Jared

Name:
Recitation Instructor:
Recitation Day and Time:

Studio College Algebra – Exam 1 – September 15, 2015

Directions: You will find 16 problems listed below. Each problem is worth 5 points. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed (in particular, calculators with a built in CAS and/or QWERTY keyboard are not allowed). You have one hour to complete this exam.

1. Evaluate and complete the following function table for $f(t) = 2t^3 + kt$, where k is some unspecified parameter.

t	-2	-1	0	1	2
$f(t)$	$-16-2k$	$-2-k$	0	$2+k$	$16+2k$

$f(-2) = 2(-2)^3 + k(-2) = -16 - 2k$

$f(-1) = 2(-1)^3 + k(-1) = -2 - k$

$f(0) = 2(0) + k(0) = 0$

$f(1) = 2(1)^3 + k(1) = 2 + k$

$f(2) = 2(2)^3 + k(2) = 16 + 2k$

2. Solve for x: $6(x-7) = 3x - 5$

$6x - 42 = 3x - 5$

$3x = 37$

$\boxed{x = \frac{37}{3}}$

3. Graph $-3x + 4y = 8$ on the grid below. Include all intercepts.

$4y = 3x + 8$

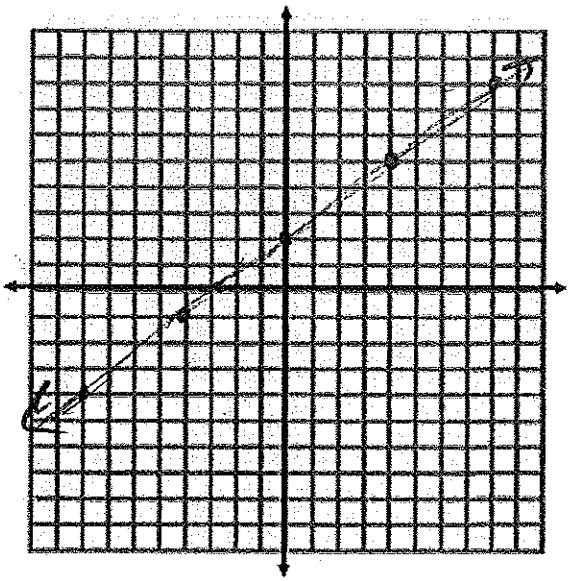
$y = \frac{3}{4}x + 2$

x-intercept:

$0 = \frac{3}{4}x + 2$

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

$-\frac{8}{3} = x$



4. Solve $|x - 7| = 3x + 1$ and check your answers.

Blane

$x - 7 = 3x + 1$ or $x - 7 = -(3x + 1)$

$-8 = 2x$ or $x - 7 = -3x - 1$

$x = -4$ or $4x = 6$.

$x = -4$ or $x = \frac{3}{2}$

check $x = -4$:

Left side: $|-4 - 7| = 11$

Right side: $3(-4) + 1 = -11$

$11 \neq -11$

$x = -4$ doesn't work

check $x = \frac{3}{2}$

Left side: $|\frac{3}{2} - 7| = \frac{11}{2}$

Right side: $3(\frac{3}{2}) + 1 = \frac{11}{2}$ ✓

Only $x = \frac{3}{2}$ works

Joe.

5. Solve $|3x - 7| < 9$.

$-9 < 3x - 7$ and $3x - 7 < 9$

$-2 < 3x$ and $3x < 16$

$-\frac{2}{3} < x$ and $x < \frac{16}{3}$

either one OKAY.

Solution: $-\frac{2}{3} < x < \frac{16}{3}$

6. Solve $|5x + 2| > 4$.

$5x + 2 > 4$ or $5x + 2 < -4$

$5x > 2$ or $5x < -6$

$x > \frac{2}{5}$ or $x < \frac{-6}{5}$

Lee

7. A car depreciates in value according to a linear model. If the initial value of the car is $36,000, and the value forty years later is $4000, what was the depreciated value of the car after 14 years?

(0, 36000)
(40, 4000)

Slope: $\frac{-32000}{40} = -800$ dollars/year

$f(x) = -800x + 36{,}000$

Plug in 14 for x: $f(14) = -800(14) + 36000$
$= -11200 + 36000$
$= \boxed{\$24800}$

8. Suppose a line passes through (-2,5) and (3,7). What is another point on the line? Show work and/or explain how you arrived at your answer.

Slope: $\frac{7-5}{3-(-2)} = \frac{2}{5}$

Line: $y - 7 = \frac{2}{5}(x - 3)$

$y = \frac{2}{5}x - \frac{6}{5} + \frac{35}{5}$

$y = \frac{2}{5}x + \frac{29}{5}$ (*)

Any (x, y) that satisfies (*), with (exception to the given points)

Brian

9. What is the domain of the function $f(x) = \dfrac{2}{3x+4}$?

$3x + 4 = 0$

$3x = -4$

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

All real numbers except $x = -\frac{4}{3}$.

10. The weekly profit function for a business is $P(x) = 25x - 200$, where x is the number of customers. How many more customers must the business add if it wants to increase profits by \$200 per week?

$\frac{200}{25} =$ 8 customers

marginal profit

Thomas

11. Given the function $C(x) = 30x + 2500$, which describes the total cost function of producing x frames, answer the folowing questions. Note: In context of this situation, x is a whole number greater than or equal to 0.

(a) What is the practical meaning of $C(0)$? Explain in a complete sentence.

2pts
- C(0) represents fixed costs.
- C(0) = $2500, the fixed costs

(either one is fine)

(b) Find and interpret $C(30)$.

1pt $C(30) = 900 + 2500 = \$3400$

2pts The total cost of making 30 frames is $3400.

12. The equation $5F - 9C = 160$ gives the relationship between Fahrenheit and Celsius temperature measurements, where F is the temperature in Fahrenheit and C is the temperature in Celsius. What Celsius measure corresponds to a Fahrenheit measure of 75 degrees? Round your answer to the nearest tenth.

$5(75) - 9C = 160$

$375 - 9C = 160$

$-9C = 160 - 375$

Rekha

13. A tutoring service charges a flat fee of \$10 for the first hour of tutoring, plus \$7 for each extra hour thereafter. Find a linear function $C(x)$ that describes the total cost of x hours of tutoring, where $x \geq 1$.

$C(x) = 7(x-1) + 10$

or $C(x) = 7x - 7 + 10$

$= 7x - 3$

14. Suppose the cost function for a certain product is given by $C(x) = 10x + 4000$ and the revenue function for the product is given by $R(x) = 20x + 2000$. How many units must be sold to make a profit of \$6000?

$P(x) = 20x + 2000 - (10x + 4000)$

$P(x) = 10x - 2000$

$6000 = 10x - 2000$

$8000 = 10x$

$x = 800$ units

John

15. Find K if $x = 4$ is a solution for $Kx + 7 = 3x + 2K$.

$K(4) + 7 = 3(4) + 2K$

$2K = 5$

$\boxed{K = \frac{5}{2}}$

16. Find a linear model that fits the data set given below.

x	-4	2	8	14	20
y	3	6	9	12	15

Slope: $\frac{3}{6} = \frac{1}{2}$

Line: $y - 6 = \frac{1}{2}(x - 2)$

$\boxed{y = \frac{1}{2}x + 5}$

(2) Point slope form is fine.