U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____ Key

Directions: Be sure to show ALL work for each problem. Leave answers as fractions.

look out 1st!

Solve for x

1A) $\frac{5}{6}x-\frac{4}{3}=x-\frac{1}{4}+\frac{7}{2}x$) · 12

$12\cdot\frac{5}{6}x-\frac{4}{3}\cdot 12=12x-\frac{12}{4}+\frac{7}{2}x\cdot 12$

$10x-16=12x-3+42x$

$10x-16=54x-3$

$-13=44x \quad x=-13/44$

1B) $\frac{2x-7}{3}+5=-2$

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

$2x-7=-21$

$2x=-14$

$x=-7$.

Solve each system of equations algebraically :

2) $y+2x=10+4y$

$2x-3y=10$

(8, 2)

$4(x+y)=42-y$

$4x+4y=42-y$

$4x+5y=42$

$-4x-6y=20$

$11y=22$

$y=2$

3) $\frac{3}{4}x+\frac{1}{3}y=1$) 12

$x-y=10$

(4, -6)

$9x+4y=12$

$4\cdot(x-y=10)+$

$4x-4y=40$

$9x+4y=12$

$13x=52 \quad x=4$

4A) You are opening a tea shop. Your signature tea is a mixture of lavender and rose hips. Lavender costs $14 a pound, while rose hips cost $9 a pound. You want to charge $11 per pound for the blend, and you want to produce it in 20 pound batches. How many pounds of each should you mix?

let L = lbs lavender R = lbs rose hips

A. Write a system of equations to represent the situation. Then solve it!

			TOTAL = P · Q
quantity	L	+ R	= 20
value	14L	+ 9R	= 11(20)

careful!

$-9(L+R)=(20)-9$

$14L+9R=220$

$-9L-9R=-180$

$5L=40$

$L=8$

8 pounds lavender

12 pounds rose hips.

U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____

4B. A boat travels 224 miles upstream in 8 hours. The next day it returns the same distance in 7 hours. Assuming the current remained the same both ways, what was the rate of the boat and the rate of the current.

	R	T	= D
up	r − c	8	224
down	r + c	7	224

r = rate boat

c = rate current

$(8r - 8c = 224) \cdot 7$

$(7r + 7c = 224) \cdot 8$

$56r - 56c = 1568$

$56r + 56c = 1792$

$112r = 3360$

$r = 30 \text{ mph}$

boat = 30 mph

current = 2 mph

4c. At a restaurant, the cost of 2 burritos and 1 tortilla salad is $20.57. The cost for 3 burritos and 3 tortilla salads is $36.24. Which pair of equations can be used to determine b, the cost of a burrito, and t, the cost of a tortilla salad?

$2b + t = 20.57$

$3b + 3t = 36.24$

A. $b + t = 20.57$, $3b + 3t = 36.24$

B. $2b + t = 20.57$, $3b + 3t = 36.24$

C. $2b + t = 20.57$, $b + t = 36.24$

D. $b + 2t = 20.57$, $b + t = 36.24$

$x = 2y - 6$

4d. Erica is training for a marathon. This week she ran 6 less than 2 times the number of miles that she ran last week. In these two weeks she ran a total of 42 miles. Which system of equations can be used to find x, the number of miles she ran this week and y, the number of miles she ran last week?

$x = 2y - 6$ $\quad x + y = 42$

A. $x + y = 42$, $x = 2y - 6$

B. $x + y = 42$, $y = 2x - 6$

C. $x + y = 42$, $x = 2y + 6$

D. $x + y = 42$, $y = 2x + 6$

Factor each expression completely

5) $6x^2 + 13x - 15$

$= (6x - 5)(x + 3)$

$-5x$

$18x$

$13x$ ✓

6) $25y^3 - 81y$

$= y(25y^2 - 81)$

$= y(5y + 9)(5y - 9)$

U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____

7) $72x^2+50x^4-120x^3$

$50x^4-120x^3+72x^2$

$=2x^2(25x^2-60x+36)$

$=2x^2(5x-6)^2$

8) $x^3+7x-3x^2-21$

$x^3-3x^2+7x-21$

$x^2(x-3)+7(x-3)$

$(x-3)(x^2+7)$

Solve the following equations by **factoring**. If prime, use the quadratic formula.

9) $7x^2-1=3x$

$7x^2-3x-1=0$

$(\quad)(\quad)=0$

QF $x=\dfrac{3\pm\sqrt{9-4(7)(-1)}}{14}$

$x=\dfrac{3\pm\sqrt{37}}{14}$

10) $200x^3-32x=0$

$2x(100x^2-16)=0$

$2x(10x+4)(10x-4)=0$

$x=0 \quad x=\dfrac{2}{5} \quad x=\dfrac{-2}{5}$

Solve using the most efficient method

11) $(2x-3)(x-7)=2$

$2x^2-14x-3x+21=2$

$2x^2-17x+19=0$

Uggh!

$(2x-19)(x-\quad)=0$

MUST USE QF $x=\dfrac{17\pm\sqrt{137}}{4}$

12) $(4x-1)^2+1=50$

$(4x-1)^2=49$

$4x-1=\pm\sqrt{49}$

$4x-1=\pm7$

$4x-1=7$ $\quad 4x=8$ $\quad x=2$

$4x-1=-7$ $\quad 4x=-6$ $\quad x=-3/2$

13. You have developed a hot new product! At its current selling price of $80, you are selling 200 per week. Your market research shows that if you drop the price by $5, you will sell 20 more each week. What price would maximize revenue?

let $x=$ # price drops

price	quantity
$80-5x$	$200+20x$

$y=(80-5x)(200+20x)$

$x\min=0 \quad y\min=0$

$x\max=16 \quad y\max=80\times200+$ ◯ $\approx 20{,}000?$

(3, 16,900)

∴ if $x=3$

price $=80-5(3)$

price $=\$65$

calc max

for max revenue of $\$16{,}900$

U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____

14. You would like to maximize the volume of the box that holds your product. If you are using rectangular sheets of cardboard that measure 24 inches by 20 inches, what should the height of the box be that would maximize the number of cubic inches that the box could hold?

$V = LWH$

$V = (24-2x)(20-2x)(x)$

$x\min = 0$ $y\min = 0$

$x\max = 10$ $y\max = ~~180~~ 900$

calc max

(3.62, 774.16)

∴ height = 3.62 inches for max volume of $774.16\ in^3$.

Solve the following example algebraically or using your graphing calculator. Round all answers to the **nearest hundredth** where applicable.

15) The following function models the height of a toy rocket (in feet) as time passes (in seconds) is as follows:

$$h(t) = -16t^2 + 60t + 20$$

a) How long will it take the rocket to hit the ground? _____

↓ calc zero

or set $h(t) = 0$

$0 = 4t^2 - 15t - 5$ 4.058 seconds.

b) How long will it take for the rocket to reach its max height? What is the max height?

$x = \frac{-b}{2a}$ or calc max 1.875 seconds

76.25 feet

c) 1 second after launch, the rocket hits a power line. How high was the power line off the ground?

let $t = 1$ or calc value $X = 1$

64 feet

d) 3 seconds after launch, the rocket hits a balloon. How high was the balloon?

let $t = 3$ or calc value $X = 3$

56 feet.

U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____

Sketch a possible graph for the polynomial. Be sure to label zeroes and y intercept.

16. $f(x) = -x(x+3)^2(x-6)$

degree 4 ↓ ↓

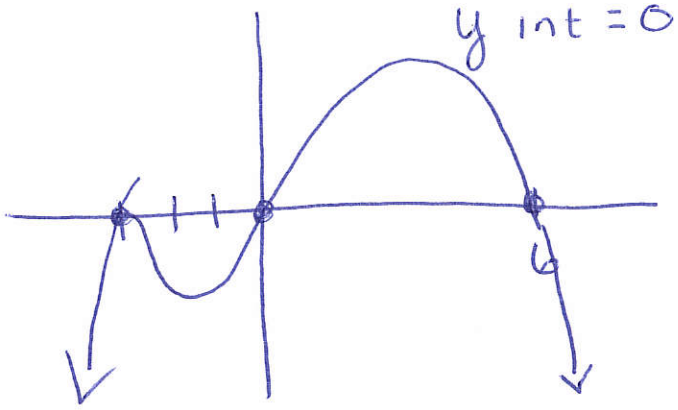
zeros:

0 m1

-3 m2

6 m1

y int = 0

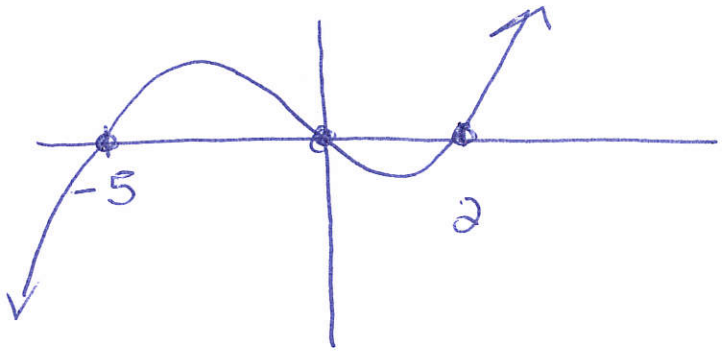


17. $f(x) = 4x(x+5)(x-2)$

degree 3 ↓ ↑

zeros $x=0$, $x=-5$, $x=2$ } m1

y int = (0, 0)



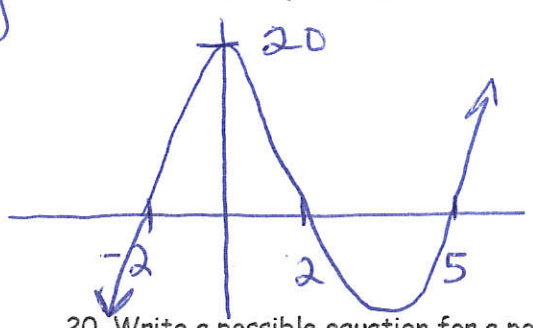
18. $g(x) = x^3 - 5x^2 - 4x + 20$

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

$g(x) = (x-5)(x+2)(x-2)$

y int = (0, 20) roots 5, -2, +2

↓ ↑



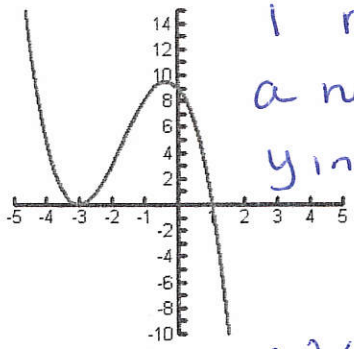
19. Write an equation to represent the graph.

-3 m2

1 m1

a neg

y int (0, 9)



$y = a(x+3)^2(x-1)$

$9 = a(9)(-1)$

$a = -1$ → $y = -1(x+3)^2(x-1)$

20. Write a possible equation for a polynomial with a degree of 6 and having 5 as a triple root, -2 as a double root, and 3 as a single root (in factored form).

m3 m2 m1

$y = (x-5)^3(x+2)^2(x-3)$

U1D3_4 Pre-Calc Algebra Review Packet Unit 1 Quiz Prep

Name: _____

Solve each radical equation. Don't forget to check for extraneous solutions!

21). $\sqrt{x^2+9} = (-5)$

$\sqrt{}$ = neg → no solution!

22.) $5\sqrt{2x+1} - 7 = 3$

$\sqrt{2x+1} = 2$

$2x+1 = 4$

$2x = 3$

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

check it ✓

23.) $\left(\sqrt[3]{x^2-1}\right)^3 = (2)^3$

$x^2 - 1 = 8$

$x^2 = 9$

$x = \pm\sqrt{9}$

$x = 3 \quad x = -3$

check it ✓ ✓

24.) $\left(\sqrt{x+7}\right)^2 = (x-5)^2$

$x + 7 = x^2 - 10x + 25$

$0 = x^2 - 11x + 18$

$0 = (x-9)(x-2)$

$x = 9 \quad x = 2$

check

$x = 9$

25.) $\sqrt{x-3} + \sqrt{x+5} = 4$

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

$x + 3 = 16 - 8\sqrt{x+5} + (x+5)$

$-24 = -8\sqrt{x+5}$

$(3)^2 = \left(\sqrt{x+5}\right)^2 \rightarrow 9 = x+5$ $x = 4$ check ✓

26). Why must we check for extraneous solutions when we solve radical eqs?

When we $(\ )^2 \rightarrow$ pos.

$\sqrt{} \neq$ neg