Semester Exam Review Packet

This packet is not necessarily comprehensive. In other words, this packet is not a promise in terms of level of difficulty or full scope of material.

Equations

1. $9 - 2(n - 1) = \frac{3n}{4}$

$9 - 2n + 2 = \frac{3n}{4}$ $44 = 11n$

$4 \cdot \left(11 - 2n\right) = \frac{3n}{4} \cdot 4$ $\boxed{n = 4}$

$11 - 8n = 3n$

$44 \quad +8n \quad +8n$

2. $\frac{2}{3}x - \frac{1}{4} = \frac{2}{3}\left(x - \frac{1}{4}\right)$ $\frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$

$\frac{2}{3}x - \frac{1}{4} = \frac{2}{3}x - \frac{1}{6}$

$-\frac{1}{4} = -\frac{1}{6}$ $\boxed{No\ solution}$

3. Cheap Company long distance phone calls cost 36 cents plus 3 cents per minute. Economy Company long distance phone calls cost 6 cents per minute. How long is a call that costs the same amount no matter which company is used? What is the cost of that call?

$X = \# min$

$\boxed{12\ min;\ \$0.72\ each}$

$0.03x + 0.36 = 0.06x$

$0.03(12) + 0.36 \qquad 0.06(12)$

$0.72 \qquad\qquad 0.72$

$3x + 36 = 6x$

$36 = 3x$

$12 = x$

4. Four times a number is two less than six times the same number minus ten. What is the number?

$24 + 2 \qquad\qquad 36 - 10$

A   4

B   6

C   29

D   31

$4x + 2 = 6x - 10$

$2 = 2x - 10$

$12 = 2x$

$6 = x$

Solving for a Variable

5. Solve $3x + 7y = 2$ for y

$-3x \qquad -3x$

$\frac{7y}{7} = \frac{2 - 3x}{7} \frac{}{7}$

$\boxed{y = \frac{2}{7} - \frac{3x}{7}}$ or $\boxed{y = \frac{2 - 3x}{7}}$

6. Solve $st + 3t = 6$ for s.

$-3t \qquad -3t$

$\frac{st}{t} = \frac{6 - 3t}{t}$

$\boxed{s = \frac{6 - 3t}{t}}$ or $\boxed{s = \frac{6}{t} - 3}$

Inequalities

Solve and graph the following inequalities:

7. $2.5 + 2x \geq 5.5 + 2.5x$

$-2x \qquad\qquad -2x$

$2.5 \geq 5.5 + 0.5x$

$-5.5 \quad -5.5$

$\frac{-3}{0.5} \geq \frac{+0.5x}{0.5}$ $-6 \geq x$

$x \leq -6$

8. $-2(1 - x) < 3(x - 2)$

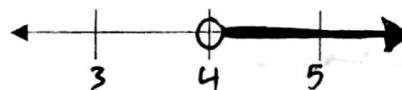$-2 + 2x < 3x - 6$

$-2x \quad -2x$

$-2 < x - 6$

$+6 \qquad +6$

$4 < x \rightarrow x > 4$

9. Patty's Pizza charges $5.50 for a large pizza plus $0.30 per topping. Pizza Town charges $5.00 for a large pizza plus $0.40 per topping. Which inequality can you use to find the number of toppings x so that the cost of a pizza at Pizza Town is greater than the cost of a pizza at Patty's Pizza?

A $(5 + 0.4)x > (5.5 + 0.3)x$
B $5.5x + 0.3 > 5x + 0.4$

C $5.5 + 0.3x > 5 + 0.4x$
D $5 + 0.4x > 5.5 + 0.3x$

10. Which compound inequality has no solution?

A. $x > 1$ OR $x < -2$
B. $x < 1$ AND $x > -2$
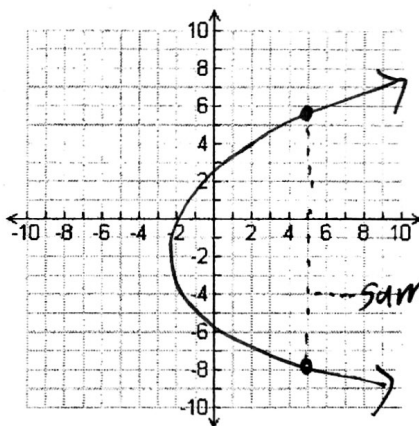
C. $x < 1$ OR $x < -2$
D. $x > 1$ AND $x < -2$

Functions

11. Create a table for a function.

x	y
0	1
2	10
4	63
6	700

each input
has 1 output

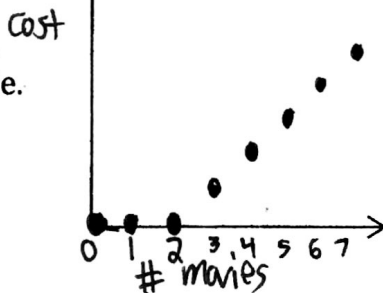12. Create a graph that is not a function.

same input, 2 outputs

13. Create a Graph for this situation:

You get two movies free from Blockbuster. Then you get charged a fixed rate per movie.

X= number of movies
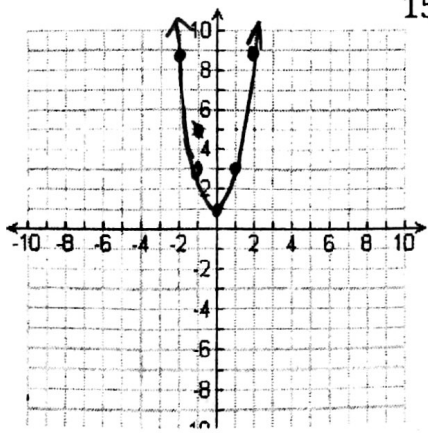Y= the total money spent in dollars

Cost

movies

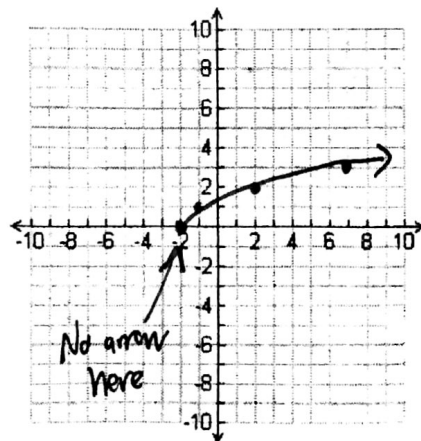For 14 and 15, make a table of values and use these values to graph the function.

14. $b(x) = 2x^2 + 1$

x	b(x)
-2	9
-1	3
0	1
1	3
2	9

15. $f(x) = \sqrt{x + 2}$

| x	f(x)
-2	0
-1	1
2	2
7	3

No arrow here

16. You put a yam in the oven. After 45 minutes, you take it out. Let $f(t)$ be the temperature of the yam t minutes after you placed it in the oven.

a. What does $f(0) = 65$ mean in terms of the situation? When you put it in the oven, it was 65°.

b. What does $f(5) < f(10)$ mean in terms of the situation? The temperature after 5 minutes was less the temperature after 10 minutes. So it g warmer in those 5 minutes.

c. What does $f(40) = f(45)$ mean in terms of the situation? The temp. after 40 mins was the same as the temp after 45 mins. The yam did not get warmer in those 5 mins.
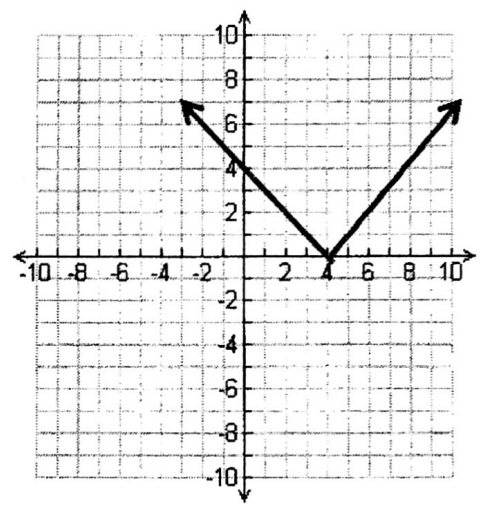
17. Which is greater, $a(-6)$ or $b(-6)$?
↳ = -4   ↳ = 11

$a(x)$
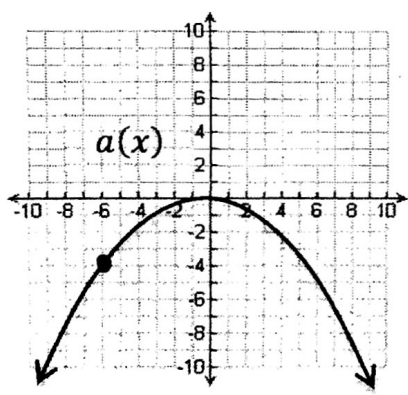
$b(x) = |x - 3| + 2$
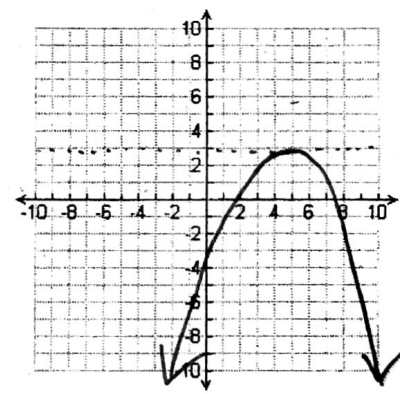$|-6-3|+2$
$|-9|+2$
$9+2$
11

$\boxed{b(-6)}$

18.

Domain:
All real numb

Range:
$y \geq 0$

19. Draw a graph that is increasing then decreasing then increasing and has a domain of all real numbers and a range of $y \leq 3$

20. A car can travel 30 miles on a gallon of gas and has a 20 gallon gas tank. Let g be the number of gallons of gas the car has in its tank. The function $d = 30g$ gives the distance d in miles that the car travels on g gallons.

$30 \cdot 20 = 600$ miles on a full tank   *decimals make s

a. What are reasonable values for the domain and range of the situation?
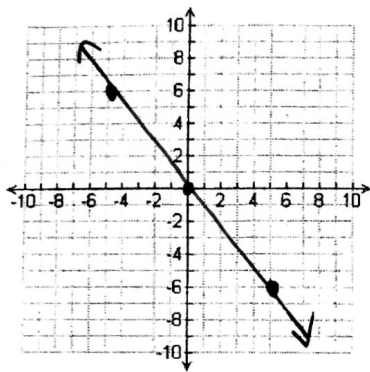Domain: $0 \leq g \leq 20$ Range: $0 \leq d \leq 600$

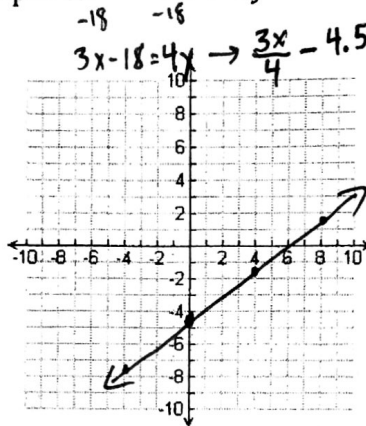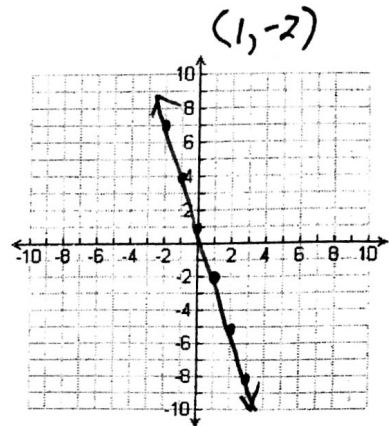b. How far can the car travel on 12 gallons of gas?

$d = 30 \cdot 12$
$\boxed{360 \text{ miles}}$

21. Graph: $y = -\frac{6}{5}x + 0$

22. Graph: $3x = 18 + 4y$
$$-18 \quad -18$$
$$3x - 18 = 4y \rightarrow \frac{3x}{4} - 4.5 = y$$

23. Graph: $y + 2 = -3(x - 1)$
$$(1, -2)$$

24. The line through A(1, -3) and B(-2, d) has a slope of -2. What is the value of d?

A $\frac{3}{2}$ C 5

B -1 (D 3)

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

$$\frac{d + 3}{-3} = -2 \rightarrow d + 3 = 6$$
$$d = 3$$

25. The table shows the cost in dollars charged by an electric company for various amounts of energy. When was the rate of change the lowest?

Energy(kWh)	200	400	600	1000	2000
Cost($)	3	31	59	115	150

$$\frac{\$28}{200 \, kWh} \quad \frac{\$28}{200 kWh} \quad \frac{\$56}{400 \, kWh} \quad \frac{\$35}{1000 kWh}$$

$$0.14 \quad 0.035$$

$$0.14 \qquad 0.14$$

$$\left(\begin{array}{c} \text{Last interval} \\ (btw \ 1000 - 2000) \end{array}\right)$$

Linear Inequalities

26. Which point is a solution of the inequality y > -x + 3?

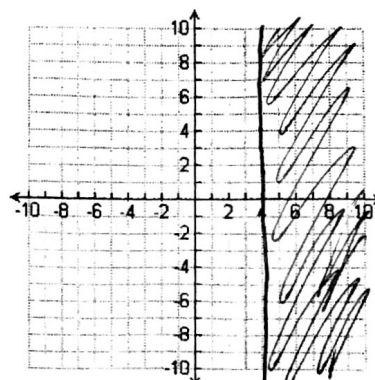A. (0, 3)   C (-1, 4)
(B. (1, 4))   D (0, -3)

A $3 > 0 + 3$ B $4 > -1 + 3$ C $4 > -(-1) + 3$
  $3 > 3$ $4 > 2$ $4 > 4$
  ✗   ✓   ✗

27. Graph: $y < x$
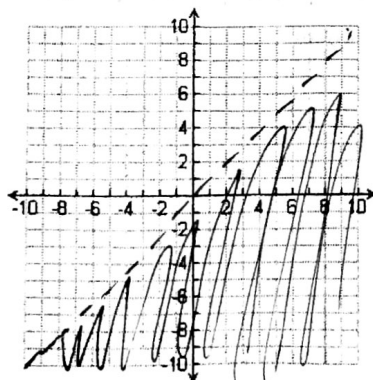
28. Graph: $x \geq 4$

Exponents

29. $\dfrac{60b^6 b^3 a e^2}{4 a e^{-2}}$

$\dfrac{60 b^3 e^2 \cdot e^2}{4}$

$\boxed{15 b^3 e^4}$

30. $\left(\dfrac{2c^{-3}a^4}{a^{10}a^6}\right)^2$

$\left(\dfrac{2}{c^3 a^6}\right)^2 = \boxed{\dfrac{4}{c^6 a^{12}}}$

31. $-(6^2)\cdot 2^{-2}$

$-36 \cdot \dfrac{1}{4} = \boxed{-9}$

Exponentials

Write the equation for each chart.

32.

x	f(x)
-2	0
-1	2
0	4
1	6
2	8

$+1 \bigl($ $-2 \rightarrow +2$
$+1 \bigl($ $-2 \rightarrow +2$ $\dfrac{2}{1}$

$\boxed{y = 2x + 4}$

33.

x	f(x)
-2	5/9
-1	5/3
0	5
1	15
2	45

$\times\cdot 3$
$\times\cdot 3$
$\times\cdot 3$
$\times\cdot 3$

$\boxed{y = 5\cdot 3^x}$

34. The graph of which function is shown below?
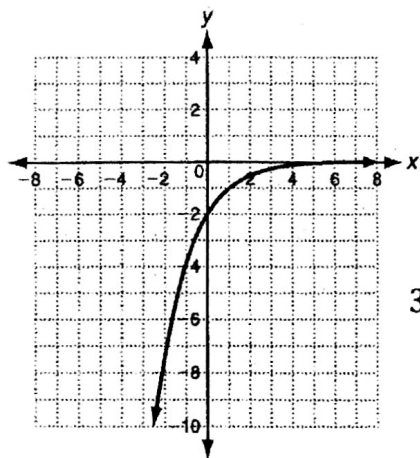
A $y = -2(2)^x$

B $y = -2\left(\dfrac{1}{2}\right)^x$

C $y = 2(2)^x$

D $y = 2\left(\dfrac{1}{2}\right)^x$

x	y
-1	-4
0	-2
1	-1
2	-½

35. What is the domain and range of the graphed function?

Domain: All real #s

Range: $y < 0$

36. The value of a car can be modeled by the function $g(t) = 22500(0.554)^t$, where **t** is the number of years. Describe what is happening with the value of the car, using both numbers from the function in your explanation.

$1 - .554 = .446 \rightarrow 44.6\%$

The original value of the car was $22,500. Each year, the car loses 44.6% of its value.

37. Suppose 6,700,000 people watch the first episode of "Keeping Up with the Kardashians", but the number of viewers decreases by 3.5% each week. $100\% - 3.5\% = 96.5\% \rightarrow 0.965$

    a. Write an exponential function to model the situation.

$$y = 6700000\,(0.965)^{t}$$

    b. If the pattern continues, how many will watch the season finale, which is ten weeks later?

$$y = 6700000(0.965)^{10} \approx \boxed{4{,}691{,}891 \text{ viewers}}$$

38. Jane's credit card company charges 20% interest per year, compounded quarterly. If Jane's credit card bill was originally \$775, how much will the bill be after 4 years if she doesn't pay it off? Round your answer to the nearest cent.

$$775\left(1 + \tfrac{.20}{4}\right)^{4 \cdot 4} \rightarrow 775(1.05)^{16}$$

<u>Sequences</u> $\boxed{\approx \$1691.73}$

39. The odometer on a car reads 60,473 on day 1. Every day, the car is driven 54 miles. If this pattern continues, what is the odometer reading on day 20?

$$60{,}473 + 54 \cdot 19$$

$\boxed{61{,}499}$

$$60{,}473 + 1026$$

40. When you fold a piece of paper in half, the thickness of the folded piece is twice the thickness of the original piece. A piece of copy paper is about 0.1 mm thick.

    a. How thick is a piece of copy paper that has been folded in half 7 times? $0.1 \cdot (2^{7})$

$\boxed{12.8 \text{ mm}}$

    b. Suppose that you could fold a piece of copy paper in half 12 times. How thick would it be? Write your answer in terms of cm.

$$0.1 \cdot 2^{12} = 409.6 \text{ mm} \cdot \frac{1\,cm}{10\,mm} = \frac{409.6}{10} = \boxed{40.96 \text{ cm}}$$

41. The 60th term of an arithmetic sequence Is 106.5 and the common difference is 1.5. Find the explicit and recursive rule for the sequence.   1st term: $106.5 - 59(1.5)$

$\boxed{\text{EXPLICIT: } a_n = 18 + 1.5(n-1)}$

$106.5 - 88.5$

18

$\boxed{\text{RECURSIVE: } a_1 = 18 \,;\, a_n = a_{n-1} + 1.5}$

42. The 10th term of a geometric sequence is 0.78125. The common ratio is -0.5. Find the explicit and recursive rule for the sequence.   1st term: $\dfrac{0.78125}{(-0.5)^{9}} = -400$

$\boxed{\text{EXPLICIT: } a_n = -400\,(-0.5)^{n-1}}$

$\boxed{\text{RECURSIVE: } a_1 = -400 \,;\, a_n = a_{n-1} \cdot -0.5}$

<u>Data</u>

Study the scatterplots and lines of best fit that we did in class.