Write the equation of the line in point slope form $y - y_1 = m(x - x_1)$ using $m = \frac{y_2 - y_1}{x_2 - x_1}$ given: **<u>(NOTES: P. 2)</u>**

(1) (0,1) and (1,2) $m = \frac{2-1}{1-0} = 1$

$y-1 = 1(x-0)$ or $y-2 = 1(x-1)$

(2) (-3,-1) and (5, -2). $m = \frac{-2-(-1)}{5-(-3)} = \frac{-1}{8}$

$y+1 = -\frac{1}{8}(x+3)$ or $y+2 = -\frac{1}{8}(x-5)$

(3) Through (4,4) and <u>parallel</u> to $y = \frac{9}{4}x$ $m = \frac{9}{4}$

same m

$y-4 = \frac{9}{4}(x-4)$

(4) Through (3,4) and perpendicular to $y = -\frac{3}{5}x - 4$ $\perp \rightarrow$ opposite reciprocal m

$m = \frac{5}{3}$ $y-4 = \frac{5}{3}(x-3)$

(5) Through (5,3) with slope=0.

$y-3 = 0(x-5) \rightarrow y = 3$

Isolate x.

(6) $5 = 7x - 16$

$+16 \quad +16$

$\frac{21}{7} = \frac{7x}{7}$

$x = 3$

(7) $2x - 3 = 5 - x$

$3x = 8$

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

(8) $2\left[\frac{1}{2}(x-3) + x = 17 + 3(4-x)\right]$

$x - 3 + 2x = 34 + 6(4-x)$

$3x = 37 + 24 - 6x$

$9x = 61$

$x = \frac{61}{9}$

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

$5(x-3) = 2x$

$5x - 15 = 2x$

$3x = 15$

$x = 5$

(10) $2x + 4 \geq 3$

$2x \geq -1$

$x \geq -\frac{1}{2}$

(11) $-2x + 4 \geq 3$

$\frac{-2x}{-2} \geq \frac{-1}{-2}$

$x \leq \frac{1}{2}$

Factor the following polynomials. <u>(NOTES: P. 5-6)</u>

(12)$x^2 - x - 20$

$(x+4)(x-5)$

(13)$x^2 - 10x + 21$

$(x-3)(x-7)$

(14)$x^2 + 10x + 16$

$(x+2)(x+8)$

(15)$x^2 + 8x - 105$

$(x+15)(x-7)$

(16)$4x^2 + 11x - 3$

$(4x-1)(x+3)$

(17)$-2x^2 + 7x + 15$

$-1(2x^2-7x-15)$

$-1(2x+3)(x-5)$

(18)$9x^2 - 16$

$(3x+4)(3x-4)$

(19)$3ab^2 + 12bc$

$3b(a+4c)$

Solve for x by (a) factoring (b) quadratic formula $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. <u>(NOTES: P. 7)</u>

(20)$-x^2 - 3x - 2 = 0$

a) $0 = x^2+3x+2$

$0 = (x+1)(x+2)$

$x = -1, -2$

$x = \frac{-(-3) \pm \sqrt{(-3)^2-4(-1)(-2)}}{2(-1)} = \frac{3 \pm \sqrt{1}}{-2}$

$x = \frac{3+1}{-2} = -2 \quad x = \frac{3-1}{-2} = -1$

(21)$2x^2 + 2x - 4 = 0$

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

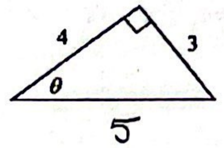
$2(x-1)(x+2)=0$

$x = 1, -2$

$x = \frac{-2 \pm \sqrt{(2)^2-4(2)(-4)}}{2(2)} = x = \frac{-2 \pm \sqrt{36}}{4} = \frac{-2 \pm 6}{4}$

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

Find the value of the trig function below. Answers should be written as a fraction. (NOTES: P. 2)



$4^2+3^2=5^2$

(22) $\cos\theta \Rightarrow \frac{adj}{hyp}$ $\quad \cos\theta = \frac{4}{5}$

(23) $\sin\theta \Rightarrow \frac{opp}{hyp}$ $\quad \sin\theta = \frac{3}{5}$

(24) $\tan\theta \Rightarrow \frac{opp}{adj}$ $\quad \tan\theta = \frac{3}{4}$

Given $f(x) = x^2 - 3x + 4$ and $g(x) = x + 1$, find the following: (NOTES: P. 4&9)

(25) $f(3) = (3)^2 - 3(3) + 4$

$= 9 - 9 + 4 = 4$

(26) $f(a)$ $\quad f(a) = (a)^2 - 3(a) + 4$

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

(27) $f(-t)$ $\quad f(-t) = (-t)^2 - 3(-t) + 4$

$= t^2 + 3t + 4$

(28) $f(x) + g(x)$

$= (x^2 - 3x + 4) + (x + 1)$

$= x^2 - 2x + 5$

(29) $f(x) - g(x)$ $\quad x^2 - 4x - 3$

$= (x^2 - 3x + 4) - (x + 1)$

$= x^2 - 3x + 4 - x - 1$

(30) $f(x)g(x)$

$= (x^2 - 3x + 4)(x + 1) = x^3 + x^2 - 3x^2 - 3x + 4x + 4$

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

(31) $g(f(x))$

$= g(x^2 - 3x + 4)$

$= (x^2 - 3x + 4) + 1 = x^2 - 3x + 5$

Solve the following system of equations using substitution or elimination. <u>(NOTES: P. 3-4)</u>

(32) $\begin{cases} y = -6x + 19 \\ 6x - y = 5 \end{cases}$ ☆ Substitution ☆

$6x - (-6x + 19) = 5$

$6x + 6x - 19 = 5$

$\frac{12x}{12} = \frac{24}{12}$

$x = 2$

$y = -6(2) + 19$

$y = -12 + 19$

$y = 7$

$(2, 7)$

(33) $\begin{cases} -3x + 8y = -7 \\ -6x + 10y = -20 \end{cases}$ ☆ Elimination ☆

$-2(-3x + 8y = -7)$

$6x - 16y = 14$

$+ \; -6x + 10y = -20$

$0 - 6y = -6 \quad y = 1$

$-3x + 8(1) = -7$

$-3x = -15$

$x = 5$

$(5, 1)$

(34) $\begin{cases} x + y + z = 2 \\ 6x - 4y + 5z = 31 \\ 5x + 2y + 2z = 13 \end{cases}$

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

$6x - 4y + 5z = 31$

$+ \; 4x + 4y + 4z = 8$

$\boxed{10x + 9z = 39}$

$6x - 4y + 5z = 31$

$2(5x + 2y + 2z = 13)$

$10x + 4y + 4z = 26$

$+ \; 6x - 4y + 5z = 31$

$\boxed{16x + 9z = 57}$

$10x + 9z = 39$

$-(16x + 9z = 57)$

$-6x = -18$

$\underline{x = 3}$

$10(3) + 9z = 39$

$9z = 9$

$\underline{z = 1}$

$x + y + z = 2$

$3 + y + 1 = 2$

$y = -2$

$(3, -2, 1)$

Simplify each radical expression. <u>(NOTES: P. 1)</u>

(46) $\sqrt{384x^3yz^2}$

384 → 2 · 192 → 2 · 96 → 2 · 48 → 2 · 24 → 2 · 12 → 2 · 6

x^3 → x^2 · x

$2\cdot2\cdot2\sqrt{6} = 8\sqrt{6}$

$8xz\sqrt{6xy}$

(47) $2\sqrt[3]{81x^2z^3}$

81 → 27 · 3

$2\cdot3\cdot z\sqrt[3]{3x^2}$

$6z\sqrt[3]{3x^2}$

(48) $-2\sqrt{12} + 3\sqrt{12}$

$1\sqrt{12} = \sqrt{4\cdot3} = 2\sqrt{3}$

(49) $2\sqrt{24} - \sqrt{12} - \sqrt{3}$

$2\sqrt{4\cdot6} - \sqrt{4\cdot3} - \sqrt{3} = 4\sqrt{6} - 2\sqrt{3} - \sqrt{3} = 4\sqrt{6} - 3\sqrt{3}$

(50) $\sqrt{10}(4\sqrt{5} + \sqrt{6})$

$4\sqrt{50} + \sqrt{60} = 4\sqrt{25\cdot2} + \sqrt{4\cdot15} = 20\sqrt{2} + 2\sqrt{15}$

(a) Classify the following function as exponential growth or decay and (b) state the y-intercept. <u>(NOTES: P. 9)</u>

(51) $y = 2(0.5)^x$ (a) $b<1$ decay

$y = 2(.5)^0 = 2$ (b) $(0,2)$

(52) $y = e^x + 3$ (a) $b = e > 1$ growth

(b) $y = e^0 + 3 = 4 \rightarrow (0,4)$

Simplify the complex numbers. <u>(NOTES: P. 1)</u>

(53) $(3 - 6i)^2$ = $(3-6i)(3-6i) = 9 - 18i - 18i + 36\cancel{i^2}^{(-1)}$

$= 9 - 36i - 36 = -27 - 36i$

(54) $(2 - i) - (8 - 2i) = 2 - i - 8 + 2i = -6 + i$

(55) $i(3i)(7 + 8i)$

$3\cancel{i^2}^{(-1)}(7+8i) \rightarrow -3(7+8i) = -21 - 24i$

State the domain of the functions below using interval notation. <u>(NOTES: P. 8)</u>

(35) $h(x) = (x-3)^2$ $(-\infty, \infty)$

(36) $f(x) = \sqrt{x+1}$ $x+1 \geq 0$ $x \geq -1$ $[-1, \infty)$

(37) $f(x) = \frac{1}{x-5}$ $x-5 \neq 0$ $(-\infty, 5) \cup (5, \infty)$

$x \neq 5$

Simplify the following expressions. Answers should contain only positive exponents. <u>(NOTES: P. 4)</u>

(38) $(3y)2x^2y^2$ $6y^3x^2 \rightarrow 6x^2y^3$

(39) $(3x^2y^3)^3$ $3^3x^6y^9 = 27x^6y^9$

(40) $(x^{-1}y^2)^4$ $x^{-4}y^8 = \frac{y^8}{x^4}$

(41) $\frac{2x^4y^3}{4x^2}$ $\frac{x^2y^3}{2}$

Write each expression in radical form given exponential form or vice versa. <u>(NOTES: P. 4)</u>

(42) $4^{\frac{5}{3}}$ $(\sqrt[3]{4})^5 = \sqrt[3]{1024}$

(43) $2^{\frac{1}{2}}$ $\sqrt{2}$

(44) $(\sqrt{5})^5$ $5^{\frac{5}{2}}$

(45) $\frac{1}{\sqrt[3]{7n}}$ $\frac{1}{(7n)^{\frac{1}{3}}} = (7n)^{-\frac{1}{3}}$

Rationalize the denominator. <u>(NOTES: P. 9)</u>

(56) $\frac{2+4i}{5+4i}$ conjugate $5-4i \rightarrow \frac{(2+4i)}{(5+4i)} \cdot \frac{(5-4i)}{(5-4i)} = \frac{10-8i+20i-16i^2}{25-\cancel{20i}+\cancel{20i}-16i^2}$ (−1) (−1)

$= \frac{10-12i}{41}$

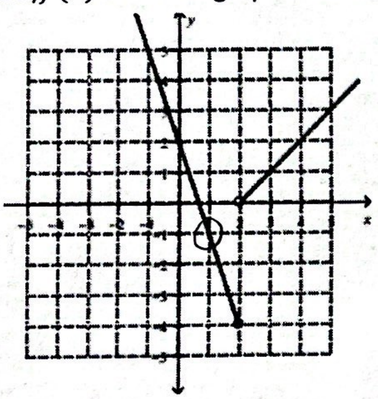
(57) $\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{\sqrt{4}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

Find the values below for the given piecewise functions. <u>(NOTES: P. 7)</u>

(58) $f(12)$ given $f(x) = \begin{cases} -18x + 20, & x < 19 \\ -16x^2, & x \geq 19 \end{cases}$ ← $x = 12$

$f(12) = -18(12) + 20 = -216 + 20 = -196$

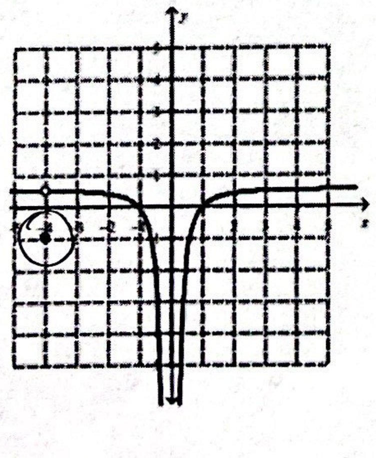
(59) $f(1)$ from the graph below.



What is y when x = 1?

$f(1) = -1$

(60) $f(-4)$ from the graph below.



What is y = when x = −4

• means = $f(-4) = -1$

o means ≠