

Sample - Key

Calculus ABC Test I—Version 7346

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:

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

$$\frac{2x}{(x-1)(x+1)} \quad \text{or} \quad \frac{2x}{x^2-1}$$

2. Simplify by combining using a common denominator:

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

$$\frac{y}{2}$$

3. Solve for θ :

$$\theta^2 = 16$$

$$\theta = \{-4, 4\}$$

4. Solve for x :

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

$$2x+2 = 36$$

$$2x = 34$$

$$x = \{17\}$$

5. Solve for x :

$$x+1 \geq 3 \quad \text{or}$$

$$|x+1| \geq 3$$

$$x+1 \leq -3$$

$$x \geq 2 \quad \text{or} \quad x \leq -4$$

$$x \leq -4 \quad \text{or} \quad x \geq 2$$

$$(-\infty, -4] \cup [2, \infty) \quad \text{interval notation}$$

6. Find the equation of the line through the point $(0,0)$ and parallel to the line $-x + 2y = 6$ in point-slope form.

$$2y = x + 6 \quad \text{slope is } \frac{1}{2}$$

$$y = \frac{1}{2}x + 3$$

$$y - 0 = \frac{1}{2}(x - 0)$$

7. Find all roots of: $y^2 + 7y + 6 = 0$

$$(y+6)(y+1) = 0$$

$$y = -6 \quad \text{or} \quad -1$$

$$y = \{-6, -1\}$$

8. Find the value of:

$$\cos\left(\frac{\pi}{3}\right) \quad \frac{\pi}{3} \equiv 60^\circ$$

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

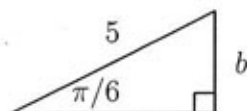
9. Find the value of:

$$\sin(0)$$

$$0$$

10. Find the value of b :

$$\sin \frac{\pi}{6} = \frac{b}{5}$$



$$\frac{1}{2} = \frac{b}{5} \quad b = \frac{5}{2}$$

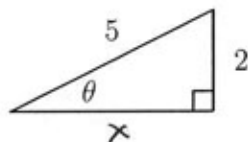
$$\frac{5}{2}$$

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

$$x^2 + 2^2 = 5^2$$

$$x^2 + 4 = 25$$

$$x = \sqrt{21}$$



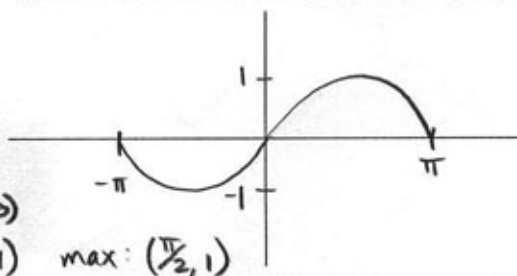
$$\cos \theta = \frac{\sqrt{21}}{5}$$

12. Graph the function
- $y = \sin(x)$
- for
- $-\pi \leq x \leq \pi$
- .

Label with the following values (if applicable): each intercept, location of each asymptote, and (x, y) coordinates of each min and max.

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

min: $(-\frac{\pi}{2}, -1)$ max: $(\frac{\pi}{2}, 1)$



13. Simplify:

$$\frac{(6y^3)^4}{2y^5} = \frac{6^4 y^{12}}{2y^5} = \frac{1296 y^{12}}{2y^5}$$

$$648 y^7$$

14. Simplify:

$$\left(\frac{1}{2}\right)^4 4^{-2} = \left(\frac{1}{16}\right)\left(\frac{1}{4^2}\right)$$

$$\frac{1}{256}$$

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

$$27^y = \frac{1}{9} \quad (3^3)^y = 3^{-2}$$

$$3y = -2$$

$$y = -\frac{2}{3}$$

16. Solve for
- x
- :

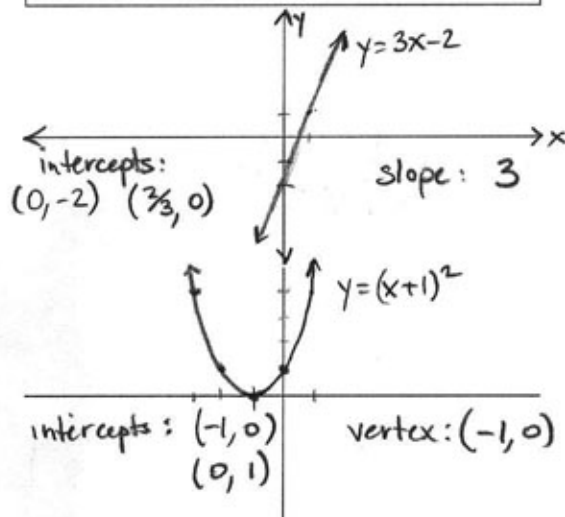
$$2^{3x} = 64$$

$$2^{3x} = 2^6 \quad 3x = 6$$

$$x = 2$$

17. Graph the function
- $y = 3x - 2$
- .

Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of vertex.



18. Graph the function
- $y = (x + 1)^2$
- .

Label with the following values (if applicable): each intercept, slope, and (x, y) coordinates of vertex.

intercepts: $(-1, 0)$ $(0, 1)$ vertex: $(-1, 0)$

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

$$P = 5 + 2 + 4$$

$$P = 11 \text{ miles}$$

20. Find the volume of a rectangular box with sides 4 meters, 3 meters, and 8 meters.

$$V = l \cdot w \cdot h$$

$$V = 96 \text{ m}^3$$