Key

Calculus ABC Test I—Version 3772 **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 as far as you can:

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

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

2. Simplify by combining using a common denominator:

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

$\frac{2x+1}{x(x+1)}$

3. Solve for x:

$$x^2+6x+8=0$$
$$(x+4)(x+2)=0 \qquad x=-4,-2$$

$x = \{-4, -2\}$

4. Solve for r:

$$\frac{r-3}{5}=\frac{r}{7} \qquad 7r-21=5r$$
$$2r=21$$
$$r=21/2$$

$r = \frac{21}{2}$

5. Solve for x:

$$3x<9x+4 \qquad -\tfrac{2}{3}<x$$
$$-4<6x$$

$x > -\frac{2}{3}$

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

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

$y=-5x+11$

7. Factor: x^2+2x-8

$(x+4)(x-2)$

$(x+4)(x-2)$

8. Find the value of:

$$\cos\left(\frac{7\pi}{6}\right) \qquad \frac{7\pi}{6}=210^\circ$$
$$-\cos\pi/6$$

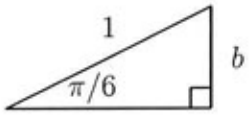
$-\frac{\sqrt{3}}{2}$

9. Find the value of:

$$\sin\left(\frac{11\pi}{6}\right) \qquad \frac{11\pi}{6}=330^\circ$$
$$-\sin\pi/6$$

$-\frac{1}{2}$

10. Find the value of b:



$\sin\frac{\pi}{6}=\frac{b}{1}$

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

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

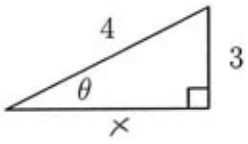
11. Find the value of $\sec(\theta)$:

$x^2 + 3^2 = 4^2$

$x^2 = 7$

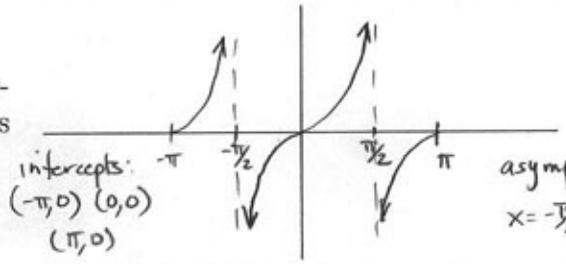
$x = \sqrt{7}$

$\sec\theta = \frac{1}{\cos\theta}$



$\frac{4}{\sqrt{7}}$

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.



intercepts: $(-\pi, 0)$ $(0,0)$ $(\pi, 0)$

asymptotes: $x = -\frac{\pi}{2}$, $x = \frac{\pi}{2}$

13. Simplify and eliminate any negative exponents:

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

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

14. Simplify and eliminate any negative exponents:

$\left(x^{-5}y^3\right)^{-3/5}$ $\quad x^3 y^{-9/5}$

$\frac{x^3}{y^{9/5}}$

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

$\left(\frac{2}{3}\right)^x = \frac{9}{4}$ $\quad \left(\frac{2}{3}\right)^x = \left(\frac{3}{2}\right)^2$

$x = -2$

16. Solve for z:

$z+2 = \log_7 3$ $\quad 7^{z+2} = 3$ $\quad (z+2)\log 7 = \log 3$

$z+2 = \frac{\log 3}{\log 7}$

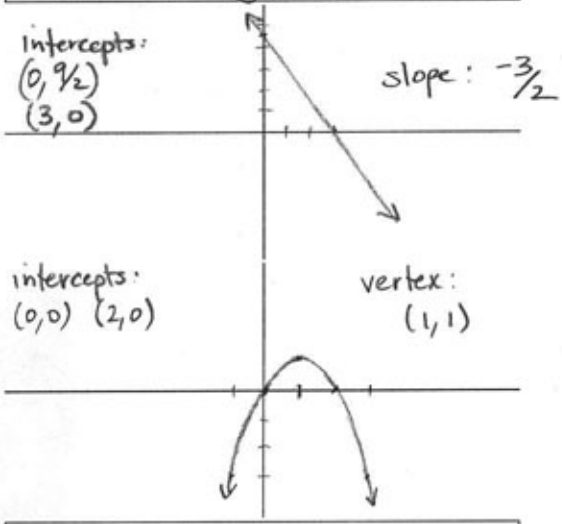
$z = \frac{\log 3}{\log 7} - 2$

or $z = \log_7 3 - 2$

17. Graph the equation $3x + 2y = 9$.
Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of vertex.

$2y = -3x + 9$

$y = -\frac{3}{2}x + \frac{9}{2}$



intercepts: $(0, 9/2)$ $(3, 0)$

slope: $-3/2$

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

Axis of symmetry: $x = -\frac{b}{2a} = \frac{-2}{-2} = 1$

intercepts: $(0,0)$ $(2,0)$

vertex: $(1,1)$

19. Find the perimeter of a rectangle which has length 4 mm and width 7 mm.

$P = 2l + 2w$ $\quad P = 2(4) + 2(7) = 22$

22 mm

20. Find the volume of a sphere of radius 5 feet.

$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi\left(5^3\right)$

$\frac{500\pi}{3}$ ft^3