UMass Dartmouth Precalculus Practice Exam

1. Evaluate the function at each specified value of the independent variable and simplify.

$$g(y) = 3 - 2y$$

a) $g(0) =$ ____ b) $g(\frac{3}{2}) =$ ____ c) $g(s+3) =$ ____

2. For the given $f(x) = x^2 + 3$, find $f(a+7)$.

$f(a+7) =$ ____

3. Which of the following represents the domain of the function $f(x) = \sqrt{9x - 14}$.

(a) $(\frac{14}{9}, \infty)$ (b) $[\frac{14}{9}, \infty)$ (c) $(\frac{9}{14}, \infty)$ (d) $[\frac{9}{14}, \infty)$

4. Find all the real solutions of the quadratic equation. (Enter your answers as a comma-separated list. Express radicals in simplest form)

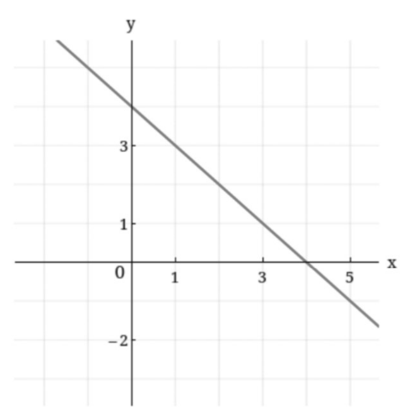
$2y^2 - 8y + 1 = 0,$ $y =$ ____

5. Solve the question by factoring. (Enter your answers as a comma-separated list.)

$x^7 + x^6 - 2x^5 = 0,$ $x =$ ____

6. For the linear equation $5x + 2y - 20 = 0$, the x-intercept is ________, and the y-intercept is ___________. The equation in slope intercept form is $y =$ ______. The slope of the graph of this equation is ___________.

7. Find the equation for the line whose graph is sketched.



8. Solve the inequality. $2(x-4)+6<7-x$ and express the solution set in the interval notation.

   (a) $(-\infty, 3)$ (b) $(3, \infty)$ (c) $(-\infty, 3]$ (d) $[-\infty, 3)$

9. Solve the absolute value equation $|2x-7|=9$. (Enter your answers as a comma-separated list. If there is no solution, enter NO SOLUTION).

   $x =$ ______

10. Solve the equation for the indicated variable.

    $\mathrm{V}=\frac{4}{3}\pi \mathrm{r}^3$; for r. $\mathrm{r} =$ ____

11. Solve the equation for the indicated variable.

    $\frac{1}{\mathrm{R}}=\frac{1}{\mathrm{R}_1}+\frac{1}{\mathrm{R}_2}$; for R_2. $\mathrm{R}_2 =$ _____

12. Perform the addition or subtraction and simplify:

    $\frac{3}{x+2}+\frac{1}{x^2-4}=$ _______

13. Perform the multiplication or division and simplify:

    $\frac{x^2+2x-35}{x^2-49}\cdot\frac{x-7}{x+6}=$ ________

14. Perform the multiplication or division and simplify:

    $\frac{\frac{x^3}{x+4}}{\frac{x}{x^2+8x+16}}=$ ________

15. Simplify the complex function:

    $\frac{\frac{2}{a\mathrm{b}^2}-\frac{2}{a^2\mathrm{b}}}{\frac{1}{\mathrm{b}}-\frac{1}{a}}=$ ________

16. Rationalize the denominator and simplify:

$$\frac{\sqrt{30}}{\sqrt{10}-3} = \_\_\_\_\_\_\_\_$$

17. Evaluate the expression,

(a) $\log_3\left(\frac{1}{81}\right) = \_\_\_\_$ (b) $\log_5 \sqrt{5} = \_\_\_\_$ (c) $\log_4 0.25 = \_\_\_\_$

18. Evaluate the expressions,

(a) $2^{\log_2 14} = \_\_\_\_$ (b) $3^{\log_3 27} = \_\_\_\_$ (c) $e^{\ln\sqrt{3}} = \_\_\_\_$

19. (a) Find the exact solution of the exponential equation in terms of logarithms.

$e^{-2x} = 7,$ $x = \_\_\_\_$

(b)Use a calculator to find an approximation to the solution rounded to six decimal places.

$x = \_\_\_\_$

20. (a) Write the equation $6^{2x} = 25$ in logarithmic form: ________.

(b) Write the equation $\ln(A) = 5$ in exponential form: ________.

21. (a) Find the exact solution of the exponential equation in terms of logarithms.

$1 + e^{4x+1} = 40,$ $x = \_\_\_\_$

(b) Use a calculator to find an approximation to the solution rounded to six decimal places.

$x = \_\_\_\_$

22. Use the Laws of Logarithms to evaluate the expression:

$\log(50) + \log(200) = \_\_\_\_\_\_\_\_$

23. Use the Laws of Logarithms to expand the logarithmic expression as much as possible.

$$\log\left(\frac{x^5 y}{z}\right) = \_\_\_\_$$

24. Use the Laws of Logarithms to combine the logarithmic expression. Write the expression as a single logarithm.

$3\log(x) + \log(y) - \log(z) =$ ________

25. Simplify the expression and express the answer using rational exponents. Assume that u and v denote positive numbers.

$\sqrt{\frac{25u^3v^2}{uv^6}} =$ ________

26. Find the equation of the circle that satisfies the given conditions.

Center $(5, -4)$; radius $= 4$

27. Use $f(x) = 4x - 3$ and $g(x) = 2 - x^2$ to evaluate the expression for the composite function:

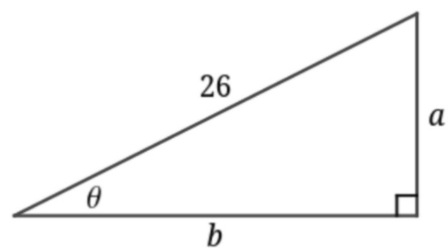
(a) $(f \circ f)(x) =$____________

(b) $(g \circ g)(x) =$____________

28. Express the lengths a and b in the figure in terms of θ.

$a =$ ________

$b =$ ________



29. Find the exact value of the cosine and sine of the following angle.

$\theta = \frac{2\pi}{3}$, $\cos\left(\frac{2\pi}{3}\right) =$ _____, $\sin\left(\frac{2\pi}{3}\right) =$ _____

30. Simplify the trigonometric expression.

$\sin^3 x + \cos^2 x \sin x =$ ________

31. Use the fundamental identities to simplify the expression:

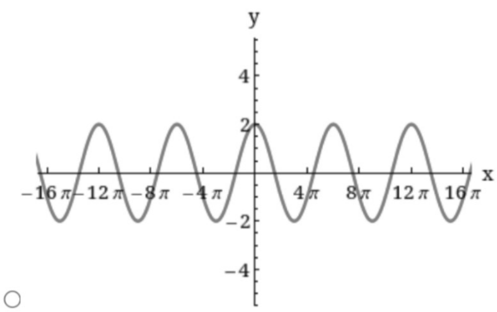
$7\sec^2 x\,(1 - \sin^2 x) =$ _______

32. Find the amplitude and period of the trigonometric function: $y = 2\cos\left(\frac{1}{6}x\right)$

amplitude = ________ period = ______________

Sketch the graph of the function.

(a)



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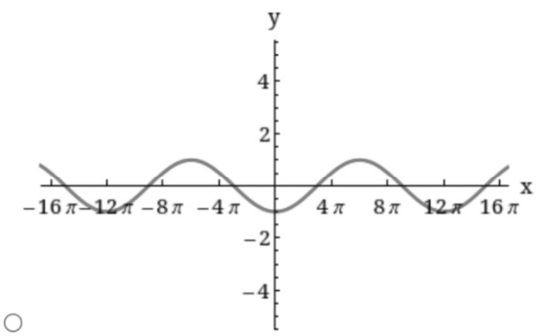

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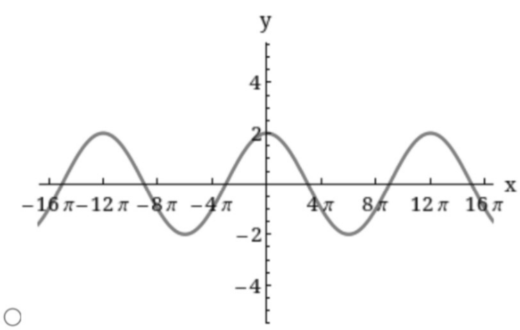

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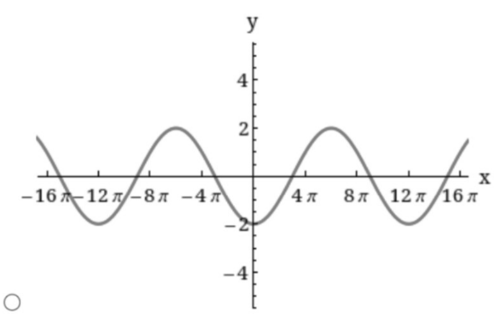


33. Find the values of the trigonometric functions of θ from the information given.

$$\sin\theta = -\frac{12}{13}, \theta \text{ in Quadrant IV}$$

$\cos(\theta) =$ ______________ $\tan\theta =$ _______________ $\operatorname{cosec}(\theta) =$ ___________

$\sec(\theta) =$ ______________ $\cot(\theta) =$ _____________

34. Find the inverse of the one-to-one function $f(x) = 2x - 4$.

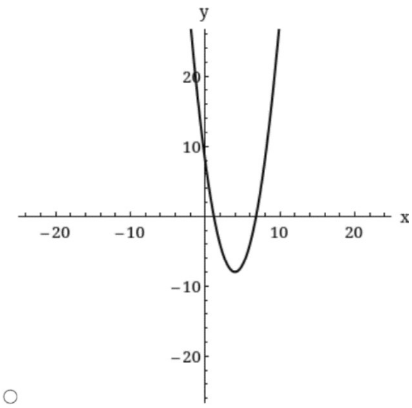
$f^{-1}(x) =$ _____________

35. A quadratic function f is given. $f(x) = x^2 - 8x + 8$

(a) Express f in standard form. $f(x) =$______________

(b) Sketch a graph of $f(x)$.

(i)



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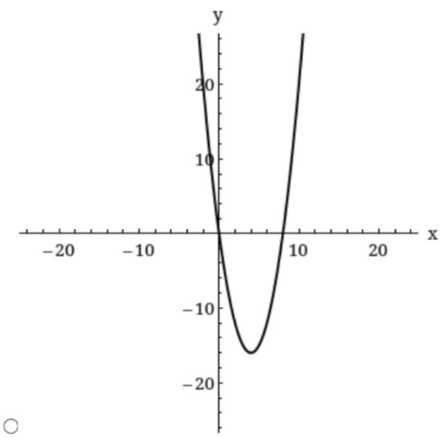

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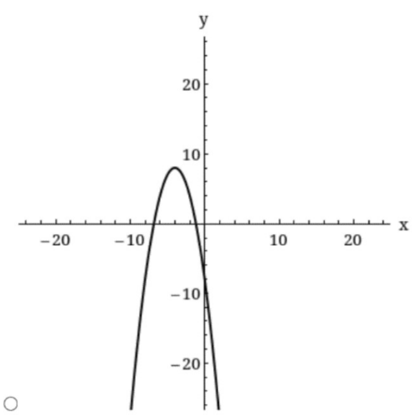

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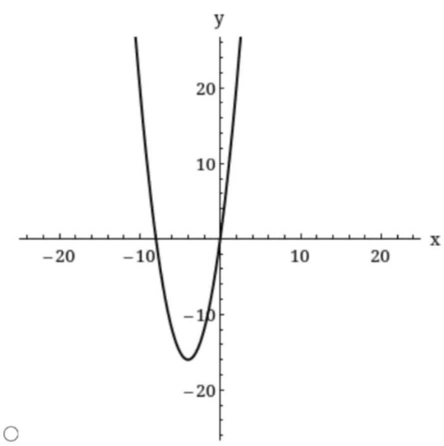

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(c) Find the maximum or minimum value of f.

The maximum or minimum value is $f(__) =$______________

Is this a maximum or minimum value?

- ○ Maximum value
- ○ Minimum value