Calculus ABC Test I—Version 778 **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:

$$\frac{17x}{8} - \frac{7x}{8} \qquad \frac{10x}{8}$$

$\frac{5x}{4}$

2. Simplify as far as you can:

$$\frac{y+1}{y^2+5y+4} \qquad \frac{(y+1)}{(y+4)(y+1)}$$

$\frac{1}{y+4}$

3. Solve for x:

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

$\sqrt{x} = 12 \quad x = 144$

$x = 144$

4. Solve for t:

$$3t\left(3 + \frac{2}{t}\right) = \left(\frac{1}{3}\right)3t \qquad 9t + 6 = t$$
$$8t = -6$$
$$t = -\frac{3}{4}$$

$t = -\frac{3}{4}$

5. Solve for x:

$$\tfrac{1}{2}x - \tfrac{2}{3} > 2$$

$\frac{1}{2}x > \frac{8}{3} \quad x > \frac{16}{3}$

$x > \frac{16}{3}$ or $(\frac{16}{3}, \infty)$

6. Find the equation of the line through the point (1,7) with slope 1 in *slope-intercept* form.

$y - 7 = 1(x-1) \quad y = x + 6$

$y = x + 6$

7. Factor: $2t^2 - t - 1$

$(2t+1)(t-1)$

$(2t+1)(t-1)$

8. Find the value of:

$$\cos\left(\frac{5\pi}{3}\right)$$

$\frac{5\pi}{3} = 300^\circ$ IV, ref 60°

$\frac{1}{2}$

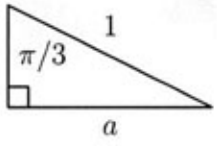
9. Find the value of:

$$\tan\left(\frac{2\pi}{3}\right)$$

$\frac{2\pi}{3} = 120^\circ$ II, ref 60

$-\sqrt{3}$

10. Find the value of a:



$\sin\frac{\pi}{3} = \frac{a}{1}$

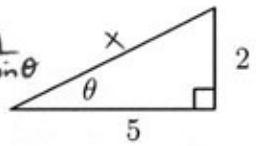
$\frac{\sqrt{3}}{2} = a$

$a = \frac{\sqrt{3}}{2}$

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

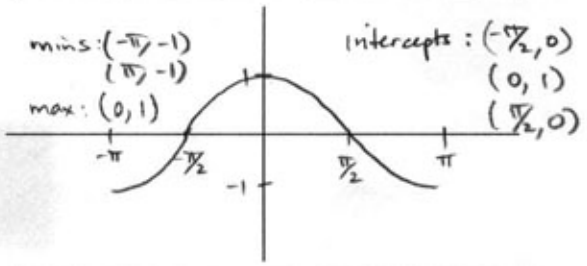
$2^2+5^2=x^2$ $\quad 4+25=x^2$ $\quad 29=x^2$ $\quad x=\sqrt{29}$

$\csc\theta = \frac{1}{\sin\theta}$



$\sqrt{29}/2$

12. Graph the function $y = \cos(x)$ 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:

$\left(\frac{4}{9}\right)^{-1/2}$ $\quad \left(\frac{9}{4}\right)^{1/2} = \sqrt{\frac{9}{4}} = \frac{3}{2}$

$3/2$

14. Simplify and eliminate any negative exponents:

$\left(x^2y^3\right)^{-1/3}$ $\quad x^{-2/3}y^{-1} = \frac{1}{x^{2/3}y}$

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

15. Solve for x (write answer as a rational number):

$8^x = 16$ $\quad (2^3)^x = 2^4$

$3x = 4$ $\quad x = 4/3$

$x = 4/3$

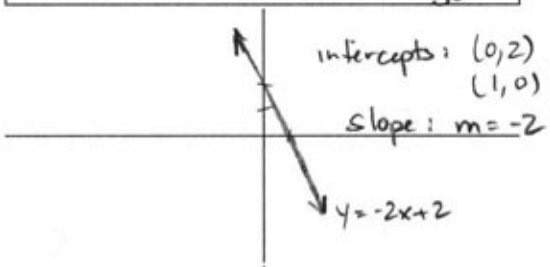
16. Solve for x:

$\log 5^{(3-x)} = \log 4$ $\quad 5^{3-x} = 4$

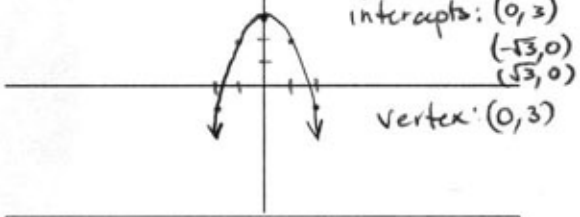
$(3-x)\log 5 = \log 4$ $\quad 3-x = \frac{\log 4}{\log 5}$ $\quad x = 3 - \frac{\log 4}{\log 5}$

$x = 3 - \frac{\log 4}{\log 5}$ or $x = 3 - \log_5 4$

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



18. Graph the function $y = 3 - x^2$.
Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of vertex.



19. Find the area of a triangle which has base 2 mm and height 5 mm.

$A = \frac{1}{2}bh = \frac{1}{2}(2)(5) = 5$

$5\ \text{mm}^2$

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

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(3^3) = 36\pi$

$36\pi\ \text{cm}^3$