

1-18 part 1

ExamPre calc semester exam review

Name Key

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the equation algebraically.

1)  $v^2 + 2 = 8 - 4v^2$   
 ~~$+4v^2 - 2 - 2 + 4v^2$~~

$5v^2 = 6$   
 $\sqrt{v^2} = \sqrt{6/5} \rightarrow v = \pm \sqrt{6/5}$

1) \_\_\_\_\_

Find the domain of the given function.

2)  $f(x) = \frac{x}{x-9}$

$x-9 \neq 0$   
 $x \neq 9$

D:  $\mathbb{R} \ x \neq 9$

2) \_\_\_\_\_

3)  $f(x) = \sqrt{9-x}$

↑  
Can't  
neg.

$9-x \geq 0$   
 $9 \geq x$

3) \_\_\_\_\_

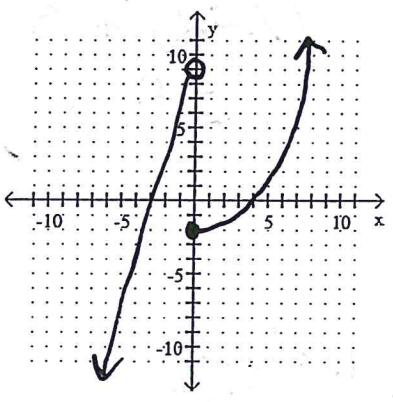
Graph the piecewise-defined function.

4)

$y(x) = \begin{cases} 9x + 8, & \text{if } x < 0 \\ 2x^2 - 2, & \text{if } x \geq 0 \end{cases}$

$9(0) + 8 = 8$   
 $2(0)^2 - 2 = -2$

4) \_\_\_\_\_



Perform the requested operation or operations.

5)  $f(x) = \frac{x-5}{8}$ ;  $g(x) = 8x + 5$ , find  $g(f(x))$

$8\left(\frac{x-5}{8}\right) + 5$

↓  
 $x - 5 + 5 = \textcircled{X}$

5) \_\_\_\_\_

Find the inverse of the function.

6)  $f(x) = x^3 + 4$

$$x = y^3 + 4$$

$$\begin{matrix} -4 & & -4 \\ \hline \sqrt[3]{x-4} & = & \sqrt[3]{y^3} \end{matrix}$$

$$\sqrt[3]{x-4}$$

6) \_\_\_\_\_

Fill in the blanks to complete the statement.

7) The graph of  $y = -\sqrt{x+2}$  can be obtained from the graph of  $y = \sqrt{x}$  by shifting horizontally   ?   units to the   ?   and reflecting across the   ?  -axis.

2 left x

7) \_\_\_\_\_

Use an equation to solve the problem.

8) When a number is added to its double and its triple, the sum is 150. Find the three numbers.

$$x + 2x + 3x = 150$$

$$6x = 150$$

$$x = 25$$

25, 50, 75

8) \_\_\_\_\_

Write the quadratic function in vertex form.

9)  $y = x^2 + 4x + 7$

$$(x-h)^2 + k$$

$$h = \frac{-b}{2a}$$

$$\frac{-4}{2} = -2$$

$$(-2)^2 + 4(-2) + 7 = 3$$

$$4 - 8 + 7$$

$$(x-2)^2 + 3$$

$$(x+2)^2 + 3$$

9) \_\_\_\_\_

If the following is a polynomial function, then state its degree and leading coefficient. If it is not, then state this fact.

10)  $f(x) = 11x^6 - 2x - 6$

yes, deg = 6, 11 = leading Co.

10) \_\_\_\_\_

Write the statement as a power function equation. Use k as the constant of variation.

11) The height h of a cone with a fixed volume varies inversely as the square of its radius r.

$$h = \frac{vk}{r^2}$$

11) \_\_\_\_\_

Find the zeros of the polynomial function and state the multiplicity of each.

12)  $f(x) = -4x^2(x - 9)(x + 4)^3$

0, mult 2  
9, mult 1  
-4, mult 3

12) \_\_\_\_\_

Divide using synthetic division, and write a summary statement in fraction form.

13)  $\frac{2x^3 + 3x^2 + 4x - 10}{x + 1}$

$$\begin{array}{r|rrrrr} -1 & 2 & 3 & 4 & -10 & \\ & & -2 & -1 & -3 & \\ \hline & 2 & 1 & 3 & -13 & \end{array}$$

13) \_\_\_\_\_

$2x^2 + x + 3 - \frac{13}{x+1}$

Use limits to describe the behavior of the rational function near the indicated asymptote.

14)  $f(x) = \frac{x + 1}{x^2 - 2x}$

14) \_\_\_\_\_

Describe the behavior of the function near its horizontal asymptote (the end behavior).

$\lim_{x \rightarrow \infty} = 0$

$\lim_{x \rightarrow -\infty} = 0$

Solve the equation.

15)  $\frac{6x \cdot x \cdot 4(x-6) \cdot 24}{x-6 \cdot x \cdot (x-6) \cdot x^2 - 6x}$

15) \_\_\_\_\_

$\frac{6x^2 - 4(x-6)}{x^2 - 6x} = \frac{24}{x^2 - 6x}$

$6x^2 - 4x + 24 = 24$

$6x^2 - 4x = 0$

$2x(3x - 2)$

0

$3x - 2 = 0$   
 $x = 2/3$

0, 2/3

Decide whether the function is an exponential growth or exponential decay function and find the constant percentage rate of growth or decay.

16)  $f(x) = 20,060 \cdot 0.865^x$

16) \_\_\_\_\_

decay 13.5%  
 $1 - .865 = .135$

Solve the equation by changing it to exponential form.

17)  $\log_4 x = 2$

17) \_\_\_\_\_

$4^2 = x$

Use the change of base rule to find the logarithm to four decimal places.

18)  $\log_{8.6} 4.4$

18) \_\_\_\_\_

$\frac{\log 4.4}{\log 8.6} = .6886$

Use a calculator to find an approximate solution to the equation.

19)  $8 \ln(x + 2.8) = 12.8$

19) \_\_\_\_\_

$\ln(x + 2.8) = 1.6$   
 $x + 2.8 = e^{1.6}$   
 $x = e^{1.6} - 2.8 = 2.15$

Solve the problem.

20) How long will it take for \$6100 to grow to \$7600 at an interest rate of 12.4% if the interest is compounded quarterly? Round the number of years to the nearest hundredth.

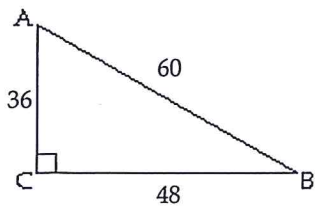
20) \_\_\_\_\_

$6100 \left(1 + \frac{.124}{4}\right)^{4t}$   
 $\frac{6100(1.031)^{4t}}{6100} = \frac{7600}{6100}$   
 $\ln 1.031^{4t} = \ln\left(\frac{76}{61}\right)$   
 $4t \ln 1.031 = \ln\left(\frac{76}{61}\right)$   
 $\frac{4t}{4} = \frac{.2016}{4}$   
 $t = .8$

$t = .8 \text{ years}$

Find the exact values of the indicated trigonometric functions. Write fractions in lowest terms.

21)



Find  $\sin A$  and  $\cos A$ .

$$\sin A = \frac{48}{60} = \frac{4}{5}$$

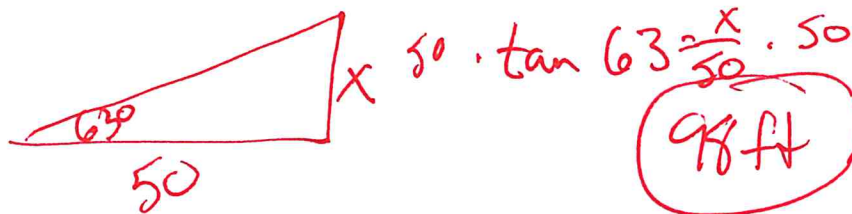
$$\cos A = \frac{36}{60} = \frac{3}{5}$$

21) \_\_\_\_\_

Solve the problem.

22) From a distance of 50 feet from the base of a building, the angle of elevation to the top of the building is  $63^\circ$ . Estimate the height of the building to the nearest foot.

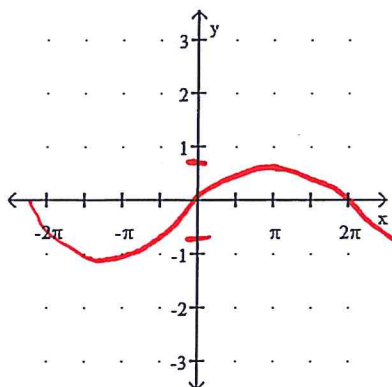
22) \_\_\_\_\_



Graph the function.

23)  $y = \frac{2}{3} \sin \frac{1}{2}x$

23) \_\_\_\_\_



$$\frac{2\pi}{\frac{1}{2}} = 4\pi$$

$$\text{amp} = \frac{2}{3}$$

