**Calculus ABC Test I—Version 2205** 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.** Simplify by combining using a common denominator:

$$\frac{3y}{y-2} + \frac{(y-6)(y-2)}{3}$$

$\frac{3y + y^2 - 6y - 2y + 12}{3(y-2)} = \frac{y^2 - 5y + 12}{3(y-2)}$

**2.** Simplify by combining using a common denominator:

$$\frac{x}{x-5} + \frac{x-3}{15-3x}$$

~~$\frac{x+6}{3(x-5)}$~~ or ~~$\frac{-x+6}{-3(5-x)}$~~ $\frac{-2x-3}{-3(x-5)}$

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

$$x^2 = 4x$$

$x=0 \quad x=4$

**4.** Solve for $y$:

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

$6-2=4$ ✓

$y = 12$

**5.** Solve for $x$:

$$x^2 < x + 2$$

$(-1,2)$ or $-1 < x < 2$

**6.** Find the equation of the line through the point (2,5) with slope 0 in *slope-intercept* form.

$y = 5$

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**7.** Factor: $2t^2 + 5t - 12$

$2t^2 - 3t + 8t - 12$

$(2t-3)(t+4)$

**8.** Find the value of:

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


$-\frac{\sqrt{2}}{2}$

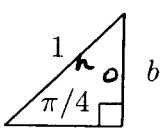
**9.** Find the value of:

$$\tan\left(\frac{\pi}{6}\right)$$

$\frac{1/2}{\sqrt{3}/2} =$

$1/\sqrt{3}$ or $\sqrt{3}/3$

**10.** Find the value of $b$:




$\sin\frac{\pi}{4} = \frac{b}{1}$

$\frac{\sqrt{2}}{2} = \frac{b}{1}$

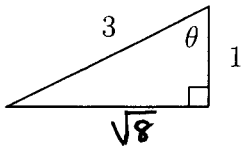
$\sqrt{2}/2$

$1^2+a^2=9$



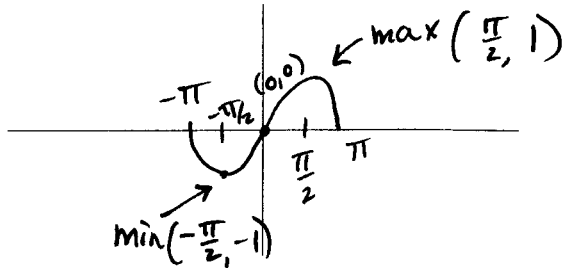
**11.** Find the value of $\sin(\theta)$:

$\sin\theta = \frac{\sqrt{8}}{3}$




$\sqrt{8}/3$

**12.** Graph the function $y = \sin(x)$ for $-\pi \le x \le \pi$.
Label with the following values (if applicable): each intercept, location of each asymptote, and $(x, y)$ coordinates of each min and max.




**13.** Simplify and eliminate any negative exponents:

$$\left(x^2y^3\right)^{-2/3}$$

$\frac{1}{x^{4/3}y^2}$

**14.** Simplify and eliminate any negative exponents:

$$\left(\frac{4}{9}\right)^{-1/2}$$

$\frac{3}{2}$

**15.** Solve for $y$ (write answer as a rational number):

$4y+1=3$
$4y=2$

$$3^{4y+1} = 27 \quad = 3^3$$

$y = 1/2$

**16.** Solve for $t$:

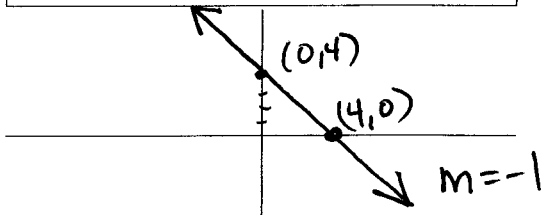
$$5^{-t/1000} = 2$$

$\frac{-t}{1000}\ln 5 = \ln 2$

$t = -\frac{\ln 2}{(\ln 5)} \cdot 1000$

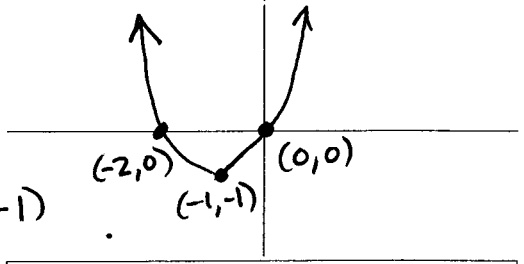
**17.** Graph the equation $x + y = 4$.
Label with the following values (if applicable): each intercept, slope, and $(x, y)$ coordinates of vertex.

$y = -x+4$




**18.** Graph the function $y = x^2 + 2x$.
Label with the following values (if applicable): each intercept, slope, and $(x, y)$ coordinates of vertex.

$\frac{-b}{2a} = \frac{-2}{2} = -1 \quad f(-1) = 1-2 = -1$
vertex $(-1,-1)$




**19.** Find the area of a rectangle which has length 8 meters and width 3 meters.

$24\ m^2$

**20.** Find the volume of a sphere of radius 3 cm.

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi 3^3$

$36\pi\ cm^3$