Calculus ABC Test II—Version 220 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 -1 in *slope-intercept* form.

$y = -x + 2$

2. Find the value of:

$$\arctan(0)$$

0

3. Solve for x:

$$\sqrt{2x+2} - 6 = 0$$

$x = 17$

4. Rewrite by completing the square: $z^2 + 22z + 21$

$(z+11)^2 - 100$

5. Find the value of:

$$\tan\left(\frac{7\pi}{4}\right)$$

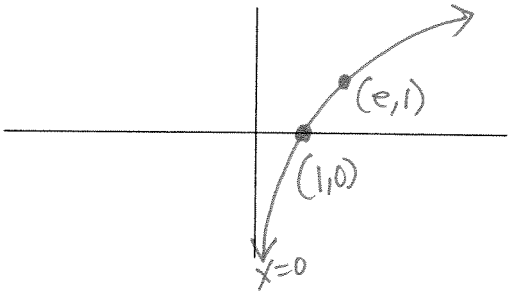
-1

6. Simplify as far as you can:

$$e^{2\ln(3)}$$

9

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 x:

$$\left(\frac{1}{4}\right)^x = 75$$

$x = \frac{\ln 75}{\ln(\frac{1}{4})} = \frac{-\ln 75}{\ln 4} = \log_{(\frac{1}{4})}(75)$

9. If $f(x) = 5x^4 + 3x^3 - 7x + 8$, find $f'(x)$.

$20x^3 + 9x^2 - 7$

10. If $y = \sqrt{x}$, find dy/dx.

$\frac{1}{2}x^{-1/2} = \frac{1}{2\sqrt{x}}$

11. If $f(r) = \sin(\sqrt{x})$, find $f'(r)$.

$\cos(\sqrt{x}) \cdot \frac{1}{2\sqrt{x}}$

12. If $y = \sqrt{x^2+1}$, find dy/dx.

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

13. Find the derivative of

$$g(\theta) = \theta^2 \tan(\theta)$$

$2\theta\tan\theta + \theta^2\sec^2\theta$

14. Find the derivative of

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

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

15. Find the derivative of

$$h(t) = \frac{\sqrt{t}}{t+1}$$

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

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

$$f'(x) = 3e^x + 2$$

$3e^x + 2x + C$

17. Evaluate the indefinite integral:

$$\int e^{3r}\, dr$$

$\frac{1}{3}e^{3r} + C$

18. Evaluate the indefinite integral:

$$\int 3t^2 \cos(t^3)\, dt$$

$\sin(t^3) + C$

19. Evaluate the definite integral:

$$\int_{-1}^{2} (3x+4)\, dx$$

$33/2 = 16.5$

$\left[\frac{3x^2}{2} + 4x\right]_{-1}^{2}$

$= \frac{3}{2}(2)^2 + 4(2) - \left(\frac{3}{2} - 4\right)$

$= 6 + 8 - \frac{3}{2} + 4$

$= 18 - \frac{3}{2}$

20. Evaluate the definite integral:

$$\int_0^1 \frac{1}{e^x}\, dx$$

$= \int_0^1 e^{-x}\, dx$

$= -e^{-x}\Big]_0^1 = -e^{-1} + e^0$

$= 1 - \frac{1}{e}$

$1 - \frac{1}{e}$