

Final Review

TRIG Review

(1) $\sin(-60) = \frac{-\sqrt{3}}{2}$

Solving

(10) $3 \csc x = 2 \csc x + 2$

$\csc x = 2$

$\sin x = \frac{1}{2}$

30, 150

(2) $\tan \frac{7\pi}{4} = -1$

(3) $\cos(-\frac{5\pi}{4}) = \frac{-\sqrt{2}}{2}$

(4) $\cos x = \frac{\sqrt{3}}{2}$

30

(11) $\tan^2 x - 2 \tan x + 1 = 0$

$(\tan x - 1)(\tan x - 1) = 0$

$\tan x = 1$

$\frac{\pi}{4}, \frac{5\pi}{4}$

$x^2 - 2x + 1$

$(x-1)(x-1)$

(5) $\tan x = 1$

45

(6) $\sin x = 0$

0°

(12) $\cos^2 x \sin x - \sin x = 0$

$\sin x (\cos^2 x - 1) = 0$

$\sin x = 0$ $\sqrt{\cos^2 x = 1}$

0, π , 2π

$\cos x = \pm 1$

0, π , 2π

(7) 250

(13) $\cos^2 x - \cos x - 2 = 0$

$(\cos x - 2)(\cos x + 1) = 0$

$\cos x = 2$ $\cos x = -1$

\emptyset

π

(8) $\frac{8\pi}{3}$

(14) $6 \cos x + 3 = 0$

$\cos x = \frac{-3}{6}$

$\cos x = \frac{1}{2}$ $\frac{\pi}{3}, \frac{5\pi}{3}$

(9) $\frac{-11\pi}{6}$

(15) $2 \sin^2 x - \sin x - 1 = 0$

$(2 \sin x + 1)(\sin x - 1) = 0$

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

$\sin x = 1$

$\frac{7\pi}{6}, \frac{11\pi}{6}$

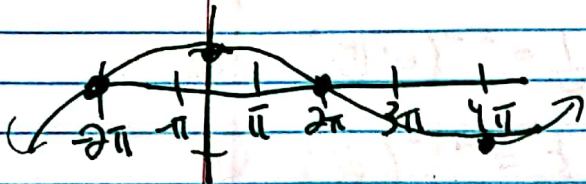
$\frac{\pi}{2}$

TRIG

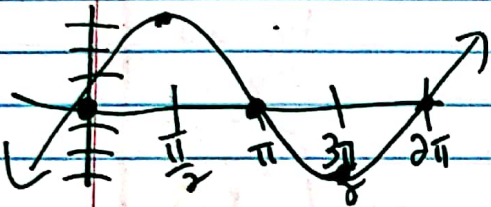
Rational Exp/Radical

Graphing.

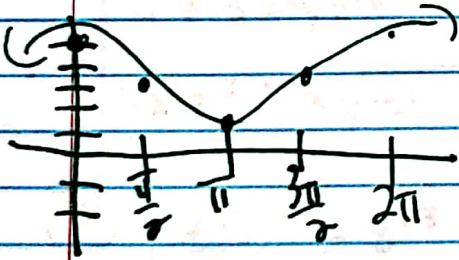
(16) $f(x) = \cos\left(\frac{1}{4}x\right)$
 $\frac{2\pi}{\frac{1}{4}} = 4\pi$



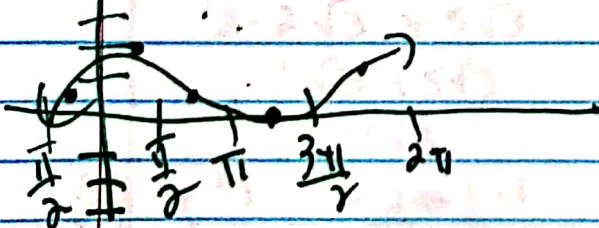
(17) $f(x) = 3\sin x$



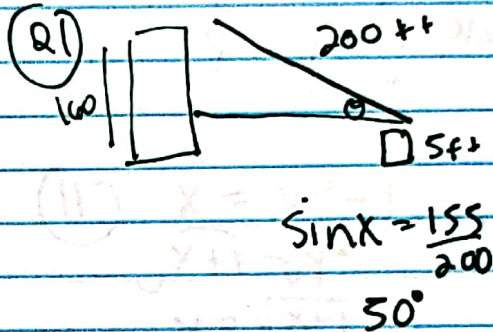
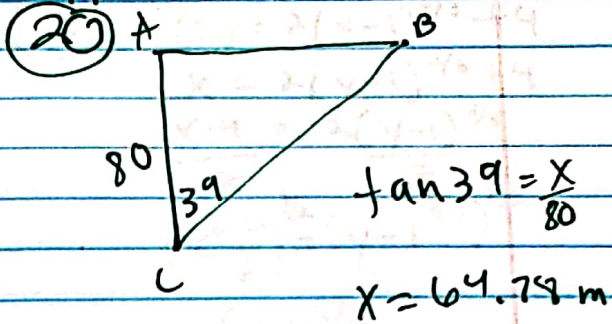
(18) $f(x) = 2\cos x + 3$



(19) $f(x) = \sin\left(x - \frac{\pi}{4}\right) + 1$



Applications.



Rational Exp / Radical

(1) $27^{2/3} = 9$

(2) $(\sqrt[3]{-64})^2 = 16$

(3) $(\sqrt[4]{16})^{-2} = \frac{1}{4}$

(4) $(\frac{4}{a})^{-1/2} = \frac{3}{2}$

(5) $\frac{4xy^{-2} \cdot \sqrt{x^{-3}y^3}}{\sqrt{x^5y} \cdot \frac{1}{2x^{-1}y^3}}$
 $= \frac{2x^{-2}y^1}{x^4y^4}$

$\frac{2}{x^6y^3}$

(6) $\sqrt[3]{24x^3yz^{10}}$
 $\sqrt[3]{8 \cdot 3 \cdot x^3yz^{10}}$

$2x^1z^3 \sqrt[3]{3yz^1}$

(7) $(\frac{24}{3})^{1/3} = 8^{1/3} = 2$

(8) $2\sqrt{4 \cdot 3} + 5\sqrt{3}$
 $2 \cdot 2\sqrt{3} + 5\sqrt{3}$
 $4\sqrt{3} + 5\sqrt{3}$
 $9\sqrt{3}$

(9) $\frac{x^{4/3}}{x^{1/4}}$ $\frac{1 \cdot \frac{2}{3} - 1 \cdot \frac{1}{4}}{1 \cdot \frac{2}{3} - 1 \cdot \frac{1}{4}}$

$x^{5/12}$ $\frac{8}{12} - \frac{3}{12}$

(10) $f(x) = 2(x-1)^{2/3} + 4$

$x = 2(y-1)^{2/3} + 4$

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

$(\frac{x-4}{2})^{3/2} = (y-1)^{2/3 \cdot 3/2}$

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

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

(11) $x = y^2 - 1$
 $\sqrt{x+1} = \sqrt{y^2}$
 $y = \sqrt{x+1}$

(12) $5x = \frac{4y^4 - 1}{5}$

$5x = 4y^4 - 1$

$\frac{5x+1}{4} = \frac{4y^4}{4}$

$\sqrt[4]{\frac{5x+1}{4}} = \sqrt[4]{y^4}$

$y = \sqrt[4]{\frac{5x+1}{4}}$

(13) $\sqrt{x-25} + 3 = 5$
 $(\sqrt{x-25})^2 = 2^2$

$x-25 = 4$

$x = 29$

(14) $(\sqrt[3]{x-16})^3 = 2^3$

$x-16 = 8$

$x = 24$

Rational Exp

(15) $\frac{2x^{3/2} = 16}{2} = \frac{16}{2}$

$(x^{3/2})^{2/3} = (8)^{2/3}$

$x = 2^2$

$x = 4$

(16) $(x-6)^2 = (\sqrt{3}x)^2$

$x^2 - 12x + 36 = 3x$

$x^2 - 15x + 36 = 0$

$(x-12)(x-3) = 0$

$x = 12 \quad x = 3$

(17) $(\sqrt{21x+1})^2 = (x+5)^2$

$21x+1 = x^2+10x+25$

$0 = x^2 - 11x + 24$

$0 = (x-8)(x-3)$

$x = \frac{11 \pm \sqrt{(-11)^2 - 4(1)(-24)}}{2(1)} = \frac{11 \pm 11}{2}$

$0 = (x-8)(x-3)$

$x = 8, 3$

(18) $y = 2\sqrt{x-3} + 1$

X	Y
3	$2\sqrt{3-3} + 1 = 1$
4	$2\sqrt{4-3} + 1 = 3$
7	$2\sqrt{7-3} + 1 = 5$

See graph

D: $(3, \infty)$

R: $(1, \infty)$

(19) $y = -3\sqrt[3]{x+5} - 4$

X	Y
-6	$-3\sqrt[3]{-6+5} - 4 = -7$
-5	$-3\sqrt[3]{-5+5} - 4 = -4$
-4	$-3\sqrt[3]{-4+5} - 4 = -7$
3	$-3\sqrt[3]{3+5} - 4 = -10$

See graph

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

(20) $y = -\sqrt{x+3}$

X	Y
0	$-\sqrt{0+3} = -\sqrt{3}$
1	$-\sqrt{1+3} = -2$
4	$-\sqrt{4+3} = -\sqrt{7}$

See graph

D: $(0, \infty)$

R: $(-\infty, 3)$

(21) $y = \sqrt[3]{x-1} - 2$

X	Y
-7	$\sqrt[3]{-7-1} - 2 = -4$
0	$\sqrt[3]{0-1} - 2 = -3$
1	$\sqrt[3]{1-1} - 2 = -2$
2	$\sqrt[3]{2-1} - 2 = -1$
9	$\sqrt[3]{9-1} - 2 = 0$

See graph

D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

①

R.E. App.

(2)

$$E = 625s^2$$

(a)

$$\frac{E}{625} = \frac{625s^2}{625}$$

$$\frac{E}{625} = s^2$$

$$s = \sqrt{\frac{E}{625}}$$

(b)

$$s = \sqrt{\frac{120,000}{625}}$$

$$s = 13.86 \text{ km/hr}$$

(c)

$$s = \sqrt{\frac{940,000}{625}}$$

$$s = 19.6 \text{ km/hr}$$

NO₁ does not double

Exp/Log

(1)

$$\log_4 \frac{1}{2} = -\frac{1}{2}$$

(2)

$$\log_4 \frac{1}{16} = -2$$

(3)

$$\log_5 125 = 3$$

(4)

$$\log_6 6 = 1$$

(5)

$$\log \frac{100x^2}{y}$$

$$\log 100 + 2\log x - \log y$$

(6)

$$\log \frac{100^{y^2}}{x^2 y^8}$$

(7)

$$y = \log_3 (x-5)$$

$$x = \log_3 (y-5)$$

$$3^x = y-5$$

$$3^x + 5 = y$$

(8)

$$y = 2^{x-3} + 4$$

$$x = 2^{y-3} + 4$$

$$x-4 = 2^{y-3}$$

$$\log_2 (x-4) = y-3$$

$$\log_2 (x-4) + 3 = y$$

(10)

$$7^{2x} = 18$$

$$\frac{\log_7 18 = 2x}{2}$$

$$x = .74$$

(11)

$$3x+7 = x-1$$

$$2x = -8$$

$$x = -4$$

(9)

$$2^{4x+2} = 8^{x+2}$$

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

$$4x+2 = 3x+6$$

$$x = 4$$

(12)

$$\log_6 x(x+9) = 2$$

$$6 = (x+9)(x-3)$$

$$6^2 = x^2 + 9x$$

$$x = -12 \quad x = 3$$

$$0 = x^2 + 9x - 36$$

Rational Functions

Exp/Log Graphing

(13) $y = 2^{x-1} + 3$

X	Y
-2	3.125
-1	3.25
0	3.5
1	4
2	5

see graph
 D: $(-\infty, \infty)$
 R: $(3, \infty)$
 $y = 3$

(16) $y = \log_2(x-2) + 1$

$x = \log_2(y-2) + 1$
 $x-1 = \log_2(y-2)$
 $2^{x-1} = y-2$
 $2^{x-1} + 2 = y$

See graph

X	Y	X	Y
-2	1.25	1.25	-2
-1	1.5	1.5	-1
0	2	2	0
1	3	3	1
2	5	5	2

D: $(-1, \infty)$
 R: $(-\infty, \infty)$
 $x = -1$

(14) $y = (\frac{1}{5})^{x-3} - 2$

X	Y
-2	241
-1	79
0	25
1	7
2	1

see graph
 D: $(-\infty, \infty)$
 R: $(-2, \infty)$
 $y = -2$

(17) $A = P(1+r)^n$

$A = 130(1+0.08)^{10}$
 $A = \$280.66$

(18) $A = P(1 + \frac{r}{n})^{nt}$

$1000 = P(1 + \frac{0.08}{4})^{4(10)}$
 $P = 452.89$

(15) $y = \log_3 x$

X	Y	X	Y
-2	1/9	1/9	-2
-1	1/3	1/3	-1
0	1	1	0
1	3	3	1
2	9	9	2

$x = \log_3 y$
 $3^x = y$
 see graph
 D: $(0, \infty)$
 R: $(-\infty, \infty)$
 $x = 0$

(19) $A = P(1-r)^t$

~~$A = 320,000(1-0.15)^7$~~
 $320,000 = P(1-0.15)^7$
 $P = 998199.85$

(20) $A = Pe^{rt}$

$A = 2000e^{0.10(2)}$
 $A = \$2442.81$

Rational Functions

$$(1) \frac{x^2-9}{x^2-9} = \frac{(x-3)(x^2+3x+9)}{(x+3)(x-3)} = \frac{x^2+3x+9}{x-3}$$

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

$$(3) \frac{(x-2)(x^2+2x+4)}{(3x-9)(x-2)} \cdot \frac{2x(3x-4)}{2x(x+2)(x+2)} = 1$$

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

$$(5) \frac{2x+1}{16x^2} \cdot \frac{4x(x^2+1)}{(2x+1)(x+2)} = \frac{(x^2+1)}{4x(x+2)}$$

$$\frac{4}{5} \frac{2x^2+4x+1x+2}{2x(x+2)+1}$$

$$(6) \frac{3x}{(x+5)(x-2)} - \frac{2(x-2)}{(x+5)(x-2)} = \frac{3x-2x+4}{(x+5)(x-2)} = \frac{x+4}{(x+5)(x-2)}$$

$$(7) \frac{2x(x-1)-3x(x+1)+6}{(x+1)(x-1)} = \frac{2x^2-2x-3x^2-3x+6}{(x+1)(x-1)} = \frac{-x^2-5x+6}{(x+1)(x-1)}$$

$$= \frac{-1(x-6)(x+1)}{(x+1)(x-1)} = \frac{-1(x-6)}{x-1}$$

$$(8) \frac{3x(x+5)-2}{(x-5)(x+5)} = \frac{3x^2+15x-2}{(x-5)(x+5)}$$

$$\frac{-6}{15}$$

Solving (9) $\frac{x}{4} = \frac{x+2}{2}$

$$2x = 4x+8$$

$$-2x = 8$$

$$x = -4$$

(10) $3(x+2) = x(2x+4)$

$$3x+6 = 2x^2+4x$$

$$0 = 2x^2+1x-6$$

$$0 = 2x^2+4x-3x-6$$

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

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

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

$$\frac{-1/2}{1} = -3$$

Rational Functions

(11) $\frac{2x}{x+2} - 4 = \frac{6}{x}$

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

$$\frac{2x - 4x - 8}{x+2} = \frac{6}{x}$$

$$\frac{-2x - 8}{x+2} = \frac{6}{x}$$

$$-2x^2 - 8x = 6x + 12$$

$$0 = 2x^2 + 14x + 12$$

$$0 = 2(x^2 + 7x + 6)$$

$$0 = (x+6)(x+1)$$

$$x = -6, -1$$

(14) $f(x) = \frac{x-1}{x+3}$ $y=1$

$$x = -3$$

D: $\mathbb{R} \neq -3$
R: $\mathbb{R} \neq 1$

(15) $f(x) = \frac{4}{x-2} - 1$

$$x = 2$$

$$y = -1$$

D: $\mathbb{R} \neq 2$
R: $\mathbb{R} \neq -1$

(12) $\left(\frac{2x}{x-2} + \frac{1}{x+2} = \frac{10}{x^2-4} \right) (x+2)(x-2)$

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

$$2x^2 + 4x + x - 2 = 10$$

$$2x^2 + 5x - 12 = 0$$

$$(2x-3)(x+4) = 0$$

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

(16) $100x = 50 + 99x$

$$x = 50$$

(13) $f(x) = \frac{2}{x+5}$

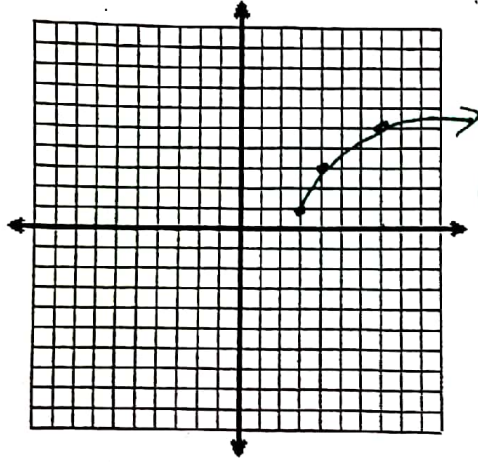
D: $\mathbb{R} \neq -5$
R: $\mathbb{R} \neq 0$

$y=0$ H.A.
 $x=-5$ V.A.

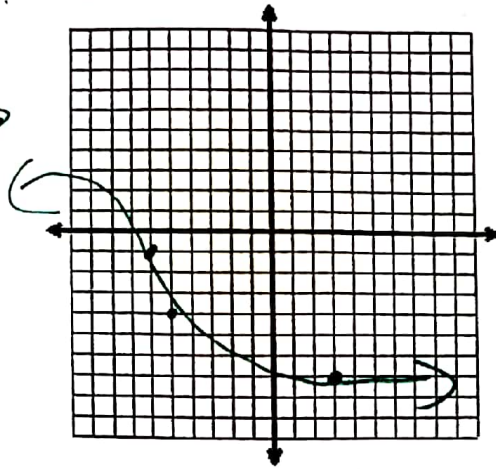
Name: _____

Assignment: _____

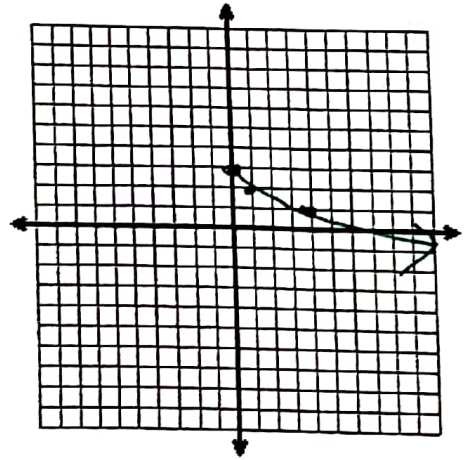
(18) $y = 2\sqrt{x-3} + 1$



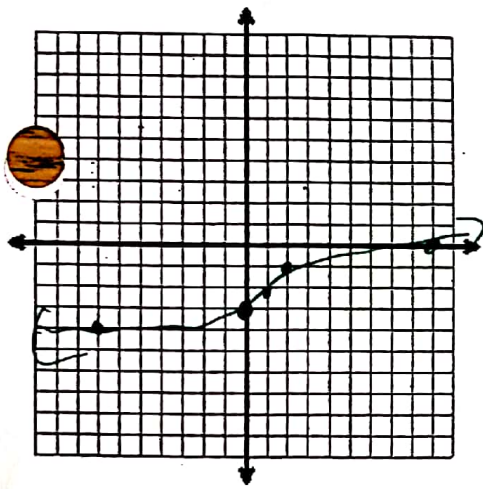
(19) $y = -3\sqrt[3]{x+5} - 4$



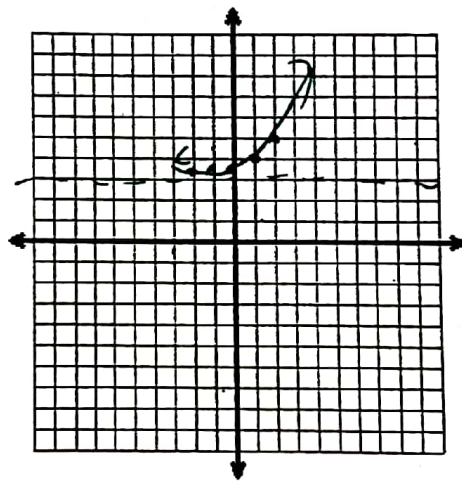
(20) $y = -\sqrt{x} + 3$



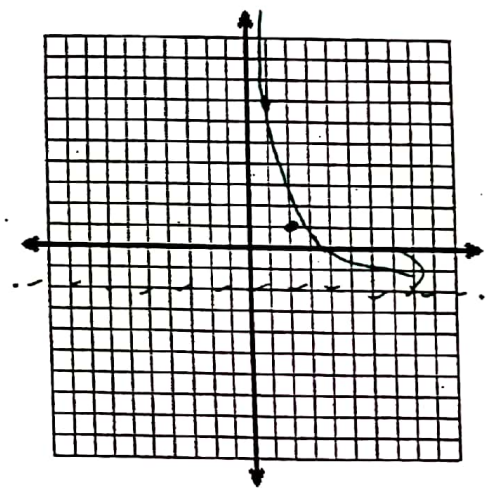
(21) $y = 3\sqrt{x-1} - 2$



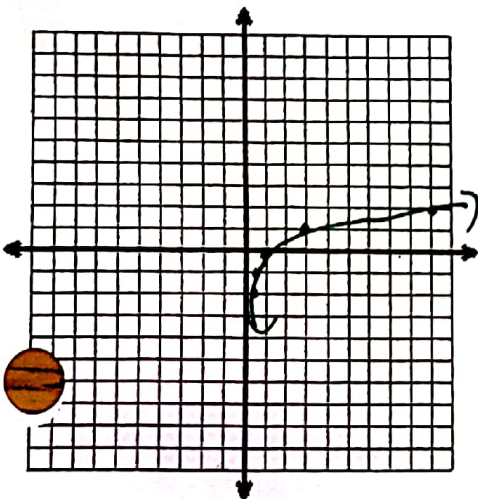
(13) $y = 2^{x-1} + 3$



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



(15) $y = \log_3 x$



$y = \log_2(x-2) + 1$

