

**Placement Exam for AP calculus AB****Bradshaw**

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

\*Please understand that this is not part of your “Summer Assignment”. It is merely a suggestion. You should try to complete this as if it were an exam. Mastery of all of the concepts tested here is necessary in order for you to be successful in AB calculus. Obviously, I cannot cover everything in 22 questions. A number of trigonometric identities and rules are not covered like the power reducing rule, half and double angle formulas, as well as topics like the properties of the natural logarithmic function, circles and conic sections, the difference quotient and others. This exam should be completed in less than one hour and no calculator should be used on this exam.

1. Find the polynomial with the given zeros.

$0, 3, -2$  and  $(-1, 8)$

1. \_\_\_\_\_

2. Use synthetic division to factor completely.

$$x^3 - x^2 - 16x - 20 \div x + 2$$

2. \_\_\_\_\_

3. Find the polynomial that has the given zeros.

Zeros are:  $2$ , and  $2 - i$

3. \_\_\_\_\_

4. Find the zeros.

$$f(x) = x^3 - x^2 - 17x + 65$$

4. \_\_\_\_\_

5. Find the domain, then, if possible, write in lowest terms; find  $x$  and  $y$  intercepts and all asymptotes, and graph each equation.

$$f(x) = \frac{x^2 + 3x}{x^3 - 4x}$$

Domain \_\_\_\_\_

Lowest terms \_\_\_\_\_

$y$ -intercept \_\_\_\_\_

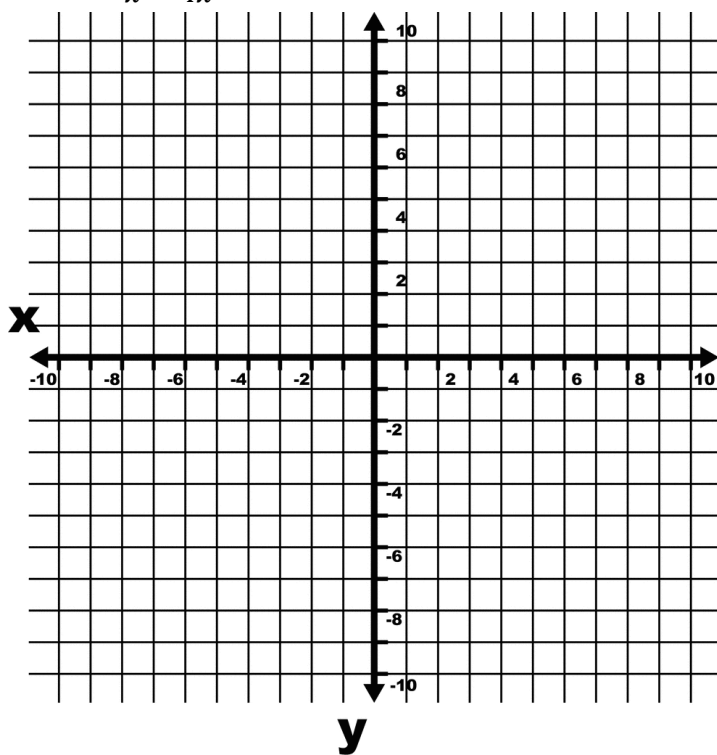
$x$ -intercept \_\_\_\_\_

Vertical asymptote \_\_\_\_\_

Horizontal asymptote \_\_\_\_\_

Oblique asymptote \_\_\_\_\_

Hole(s) \_\_\_\_\_



Solve

$$6. \frac{3x-5}{x+2} \leq 2$$

6. \_\_\_\_\_

Solve

7.  $64^{x^2}(16^{3x}) = 4^{-1}$   $x =$  \_\_\_\_\_  
\*exact answer in radical form

8.  $(3)10^{3x-5} = 6$   $x =$  \_\_\_\_\_

Find the “exact value” (no rounded decimals).

9.  $\log_5 50 - \log_5 2 =$  \_\_\_\_\_

Write as a sum or difference. Express powers as factors.

10.  $\ln \frac{\sqrt[3]{x^2+1}}{x\sqrt{x-1}}$  \_\_\_\_\_

Write as a single logarithm.

11.  $\log(x^2 + 7x + 10) - 3\log(x + 2)$  \_\_\_\_\_

Solve each equation. Use only exact answers (no rounded decimals).

12.  $\log_6 x + \log_6 (x + 2) = 2$  \_\_\_\_\_

13.  $3^{2x} + 3^{x+1} - 4 = 0$  \_\_\_\_\_

14.  $s =$  arc length,  $r =$  radius and  $\theta =$  the central angle. Find the missing value.

$\theta = \frac{5}{4}$  radians,  $s = 10\text{cm}$ ,  $r =$  \_\_\_\_\_

15.  $A$  is the area of the sector of a circle with radius  $r$  and a central angle of  $\theta$ .

Find the missing value.

$r = 4\text{m}$ ,  $\theta = 150^\circ$   $A =$  \_\_\_\_\_

16. Find the “exact value”.

7)  $\sin(-\frac{11\pi}{6})$  \_\_\_\_\_

17. Find the exact values of the trigonometric functions.

$$\sin \theta = -\frac{1}{4}, \tan \theta > 0 \quad \cos \quad \tan \quad \csc \quad \sec \quad \cot$$

18. Graph the following function. Label 5 points.

$$y = 2 \sec\left(\frac{2}{3}x\right) - 3 \quad \text{Amplitude} \quad \text{Period} = \quad \text{Five ordered pairs } ( \quad , \quad )$$



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Find the exact value. (Do not provide a decimal value), (if it is undefined write DNE)

19.  $\csc [\tan^{-1}(-2)]$  \_\_\_\_\_

20.  $\cot^{-1}\left(-\frac{\sqrt{3}}{3}\right)$  \_\_\_\_\_

21.  $\sin \frac{\pi}{18} \cos \frac{5\pi}{18} + \cos \frac{\pi}{18} \sin \frac{5\pi}{18}$  \_\_\_\_\_

22.  $\cos^2 \theta - \sin^2 \theta + \sin \theta = 0$  \_\_\_\_\_