'(\theta)$.

$-5\sin(\theta^2+1)\cdot 2\theta$ ✓

12. If $w = \sqrt{t^2+4}$, find dw/dt.

$\sqrt{t^2+4} = (t^2+4)^{\frac{1}{2}}$

$\frac{1}{2}(t^2+4)^{-\frac{1}{2}} \cdot 2t = \frac{t}{\sqrt{t^2+4}}$ ✓

13. Find the derivative of

$$f(\theta) = (\theta - \pi)\sin(\theta)$$

$(\theta-\pi)\cos(\theta) + (1)\cdot\sin(\theta)$ ✓

14. Find the derivative of

$$g(x) = \frac{e^x - 1}{e^x + 1}$$

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

15. Find the derivative of

$$h(x) = \frac{x^2 - 7x}{x + 4}$$

$\frac{(x+4)(2x-7) - (x^2-7x)(1)}{(x+4)^2}$ ✓

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

$$f'(t) = \cos(t) - \frac{1}{t}$$

$\sin(t) - \ln(t) + C$ ✓

17. Evaluate the indefinite integral:

$\int e^{-t}$

$$\int \frac{1}{e^t}\,dt$$

$-e^{-t} + C$ ✓

18. Evaluate the indefinite integral:

$u = x^3$ $du = 3x^2dx$ $\frac{du}{3} = x^2dx$

$$\int x^2 e^{-x^3}\,dx$$

$= \frac{1}{3}\int e^{-u}\,du = -\frac{1}{3}e^{-u}$

$-\frac{1}{3}e^{-x^3} + C$ ✓

19. Evaluate the definite integral:

$\frac{3}{2}t^2 - 4t\Big]_{-1}^{2}$

$$\int_{-1}^{2} (3t - 4)\,dt$$

$-\frac{15}{2}$ ✓

20. Evaluate the definite integral:

$$\int_0^{\pi/2} \sin(2x)\,dx$$

1 ✓