Calculus ABC Test I—Version 7092 **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 as far as you can:

$$\frac{6z+18}{9z+27} \qquad \frac{6(z+3)}{9(z+3)}$$

$\frac{2}{3}$

2. Simplify by combining using a common denominator:

$$\frac{5y}{4} - \frac{3y}{4} \qquad \frac{2y}{4} = \frac{y}{2}$$

$\frac{y}{2}$

3. Solve for t:

$$t\left(1+\frac{3}{t}\right)=(2)t \qquad t+3=2t \qquad 3=t \checkmark$$

$t = 3$

4. Solve for z:

$$10\left(\frac{z}{5}\right)=\left(\frac{3z}{10}+7\right)10 \qquad 2z = 3z+70 \qquad -70 \checkmark = z$$

$z = -70$

5. Solve for x:

$|x+1| \geq 3$ $\quad x+1 \geqslant 3, \quad x+1 \leqslant -3$

$x \geqslant 2, \quad x \leqslant -4$

$x \leq -4$ or $x \geqslant 2$

or

$(-\infty, -4] \cup [2, \infty)$

6. Find the equation of the line between the points $(2,1)$ and $(1,6)$ in *point-slope* form.

slope $m = \frac{6-1}{1-2} = -5$ $\qquad y-1 = -5(x-2)$

$y-1 = -5(x-2)$

or

$y-6 = -5(x-1)$

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

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

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

8. Find the value of:

$$\cos\left(\frac{5\pi}{6}\right) \qquad \frac{5\pi}{6} = 150^\circ \quad \text{II}, \ \cos < 0 \quad (\text{ref } 30^\circ)$$

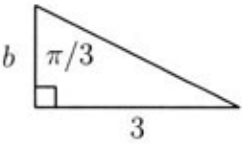
$-\frac{\sqrt{3}}{2}$

9. Find the value of:

$$\tan(0)$$

0

10. Find the value of b:



$\tan\frac{\pi}{3} = \frac{3}{b}$

$\sqrt{3} = \frac{3}{b}$

$b = \frac{3}{\sqrt{3}} = \sqrt{3}$

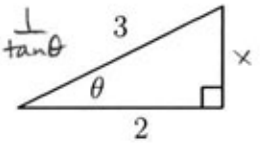
$b = \sqrt{3}$

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

$2^2 + x^2 = 3^2$ $\quad \cot\theta = \frac{1}{\tan\theta}$

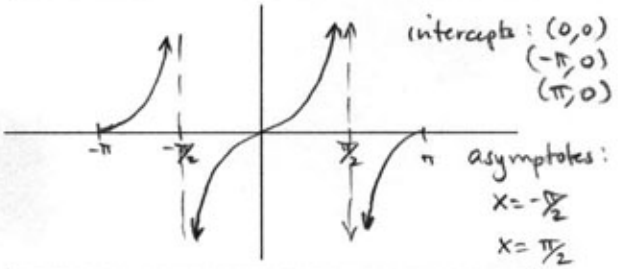
$4 + x^2 = 9$

$x^2 = 5 \quad x = \sqrt{5}$



$\frac{2}{\sqrt{5}}$

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

$$\frac{y^{-3}z^4}{y^{-5}z^5} \qquad y^2 z^{-1} = \frac{y^2}{z}$$

$\frac{y^2}{z}$

14. Simplify and eliminate any negative exponents:

$$\left(b^{2/5}\right)^{-3/4} \qquad b^{-6/20} = b^{-3/10}$$

$\frac{1}{b^{3/10}}$

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

$32^{3r} = 2 \quad (2^5)^{3r} = 2^1$

$15r = 1$

$r = \frac{1}{15}$

$r = \frac{1}{15}$

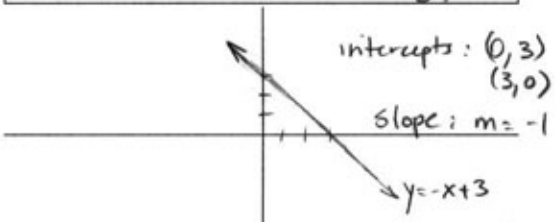
16. Solve for x:

$9^{x/2} = 8$

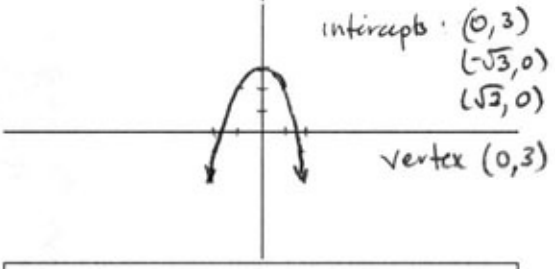
$\log 9^{x/2} = \log 8 \qquad \frac{x}{2} = \frac{\log 8}{\log 9}$

$x = \frac{2\log 8}{\log 9}$ or $x = 2\log_9 8$

17. Graph the function $y = -x + 3$.
Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of ~~ver~~tex.



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 perimeter of a rectangle which has length 2 cm and width 8 cm.

$P = 2l + 2w = 2(2) + 2(8) = 20$

20 cm

20. Find the volume of a right circular cylinder (a can) with radius 8 meters and height 3 meters.

$V = \pi r^2 h = \pi(8)^2(3) = 192\pi$

$192\pi \text{ m}^3$