# Solutions – Alg 2A Review Problems for Trimester Exam

## Domain/Range

(1a) domain $-4 \le x < 2$

range $-3 \le y < 5$

(1b) domain $-3 \le x \le 2$

range $-2 \le y \le 3$

(3) a, f, and g should be circled

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

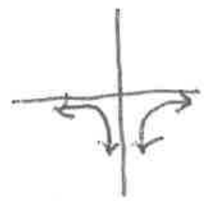
(2a) domain all reals can be written as $-\infty < x < \infty$

range $y \ge 0$ $0 \le y < \infty$

(2b) domain all reals except $x=3$ $-\infty < x < \infty,\ x \ne 3$

range all reals except $y=1$ $-\infty < y < \infty,\ y \ne 1$

(2c) graph on calculator



domain

all reals except $x=0$

$-\infty < x < \infty,\ x \ne 0$

range $y < 0$

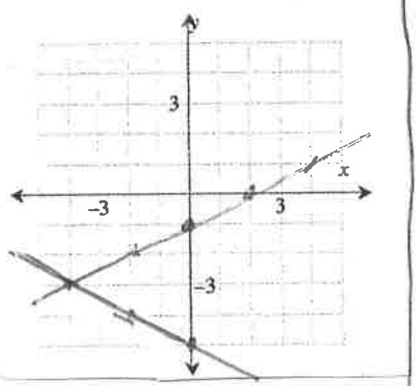
$-\infty < y \le 0$

(5) $y = -\frac{1}{2}x - 5$ and $x - 2y = 2$ ✓

$-2y = -x + 2$

$2y = x - 2$

$y = \frac{1}{2}x - 1$




(6) $(5,-1)$ $(-1,2)$

$\text{slope} = \frac{\Delta y}{\Delta x} = \frac{2 - -1}{-1 - 5} = \frac{3}{-6} = \frac{-1}{2}$

$y = mx + b$

$y = -\frac{1}{2}x + b$

$(5,-1)$ $-1 = \frac{-1}{2}(5) + b$

$-1 = \frac{-5}{2} + b$

$b = 1.5$

$y = \frac{-1}{2}x + 1.5$

(7) $\frac{3(x-4)}{5} = \frac{4-x}{2}$

can cross multiply or just clear fractions.

$3(x-4) \cdot 2 = 5(4-x)$

$6(x-4) = 20 - 5x$

$6x - 24 = 20 - 5x$

$11x - 24 = 20$

$11x = 44$

$x = 4$

(8)

(2x + 5) – (5x + 4) = 6 – 2(x – 3)

2x + 5 – 5x + 4 = 6 – 2x – 6

error (-)

2nd error

–3x + 9 = –2x

–3x + 9 = –2x

~~x = 8~~

answer should be $x = -11$

(9) $f(x) = (x-4)^2$

a) $f(3) = (3-4)^2$

$= (-1)^2$

$= \underline{\underline{1}}$

b) $f(\bar{2}) = (-2-4)^2$

$= (-6)^2$

$= \underline{\underline{36}}$

c) $f(x) = 25$

$(x-4)^2 = 25$

$\sqrt{\phantom{x}} \quad \sqrt{\phantom{x}}$

$x-4 = \pm\sqrt{25}$

$x-4 = 5 \qquad x-4 = -5$

$\phantom{x-4 = 5 \qquad} +4 \quad +4$

$x = 9 \qquad x = -1$

(10) $f(x) = \sqrt{2x-8}$

a) $f(12) = \sqrt{2(12)-8}$

$= \sqrt{24-8}$

$= \sqrt{16}$

$= \underline{\underline{4}}$

b) $\sqrt{2x-8} = 3$

square both sides

$2x-8 = 9$

$2x = 17$

$\underline{\underline{x = 8.5}}$

(11) $6x^3 + 5x^2 = 0$

factor out $x^2$ which is common

$x^2(6x+5) = 0$

Use zero product property

$x^2 = 0 \qquad 6x+5 = 0$

$x = 0 \qquad x = -\frac{5}{6}$

(12) $4m^4 - 6m^3 + 2m^2$

$2m^2(2m^2 - 3m + 1)$

$2m^2(2m-1)(m-1)$

FACTORED completely

| | $m$ | $-1$ |
|---|---|---|
| $2m$ | $2m^2$ | $-2m$ |
| $-1$ | $-m$ | $1$ |

$2m \times -3m$

(13) $(3x+7)(4x-7)(9874x) = 0$

Use zero product property

$3x+7 = 0 \qquad 4x-7 = 0 \qquad 9874x = 0$

$x = -\frac{7}{3} \qquad x = \frac{7}{4} \qquad x = 0$

(14)

$3x^3 + 6x^2 - 45x = 0$

$3x(x^2 + 2x - 15) = 0$

$x^2 + 2x - 15 = 0$

$(x-5)(x+3) = 0$

$x = 5$ or $x = -3$

can't divide by x because it would eliminate a solution.

factors are incorrect

instead

$3x(x+5)(x-3) = 0$

Use zero product property

$3x = 0 \qquad x+5 = 0 \qquad x-3 = 0$

$x = 0 \qquad x = -5 \qquad x = 3$

(15) $y - 8x - 8 = 3(x^2 + 2x) + 8x - 9$

$y - 8x - 8 = 3x^2 + 6x + 8x - 9$

$y - 8x - 8 = 3x^2 + 14x - 9$

$\underline{\underline{y = 3x^2 + 22x - 1}}$

(16) $5x - 2y = -36$ → multiply all terms by 3 → $15x - 6y = -108$
$4x + 3y = -15$ → multiply by 2 → + $8x + 6y = -30$ then eliminate

$23x = -138$

$x = -6$

$4(-6) + 3y = -15$
$-24 + 3y = -15$
$3y = 9$
$y = 3$

intersection is at $(-6, 3)$

(17) 3, 6, 12, ...... a) ~~geometric~~ since there is a constant multiplier of 2

b) $t_n = 3(2)^{n-1}$ or $t_n = \frac{3}{2}(2)^n$

(18) 148, 144, 140, 136, 132, 128. $t_n = 148 - 4(n-1)$ which is same as $t_n = -4n + 152$

$t_{225} = 148 - 4(225-1) = -748$

(19) expon functions

Geometric

| x | y |
|---|---|
| 0 | 3.1 |
| 1 | 4.34 |
| 2 | 6.076 |
| 3 | 8.5064 |
| 4 | 11.90896 |

$y = 3.1(1.4)^x$

| x | y |
|---|---|
| 0 | 3 |
| 1 | 18 |
| 2 | 108 |
| 3 | 648 |
| 4 | 3888 |

$3 \cdot b \cdot b = 108$
$3 \cdot b^2 = 108$
$b^2 = 36$
$b = 6$

$y = 3(6)^x$

(20) .... $y = 2254000(1.035)^{15} = 3,776,236.265$
$= 3,776,000$ people

(21) $100\% - 12\% = 88\%$
multiplier is 0.88

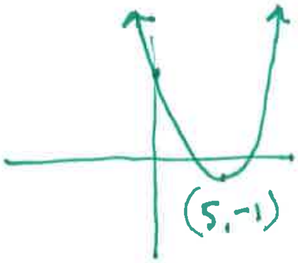
(a) $y = 9000(0.88)^5 = \$4,749.59$ value in 5 yrs.

(b) $y = 9000(.88)^{-3} = \$13,206.71$ value 3 years ago

$y = (x-5)^2 - 1$

(22) vertex is $(5,-1)$ because replace $x$ with $x-5$ in any function shifts a graph 5 units to the right

Attaching a $-1$ to the end of any function shifts it down 1 unit




This vertex is a minimum because the "a" coefficient is positive so the parabola has a positive orientation.

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(23) $y = \frac{1}{4}(x+2)(x-6)$

(a) It is easier to find the x-intercepts since the parabola function is in factored form. In other words, its easy to set equal to 0 and use the zero product property to quickly solve for $x$.

b) $\frac{1}{4}(x+2)(x-6) = 0$

$x+2=0$ $\quad$ $x-6=0$

$x=-2$ $\quad$ $x=6$

so the x-intercepts are $(-2,0)$ and $(6,0)$

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(24a) $y = x^2+8x+20$

$y = x^2+8x \quad +20$

Add $\left(\frac{8}{2}\right)^2 = 16$ to complete the square

$y+16 = \underbrace{x^2+8x+16} \quad +20$

$y+16 = (x+4)^2 + 20$

$\quad -16 \qquad\qquad -16$

$y = (x+4)^2 + 4$

so the vertex is $(-4,4)$

(24b) $y = 2x^2+8x-24$

divide by 2

$\frac{y}{2} = x^2 + 4x \quad -12$

$\frac{y}{2} + 4 = \underbrace{x^2+4x+4} \quad -12$

$\frac{y}{2} + 4 = (x+2)^2 - 12$

$\frac{y}{2} = (x+2)^2 - 16$

$y = 2(x+2)^2 - 32$

so the vertex is $(-2,-32)$