

The Rules:

- Only you may write on this packet.
- You must finish within allocated class time.
- You may collaborate with your peers, but collaborating means discussing and explaining rather than copying.
- Each problem is scored separately and each problem must be completed to earn any credit.

Some helpful pointers:

- Many of these questions should appear familiar. Look through your old assessments, notes and HW papers!
- Try to identify which unit each problem is from.
- Feel encouraged to have discussions with your table-mates and peers!
- This is a great way to help you start studying for finals, use this as a guide to assess if you need to spend extra time on certain topics/chapters!
- Be proud of your work! You've done a great job this semester! ☺

1. Solve for x. $2(x+9)^2 - 20 = 108$ (2 points)

$$2(x+9)^2 = 128$$

$$(x+9)^2 = 64$$

$$x+9 = \pm 8$$

$$x = -9 \pm 8$$

$x = -1$

$x = -17$

2. Cynthia opened a bank account and 3 years later she had \$94.72. 17 years after she opened the account it was worth \$115.92. Assume interest is compounded annually. How much money did she open the account with? (3 points)

$$(3, 94.72)(17, 115.92)$$

$$\frac{ab^1}{a^1b^3} = \frac{115.92}{94.72}$$

$$\frac{b^4}{b^4} = 1.2224$$

$$b = 1.015$$

$$a(1.015)^3 = 94.72$$

$$a = 90.58$$

$\$90.58$

3. Given $g(x)$, and $h(x)$ find each. (4 points)

$$g(x) = \sqrt{x+3} - 4$$

x	h(x)
-8	6
-5	-7
-3	8
-1	5
2	-1
6	8

a) x when $g(x) = 0$

$$0 = \sqrt{x+3} - 4$$

$$4 = \sqrt{x+3}$$

$$16 = x+3$$

$x = 13$

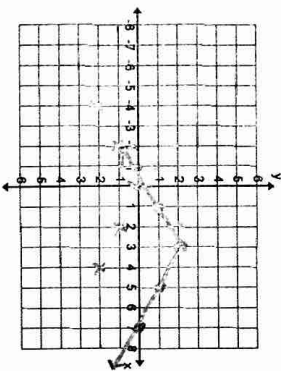
b) $g(h(-1)) =$

$$g(5) = \sqrt{5+3} - 4$$

$$= \sqrt{8} - 4$$

$2\sqrt{2} - 4$

4. Graph $y = -\frac{1}{2}(x-3) + 2$ (2 points)



OR
 R3
 HD by 2
 U2

5. Find the equation of the line in point-slope form that passes through the points (5, -10) and (-4, -2) (3 points)

$$\frac{-10 + 2}{5 + 4} = \frac{-8}{9}$$

$$y + 10 = -\frac{8}{9}(x - 5)$$

OR

$$y + 2 = -\frac{8}{9}(x + 4)$$

6. Solve the system of equations (2 points)

$$y = -\frac{1}{2}x - 2 \quad y = -\frac{1}{2}(2) - 2 = -3$$

$$3x - 2y = 12$$

$$3x - 2(-\frac{1}{2}x - 2) = 12$$

$$3x + x + 4 = 12$$

$$4x = 8$$

$$x = 2$$

$$(2, -3)$$

8. Solve for x. Give the exact answer and decimal approximation. (2 points)

$$x^7 = 78$$

$$x = 78^{1/7}$$

$$x \approx 1.843$$

7. At a local carnival there is a game with two targets. You throw a ball which can hit either a small 3-point target or a large 2-point target. At the end of the game, Nathan has 28 points and threw 12 balls. How many times did he hit the 2-point target? How many times did he hit the 3-point target? (3 points)

$$x + y = 12 \rightarrow y = 12 - x$$

$$3x + 2y = 28$$

$$3x + 2(12 - x) = 28$$

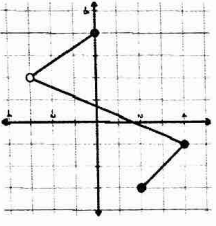
$$3x + 24 - 2x = 28$$

$$x = 4$$

$$y = 12 - 4 = 8$$

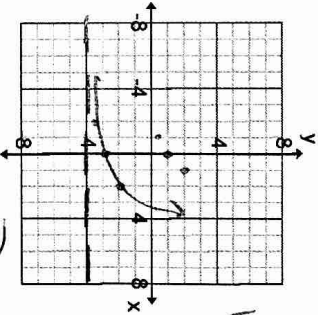
3pt 4 hits
2pt 8 hits

9. Write the domain and range in interval notation. (2 points)



D: $[-4, 2] \cup (-2, 3]$
R: $(-3, 4]$

10. Sketch a graph of $f(x) = 2^x - 4$ (2 points)



$(0, -4)$
 $(2, -2)$

HD by 2
D: 4

12. Simplify: $\left(\frac{25x^6}{10x^3yz^0}\right)^{-3}$ (2 points)

$$\left(\frac{5x^3}{2yz}\right)^{-3} = \left(\frac{2y}{5x^3}\right)^3$$

$$\frac{8y^3}{125x^9}$$

14. Solve for x. $16^x = 8^{-x-3}$ (2 points)

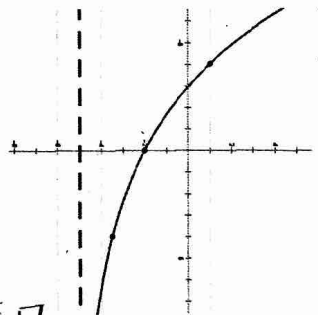
$$2^{4(3x)} = 2^3(x-3)$$

$$12x = 3x - 9$$

$$9x = -9$$

$$x = -1$$

11. Write the equation of the graph. Base = $\frac{1}{2}$ (2 points)



D: 5
VD: 3
HD: 4

$$y = 3\left(\frac{1}{2}\right)^{x+4} - 5$$

13. Simplify: $\sqrt[4]{81m^8n^{16}}$ (2 points)

$$3m^2n^4\sqrt[4]{m^3}$$

15. Solve for x. $\log_3(2x+5) - \log_3 8 = 2$ (2 points)

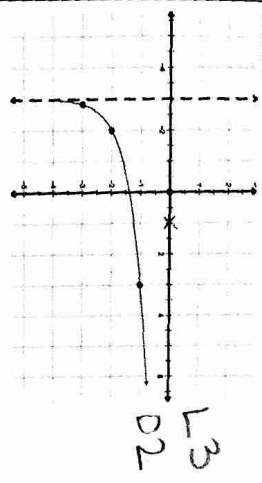
$$1093\left(\frac{2x+5}{8}\right) = 2$$

$$3^2 = \frac{2x+5}{8}$$

$$72 = 2x+5$$

$$\sqrt[6]{7/2} = x$$

16. Write the equation of the graph. (2 points)
Base: 6



$$y = 109_{14}(x+3) - 2$$

18. Solve for x. Find the exact and approximate answer. (2 points)

$$9 \cdot 14^{x+1} = 819$$

$$14^{x+1} = 91$$

$$\log_{14} 91 = x+1$$

$$\frac{\log 91}{\log 14} - 1 = x$$

$$x \approx 0.7109$$

17. Given $h(x) = \frac{x}{6} + 7$, find $h^{-1}(11)$ (2 points)

$$11 = \frac{x}{6} + 7$$

$$4 = \frac{x}{6}$$

$$24 = h^{-1}(11)$$

19. Atmospheric pressure on an airplane's surface is exponentially related to the plane's altitude. At sea level, pressure is 19.2 pounds per square inch (psi) and decreases 17% for each mile the plane rises. Determine the airplane's altitude when the pressure is 2.91 psi. (3 points)

$$2.91 = 19.2(0.83)^x$$

$$0.152 = 0.83^x$$

$$\frac{\log 0.152}{\log 0.83} = x$$

$$110.126 \text{ mi}$$

20. Solve for x. Write your answer in interval notation and on a number line. (3 points) $|6x-9| \geq 17$

$$6x - 9 \geq 17$$

$$6x - 9 \leq -17$$

$$6x \geq 26$$

$$6x \leq -8$$

$$x \geq \frac{13}{3}$$

$$x \leq -\frac{4}{3}$$

$$(-\infty, -\frac{4}{3}] \cup [\frac{13}{3}, \infty)$$



22. Factor: $6x^2 + 16x^2 - 6x$ (2 points)

$$2x(3x^2 + 8x - 3)$$

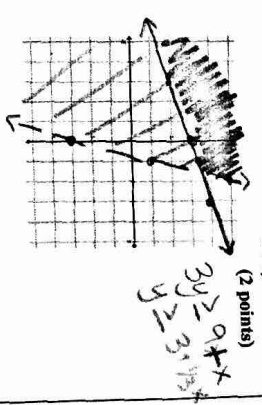
$$2x(3x-1)(x+3)$$

24. Factor completely: $8x^4 - 36x^3 - 20x^2$ (2 points)

$$4x^2(2x^2 - 9x - 5)$$

$$4x^2(2x+1)(x-5)$$

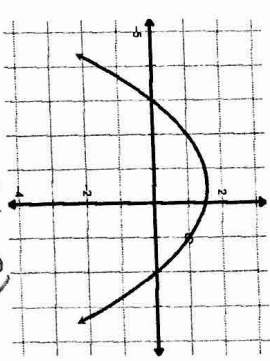
21. Find the solution region. $y > 4x - 3$ and $-x + 3y \geq 9$ (2 points)



23. What is the line of symmetry for $h(x) = x^2 - 5x + 16$? (1 point)

$$\frac{-b}{2a} = \frac{5}{2} = x$$

25. Write the equation of the graph in factored form. (3 points)



$$y = a(x+3)(x-2)$$

$$1 = a(4)(-1)$$

$$y = -\frac{1}{4}(x+3)(x-2)$$