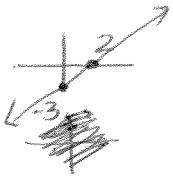
**Calculus ABC Test II—Version 2617** Name: Key

**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 with $x$-intercept 2 and $y$-intercept -3 in *point-slope* form. (0,-3), (2,0)

$m = \frac{-3-0}{0-2} = \frac{-3}{-2} = +\frac{3}{2}$

$y-0=3/2(x-2)$ or $y-(-3)=3/2(x-0)$

**2.** Find the value of:

$$\arcsin(-1)$$

$-\pi/2$

**3.** Solve for $x$:

$$\sqrt{x} - 5 = 7$$

$\sqrt{x}=12$

$x=144$

**4.** Rewrite by completing the square: $x^2 - 8x + 13$

$x^2-8x+16-16+13$

$(x-4)^2-3$

**5.** Find the value of:

$$\cos\left(\frac{\pi}{2}\right)$$

0

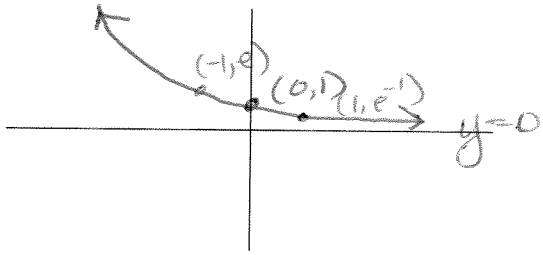
**6.** Solve for $y$:

$$4 + \ln(y) = 18$$

$\ln y = 14$

$y=e^{14}$

**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 $y$ (write answer as a rational number):

$$4^y = 8 \qquad 2^{2y} = 2^3$$

$2y=3$

$y=3/2$

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

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

**10.** If $y = \sin(\theta)$, find $dy/d\theta$.

$\cos(\theta)$

**11.** If $f(x) = 3\tan(2x)$, find $f'(x)$.

$6\sec^2(2x)$

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

$\cos(\theta^2+\theta)(2\theta+1)$

**13.** Find the derivative of

$$g(\theta) = (\theta + \pi)\cos(\theta)$$

$\cos\theta + (\theta+\pi)(-\sin\theta)$

**14.** Find the derivative of

$$f(t) = \frac{t}{e^t}$$

$\frac{e^t - te^t}{(e^t)^2}$

**15.** Find the derivative of

$$f(t) = \frac{t+1}{t^{3/2}}$$

$\frac{t^{3/2} - (t+1)\frac{3}{2}t^{\frac{1}{2}}}{t^3}$

**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:

$$\int (3-x)^5\,dx$$

$-\frac{(3-x)^6}{6} + C$

**18.** Evaluate the indefinite integral:

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

$\sin(t^3) + C$

**19.** Evaluate the definite integral:

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

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

$= \frac{2}{3}(2)^3 - (2) - \left(\frac{2}{3}(-1)^3 - (-1)\right)$

$= \frac{16}{3} - 2 + \frac{2}{3} - 1$

$= \frac{18}{3} - 3 = 6 - 3 = 3$

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**20.** Evaluate the definite integral:

$$\int_4^9 \frac{1}{\sqrt{t}}\,dt$$

$\int_4^9 t^{-1/2}\,dt$

$= 2t^{1/2}\Big]_4^9 = 2\sqrt{9} - 2\sqrt{4}$

$= 6 - 4 = 2$

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