Calculus ABC Test I—Version 9232 **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:

$$\left(\frac{a-4}{a-4}\right)\left(\frac{a}{a+2}\right)-\left(\frac{a-6}{a-4}\right)\left(\frac{a+2}{a+2}\right) \quad \frac{a^2-4a-(a^2-4a-12)}{(a-4)(a+2)}$$

$\boxed{\frac{12}{(a-4)(a+2)}}$

2. Simplify by combining using a common denominator:

$$\frac{3}{2a+3}+\frac{2a}{2a+3} \quad \frac{3+2a}{2a+3}$$

$\boxed{1}$

3. Solve for w:

$$(w-1)w^2\left[\left(\frac{1}{w-1}\right)-\frac{4}{w^2}\right]=0 \quad w^2(w-1)$$

$$w^2-4(w-1)=0 \quad w^2-4w+4=0$$

$$(w-2)(w-2)=0$$

$$w=2 \checkmark$$

$\boxed{w=2}$

4. Solve for x:

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

$$\left(\sqrt{2x+2}\right)^2=(6)^2 \quad 2x+2=36$$

$$2x=34$$

$$x=17 \checkmark$$

$\boxed{x=17}$

5. Solve for x:

$$1 \le 3x+4 \le 16$$

$$-3 \le 3x \le 12$$

$$-1 \le x \le 4$$

$\boxed{-1 \le x \le 4 \text{ or } [-1, 4]}$

6. Find the equation of the line between the points $(5,6)$ and $(-1,3)$ in *slope-intercept* form.

Slope: $m=\frac{6-3}{5-(-1)}=\frac{3}{6}=\frac{1}{2}$ $\quad y-6=\frac{1}{2}(x-5)$

$$y=\frac{1}{2}x+\frac{7}{2}$$

$\boxed{y=\frac{1}{2}x+\frac{7}{2}}$

7. Factor: $2w^2-7w+6$

$$(2w-3)(w-2)$$

$\boxed{(2w-3)(w-2)}$

8. Find the value of:

$$\sin\left(\frac{7\pi}{4}\right) \quad \frac{7\pi}{4}=315^\circ \text{ (ref } 45^\circ\text{)}$$

IV → sin neg

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

9. Find the value of:

$$\sin\left(\frac{5\pi}{6}\right) \quad \frac{5\pi}{6}=150^\circ \text{ (30° ref)}$$

II → sin pos

$\boxed{\frac{1}{2}}$

10. Find the value of c:

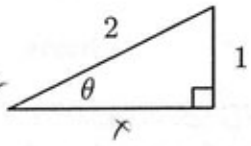
$$\sin\frac{\pi}{4}=\frac{2}{c}$$

$$\frac{\sqrt{2}}{2}=\frac{2}{c} \quad c=2\sqrt{2}$$

$\boxed{c=2\sqrt{2}}$

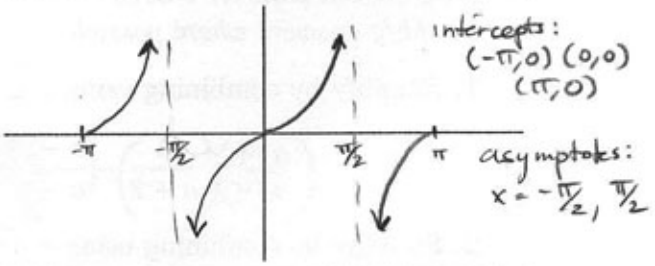
11. Find the value of $\cot(\theta)$:

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



$\cot\theta = \sqrt{3}$

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:

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

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

14. Simplify:

$\left(3x^2\right)\left(4x^5\right)$ $\quad 12x^7$

$12x^7$

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

$5^{1-3x} = 25 = 5^2$ $\quad 1-3x = 2$ $\quad -1 = 3x$ $\quad x = -\frac{1}{3}$

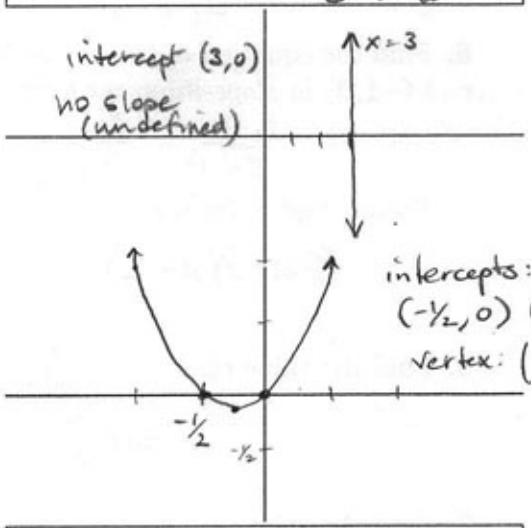
$x = -\frac{1}{3}$

16. Solve for t:

$10^{3t} = 8$ $\quad 3t \log 10 = \log 8$ $\quad t = \frac{\log 8}{3}$

$t = \frac{1}{3}\log 8$ or $t = \frac{1}{3}\frac{\ln 8}{\ln 10}$

17. Graph the equation $x = 3$.
Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of ~~vertex~~.



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

Vertex: $x = -\frac{b}{2a} = -\frac{1}{2(2)} = -\frac{1}{4}$ $\quad y = 2\left(-\frac{1}{4}\right)^2 + \left(\frac{1}{4}\right) = -\frac{1}{8}$

$2x^2+x=0$ $\quad x(2x+1)=0$ $\quad x=0,\ x=-\frac{1}{2}$

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 right circular cylinder (a can) with radius 6 cm and height 3 cm.

$V = \pi r^2 h = \pi(6)^2(3)$

$108\pi\ \text{cm}^3$