Key

Calculus ABC Test I—Version 8511 **Name:** _____

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:

$$-1\left(\frac{y}{1-y}\right)+\frac{2}{y-1} \qquad \frac{-y+2}{y-1}$$

$\frac{2-y}{y-1}$

2. Simplify by combining using a common denominator:

$$\frac{y}{y}\left(\frac{1}{y+1}\right)-\left(\frac{1}{y}\right)\left(\frac{y+1}{y+1}\right) \qquad \frac{y-y-1}{y(y-1)}$$

$\frac{-1}{y(y-1)}$

3. Solve for r:

$\left(\sqrt{r+1}\right)^2=(8-2r)^2$ $\quad 2r+\sqrt{(r+1)}=8$

$r+1=64-32r+4r^2$ $\quad 4r^2-33r+63=0$

$(4r-21)(r-3)=0$

$r=\{3\}$

4. Solve for x:

$8=5x+3$ $\quad 6x\left(\frac{4}{3x}\right)=\left(\frac{5}{6}+\frac{1}{2x}\right)6x$ $\quad r=\frac{21}{4}$ $\quad r=3$ ✓

$5=5x$ $\quad x=1$ ✓

$x=\{1\}$

5. Solve for t:

$t-5<2$ and $\quad |t-5|<2 \quad t<7$ and $t>3$

$t-5>-2$

$\{t\in\mathbb{R}\mid 3<t<7\}$ or $(3,7)$

6. Find the equation of the line through the point (-3,-5) with slope $\frac{1}{2}$ in *slope-intercept* form.

$y+5=\frac{1}{2}(x+3)$ $\quad y=\frac{1}{2}x-\frac{7}{2}$

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

7. Factor: t^2-5t+6

$(t-3)(t-2)$

$(t-3)(t-2)$

8. Find the value of:

$-\sin\frac{\pi}{6}=-\frac{1}{2}$ $\quad \sin\left(\frac{11\pi}{6}\right)$ $\quad \frac{11\pi}{6}=330°$ IV

$-\frac{1}{2}$

9. Find the value of:

$+\sin\frac{\pi}{6}=\frac{1}{2}$ $\quad \sin\left(\frac{5\pi}{6}\right)$ $\quad \frac{5\pi}{6}=150°$ II

$\frac{1}{2}$

10. Find the value of c:

$\cos\frac{\pi}{4}=\frac{8}{c}$

$\frac{\sqrt{2}}{2}=\frac{8}{c}$

$c=8\sqrt{2}$

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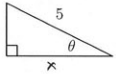
11. Find the value of $\cot(\theta)$:

$x^2+1^2=5^2$ $\quad \cot\theta = \frac{1}{\tan\theta}$

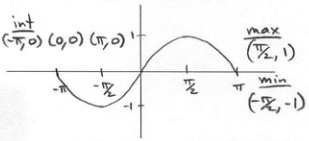
$x^2=24$

$x=\sqrt{24}$ $\quad = \frac{\sqrt{24}}{1}$



$\cot\theta = 2\sqrt{6}$

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:

$z^{2/3}z^{1/5}$ $\quad z^{13/15}$

$z^{13/15}$ or $\sqrt[15]{z^{13}}$

14. Simplify and eliminate any negative exponents:

$\left(8x^6\right)^{-2/3}$ $\quad \frac{1}{8^{2/3}x^4} = \frac{1}{4x^4}$

$\frac{1}{4x^4}$

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

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

$3x = 2$ $\quad x = 2/3$

$x = 2/3$

16. Solve for x:

$3^{12x} = \frac{17}{2}$ $\quad 2 \cdot 3^{12x} = 17$

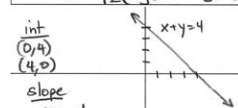
$12x \log 3 = \log 17/2$ $\quad x = \frac{\log 17 - \log 2}{12 \log 3}$

$x = \frac{\log 17 - \log 2}{12 \log 3}$

or $x = \frac{1}{12}(\log_3 17 - \log_3 2)$

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

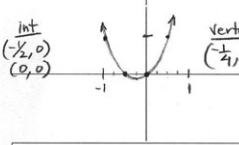
$y = -x + 4$



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

$x = \frac{-b}{2a} = \frac{-1}{4}$ $\quad y(-1/4) = 2\left(\frac{1}{16}\right) - \frac{1}{4}$

$= \frac{1}{8} - \frac{1}{4} = \frac{-1}{8}$



19. Find the perimeter of a triangle with sides of length 2 cm, 5 cm, and 4 cm.

$P = 2+5+4 = 11$

11 cm

20. Find the volume of a rectangular box with sides 8 mm, 2 mm, and 2 mm.

$V = l \cdot w \cdot h = (8)(2)(2)$

$= 32$

$32\ \text{mm}^3$