SAT # 9

SAT # 9 - #1,2,3,4,5

$2x - y = 8$ $\qquad$ $x + 2y = 4$

$+y \quad +y$

$2x = 8 + y$

$-8 \quad -8$

$(2x - 8) = y$

$x + 2(2x - 8) = 4$

$x + 4x - 16 = 4$

$5x - 16 = 4$

$+16 \quad +16$

$\frac{5x}{5} = \frac{20}{5}$

$x = 4$

$(2(4) - 8) = y$

$0 = y$

$x + y = 4 + 0 = 4$

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

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

$5x^2 - 5x$

$2y - 3x = -4$ $\qquad$ $y = mx + b$

$+3x \quad +3x$

$2y = 3x - 4$

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

$y = \frac{3}{2}x - 2$ $\qquad$ $m = +\frac{3}{2}$ $\qquad$ $y - int = (0, -2)$

$y = mx + b$ $\qquad$ $let\ h = height$

$let\ s = \#\ of\ seconds$

$h = 8s + 15$

$C = 75h + 125$ $\qquad$ $let\ C = Dollar\ Charge$

$let\ h = hours$

$C = 75h + 125$

$C = 75(0) + 125$

$C = 0 + 125$

$C = 125$

$C = 75h + 125$

$C = 75(2) + 125$

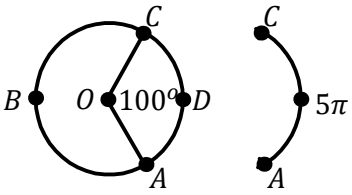
$C = 150 + 125$

$C = 375$

Arbitrary
$C = 0,2$
$C = 1,3$
$C = 2,4$

$375 - 125 = 150$

SAT # 9 - #6,7,8



$$\frac{arc\ length}{Circumference} = \frac{\theta}{360^o}$$

$$\frac{a}{2\pi r} = \frac{\theta}{360^o}$$

$$\frac{5\pi}{2\pi r} = \frac{100}{360}$$

$$\frac{5}{2r} = \frac{100}{360}$$

$$360 \times 5 = 100 \times 2r$$

$$1800 = 200r$$

$$\frac{1800}{200} = \frac{200}{200}r$$

$$\boxed{r = 9}$$

$$C = 2\pi r$$

$$C = 2\pi(9)$$

$$\boxed{C = 18\pi}$$

$$18\pi - 5\pi = \boxed{13\pi}$$

$$100^o \times \frac{\pi}{180^o} = \boxed{\frac{5\pi}{9}}$$

$\pi = 180^o$

$a = r\theta$

$$5\pi = r\left(\frac{5\pi}{9}\right)$$

$$9 \times 5\pi = r\left(\frac{5\pi}{9}\right) \times 9$$

$$45\pi = 5\pi r$$

$$\frac{45\pi}{5\pi} = \frac{5\pi r}{5\pi}$$

$$\boxed{r = 9}$$

$$\frac{8}{x} = 160$$

$$x \times \frac{8}{x} = 160 \times x$$

$$8 = 160x$$

$$\frac{8}{160} = \frac{160x}{160}$$

$$\boxed{0.05 = x}$$

$$2ax - 15 = 3(x + 5) + 5(x - 1)$$

$$2ax - 15 = 3x + 15 + 5x - 5$$

$$2ax - 15 = 8x + 10$$

$$+15 \qquad +15$$

$$2ax = 8x + 25$$

$$2ax = 8x$$

$$\frac{2ax}{x} = \frac{8x}{x}$$

$$2a = 8$$

$$\frac{2a}{2} = \frac{8}{2}$$

$$a = 4$$

$$2ax = 8x + 25$$

$$2(4)x = 8x + 25$$

$$8x = 8x + 25$$

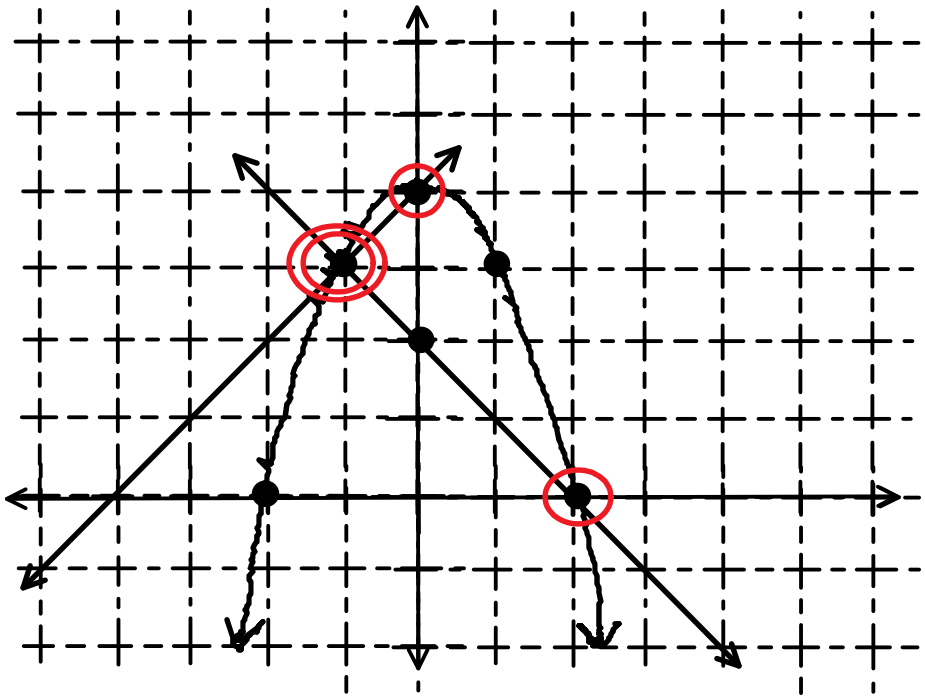
$$-8x \quad -8x$$

$$0 \neq 25$$

$$0 \neq 25$$

No Solution
≠

SAT # 9 - #9,10,11



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

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

$$(x-3) \times \frac{x}{x-3} = x \times (x-3)$$

$$x = x(x-3)$$

$$x = x^2 - 3x$$

$$-x \qquad -x$$

$$0 = x^2 - 4x$$

$$0 = x(x-4)$$

$x = 0$

$$x - 4 = 0$$

$$+4 \quad +4$$

$x = 4$

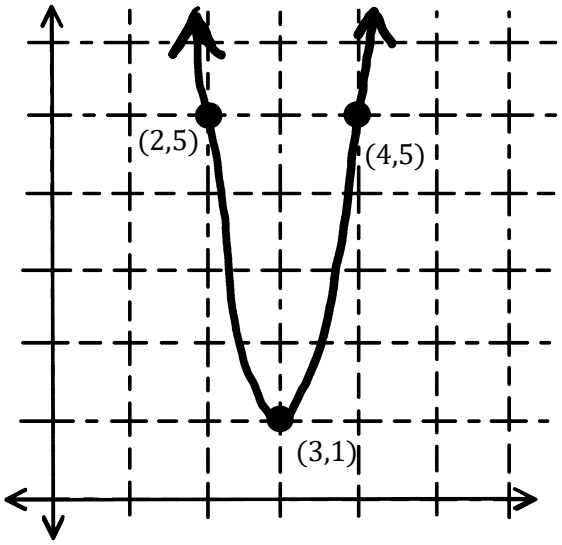
$$x - 3 \neq 0$$

$$+3 \quad +3$$

$x \neq 3$

SAT # 9 - #12,13

$$\frac{1}{2x+1}+5$$
$$\frac{1}{2x+1}+\frac{5}{1}\times\frac{2x+1}{2x+1}$$
$$\frac{1}{2x+1}+\frac{10x+5}{2x+1}$$
$$\frac{10x+6}{2x+1}$$



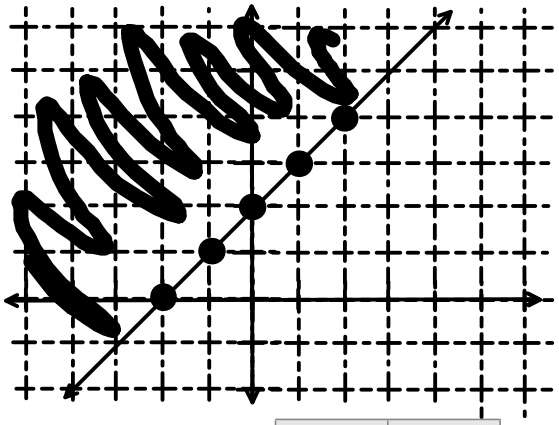
$y = a(x-p)^2 + q$
$y = a(x-3)^2 + 1$
$y = a(x-3)^2 + 1$

$5 = a(4-3)^2 + 1$
$5 = a(-1)^2 + 1$
$5 = 1a + 1$
$-1 \quad = 1$
$4 = a$

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

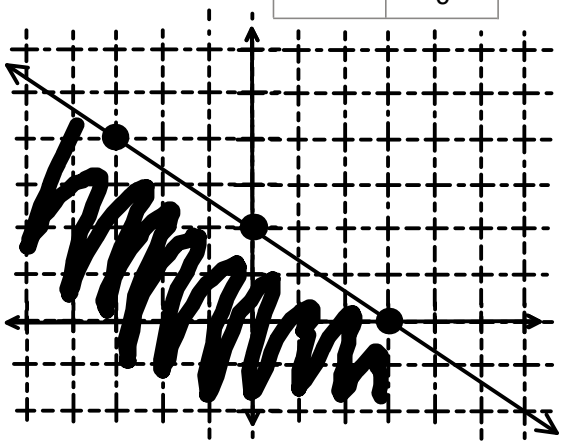
SAT # 9 - #14

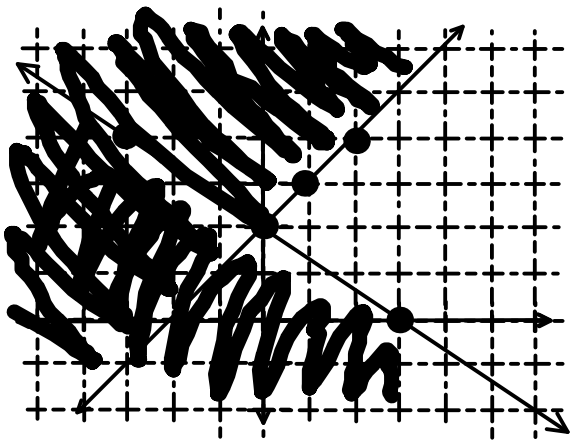
$y \geq x + 2$ $\quad y = mx + b$

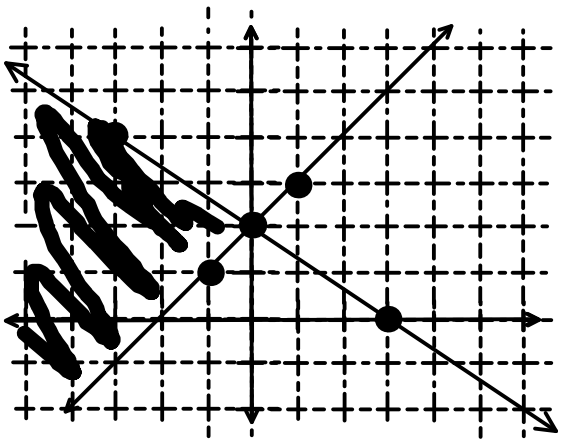


x	y
0	
	0

$2x + 3y \leq 6$







<, > ○	————
Not Included	(open, round, dotted)

≤, ≥ •	————
Included	(closed, square, solid)

Test Point (x, y) $(0,0)$

Choose a Point on either side of the Line

Zero-Zero Test*

$y \geq x + 2$
$0 \geq 0 + 2$
$0 \geq 2$

Substitute for x and y.

✗

Incorrect: Shade the "NOT" (0,0) side of the line.

$2x + 3y \leq 6$
$2(0) + 3(0) \leq 6$
$0 \leq 6$

✓

Correct: Shade the $(0,0)$ side of the line.

SAT # 9 - #15,16,17

$$\sqrt{x+2} = -x$$
$$\left(\sqrt{x+2}\right)^2 = (-x)^2$$
$$x + 2 = x^2$$
$$-x - 2 \quad -x - 2$$
$$0 = x^2 - x - 2$$
$$0 = (x-2)(x+1)$$

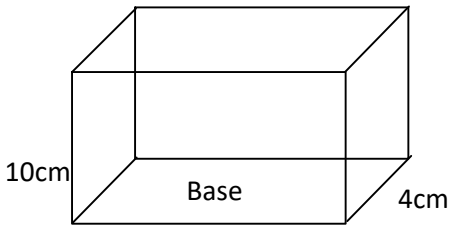
$x - 2 = 0$ ✗ $x = 2$

$x + 1 = 0$ ✓ $x = -1$

$\sqrt{x+2} = -x$
$\sqrt{2+2} = -2$
$\sqrt{4} = -2$
$2 = -2$

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

Rectangular Prism



$V = (area\ of\ base) \times (height)$
$V = (l \times w) \times (h)$
$V = lwh$

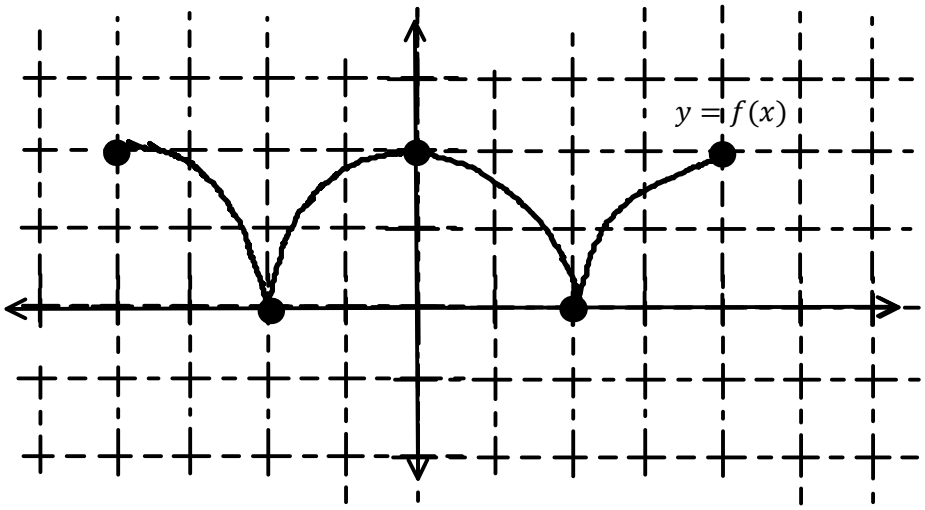
$V = lwh$
$V = 4 \times 9 \times 10$
$V = 360cm^3$

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

$g(x) = f(x) + 6$

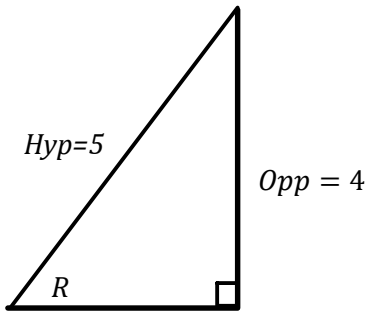
$f(x)$ max : $y = 2$

$g(x) = f(x) + 6$
$g(x) = 2 + 8$



SAT # 9 - #15,16,17

$sinR = \frac{4}{5}$



$adj = 3$

$a^2 + b^2 = c^2$
$4^2 + b^2 = 5^2$
$16 + b^2 = 25$
$-66 \qquad -16$
$b^2 = 9$
$\sqrt{b^2} = \sqrt{9}$

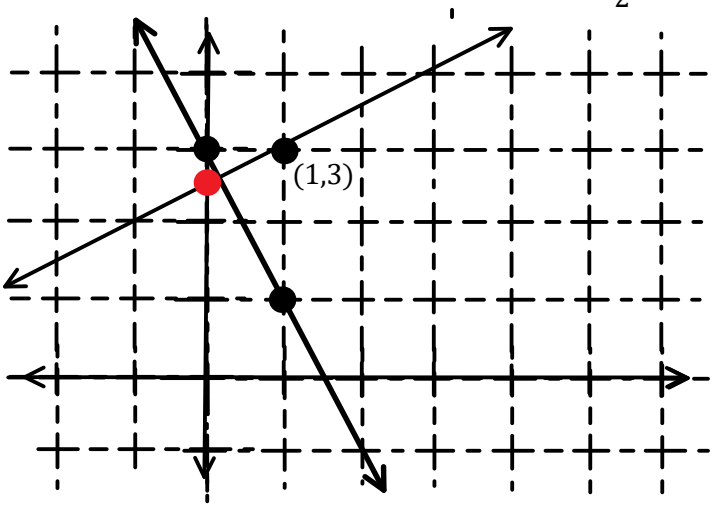
$b = 3$
$adj = 3$

$tan\theta = \frac{opp}{adj}$

$tan\theta = \frac{4}{3}$

$f(x) = y$ Negative Reciprocal

$f(x) = -2x + 3 \quad y = mx + b \qquad m_{perp} = \frac{1}{2}$



$g(x) = \frac{1}{2}x + b$
$3 = \frac{1}{2}(1) + b$
$3 = \frac{1}{2} + b$
$-\frac{1}{2} \quad -\frac{1}{2}$
$b = \frac{5}{2}$

$g(x) = \frac{1}{2}x + \frac{5}{2}$

$g(x) = \frac{1}{2}x + \frac{5}{2}$
$g(0) = \frac{1}{2}(0) + \frac{5}{2} = \frac{5}{2}$

$3 - \frac{1}{2}$
$\frac{2}{2} \times 3 - \frac{1}{2}$
$\frac{6}{2} - \frac{1}{2} = \frac{5}{2}$

SAT #9 - 1,2,3,4,5/6*

$$3x + 3 = 27$$
$$-3 \quad -3$$
$$3x = 24$$
$$\frac{3x}{3} = \frac{24}{3}$$
$$x = 8$$

$$3x + 3 = 27$$
$$3(3) + 3 = 27$$
$$9 + 3 = 27$$
$$12 \neq 27$$

$$3x + 3 = 27$$
$$3(8) + 3 = 27$$
$$24 + 3 = 27$$
$$27 = 27$$

$$\frac{2n}{5} = 10$$
$$5 \times \frac{2n}{5} = 10 \times 5$$
$$2n = 50$$
$$\frac{2n}{2} = \frac{50}{2}$$
$$n = 25$$

$$2n - 1 =$$
$$2(25) - 1 =$$
$$50 - 1 = 49$$

$$1\ cubit = 7\ palms$$

$$140\ cubits \times \frac{7\ palms}{1\ cubit} = 980\ palms$$

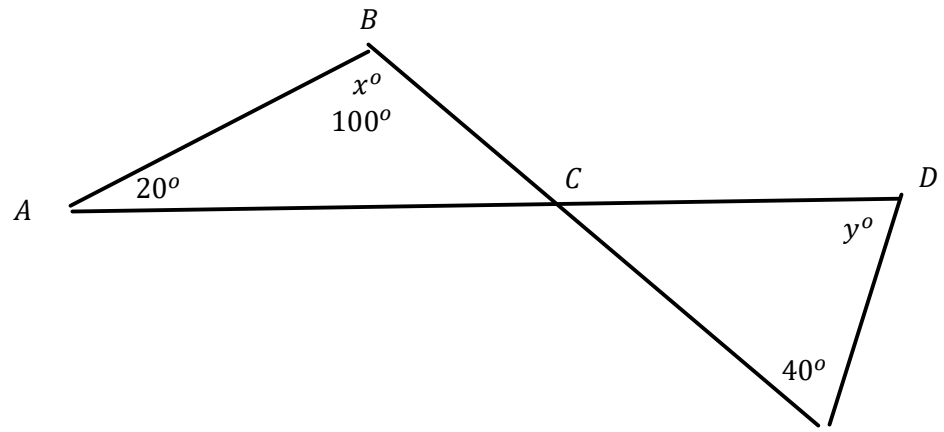
$$\sqrt{x^2} = x$$

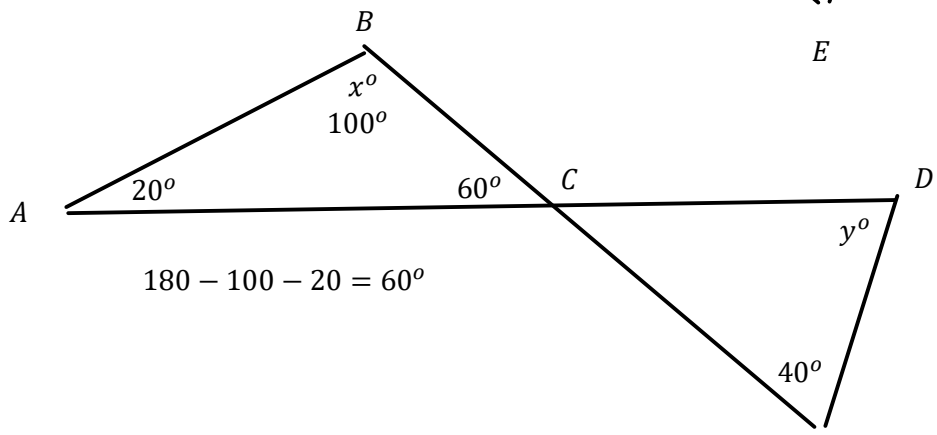
$$\sqrt{x^2} = x$$
$$\sqrt{(-4)^2} = -4$$
$$\sqrt{16} = -4$$
$$4 \neq 4$$

$$\sqrt{x^2} = x$$
$$\sqrt{(0)^2} = 0$$
$$0 = 0$$

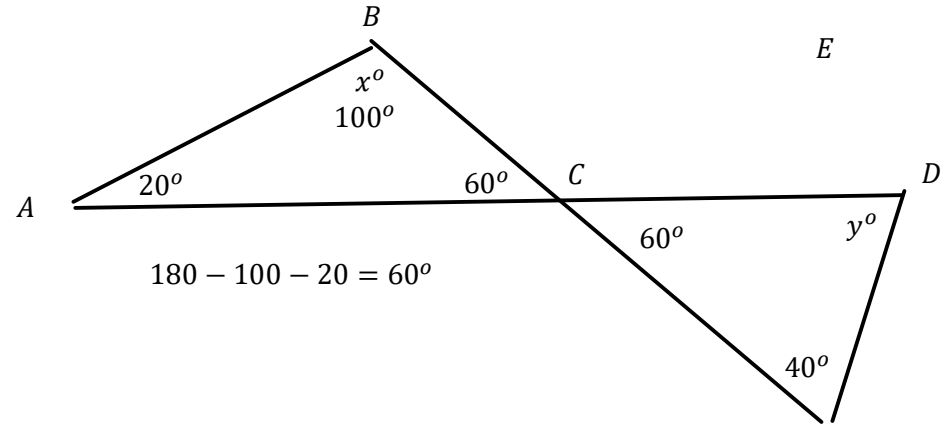
$$\sqrt{x^2} = x$$
$$\sqrt{(1)^2} = 1$$
$$1 = 1$$

SAT #9 - 7

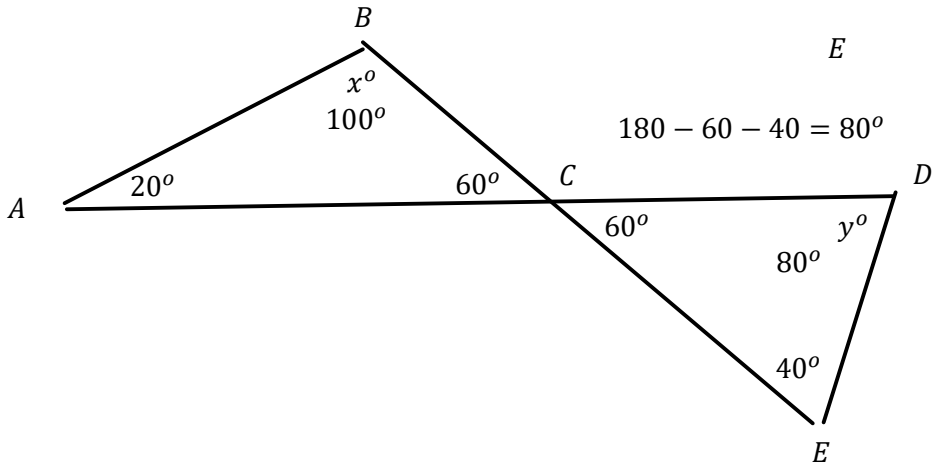




$180 - 100 - 20 = 60^o$



$180 - 100 - 20 = 60^o$



$180 - 60 - 40 = 80^o$

SAT #9 - 8,9,10,12

(0,3) (1,5)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$m = \frac{5-3}{1-0} = \frac{2}{1}$$

$$m = \frac{\$2}{1\ mile}$$

	Beverages Purchased	Beverage Not Purchased	Total
Gasoline Purchased	60	25	85
Gasoline Not Purchased	35	15	50
Total	95	40	135

$\frac{1}{4} \rightarrow Freshman,$
$\frac{1}{3} \rightarrow Sophomores,$
$\frac{1}{2}\ remaining \rightarrow Juniors,$
$336\ Total.$

$$\frac{12}{12} \times 1 - \frac{1}{4} - \frac{1}{3}$$
$$1 - \frac{1 \times 3}{4 \times 3} - \frac{1 \times 4}{3 \times 4}$$
$$\frac{12}{12} - \frac{3}{12} - \frac{4}{12} = \frac{5}{12}$$

$$\left(1 - \frac{1}{4} - \frac{1}{3}\right) \div 2 \times 336 = 70$$

$$\frac{5}{12} \div 2$$
$$\frac{5}{12} \div \frac{2}{1}$$
$$\frac{5}{12} \times \frac{1}{2} = \frac{5}{24}$$

$$\frac{5}{24} \times \frac{336}{1} = 70$$

$$3.1\ miles \times \frac{\square}{\square} =$$

$$3.1\ miles \times \frac{\square}{mile} =$$

$$3.1\ miles \times \frac{km}{mile} =$$

$$3.1\ miles \times \frac{1km}{0.6214mile} =$$

$$3.1\ miles \times \frac{1km}{0.6214mile} = 5\ miles$$

SAT #9 - 11*13

$Plant\ A = 20cm$
$Plant\ B = 12cm$

$A : B$
$C : D$

$20 : 12$
$54 : D$

$5 : 3$
$54 : D$

$let\ x = \#\ 100\ pounds\ 100\ packages$
$let\ y = \#\ 120\quad "\quad 100\quad "$

$$x + y \geq 10$$
$$-y \quad -y$$
$$x \geq 10 - y$$

$$100x + 120y \leq 1100$$
$$100(10 - y) + 120y \leq 1100$$
$$1000 - 100y + 120y \leq 1100$$
$$-1000 \qquad -1000$$
$$20y \leq 100$$
$$\frac{20y}{20} \leq \frac{100}{20}$$
$$y \leq 5$$

$$x + y \geq 10$$
$$-y \quad -y$$
$$x \geq 10 - y$$
$$x \geq 10 - (5)$$
$$x \geq 5$$

$$x + y \geq 10 \qquad y = 4^*$$
$$x + 4 \geq 10$$
$$x \geq 6$$

$$100x + 120y \leq 1100$$
$$100(6) + 120(4) \leq 1100$$
$$600 + 480 \leq 1100$$
$$1080 \leq 1100$$

$$x + y \geq 10 \qquad y = 5^*$$
$$x + 5 \geq 10$$
$$x \geq 5$$

$$100x + 120y \leq 1100$$
$$100(5) + 120(5) \leq 1100$$
$$500 + 600 \leq 1100$$
$$1100 \leq 1100$$

$$x + y \geq 10 \qquad y = 6^*$$
$$x + 6 \geq 10$$
$$x \geq 4$$

$$100x + 120y \leq 1100$$
$$100(4) + 120(6) \leq 1100$$
$$400 + 720 \leq 1100$$
$$1120 \leq 1100$$

SAT #9 - 14,15,16

$$\frac{Change\ in\ value}{time} = \frac{120000 - 30000}{10} = \frac{90000}{10} = 9000$$

$v = 120000 - 9000t$

$$(4x + 4)(ax - 1) - x^2 + 4 = bx$$
$$4ax^2 - 4x + 4ax - 4 - x^2 + 4 = bx$$

$4ax^2 - x^2 = 0x^2$ $\quad$ $-4x + 4ax = bx$ $\quad$ $-4 + 4 = 0$

$x^2(4a - 1) = 0x^2$ $\quad$ $x(-4 + 4a) = bx$

$$4a - 1 = 0$$
$$+1 \quad +1$$
$$4a = 1$$
$$\frac{4a}{4} = \frac{1}{4}$$
$$a = \frac{1}{4}$$

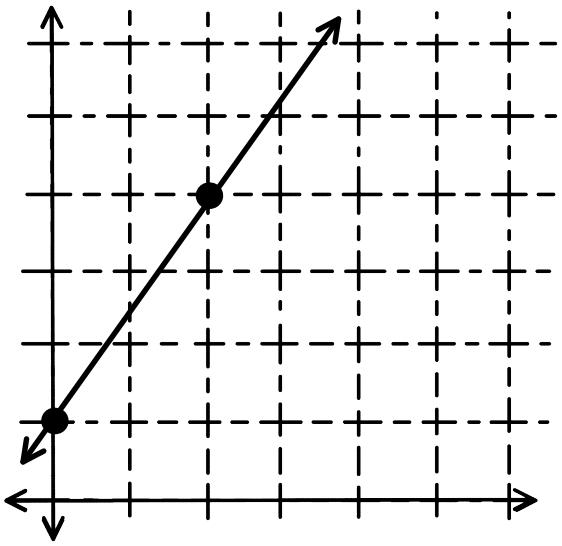
$$-4 + 4a = b$$
$$-4 + 4\left(\frac{1}{4}\right) = b$$
$$-4 + 1 = b$$
$$3 = b$$

(0,1) $\quad$ (2,4)

$$m = \frac{4 - 1}{2 - 0} = \frac{4}{2} = 2$$

$y = mx + b$
$y = 2x + b$
$1 = 2(0) + b$
$1 = 0 + b$
$1 = b$

$y = 2x + 1$ $\quad$ $y - mx + b$



SAT #9 - 17,18,19,20*

$2w + 4t = 14$ $\qquad 4w + 5t = 25$
$(2w + 4t = 14) \times 2$
$4w + 8t = 28$

$$\begin{array}{r} 4w + 8t = 28 \\ \underline{-(4w + 5t = 25)} \\ 3t = 3 \\ \frac{3t}{3} = \frac{3}{3} \\ t = 1 \end{array}$$

$$\begin{array}{r} 2w + 4t = 14 \\ 2w + 4(1) = 14 \\ 2w + 4 = 14 \\ -4 \quad -4 \\ 2w = 10 \\ \frac{2w}{2} = \frac{10}{2} \\ w = 5 \end{array}$$

$$\begin{array}{r} 2w + 3t = \\ 2(5) + 3(1) = \\ 10 + 3 = 13 \end{array}$$

Crunchy Grain Cereal
$1\ Serving = \frac{3}{4}\ cup = 160\ Other\ Calories, 50\ Fat\ Calories = 180\ mg\ Potassium = 5\%\ Daily$
$210 - 50 = 160$

let $p = \%\ Potassium$
let $x = \#\ Cups\ Crunchy\ Cereal\ Servings$

$p = 5x$

Super Grain Cereal
$1\ Serving = 1\ cup = 240\ Calories$

ley $y = \#\ Cups\ Super\ Cereal\ Servings$
let $C = Total\ Calories$

$C = 280x + 240y$ $\qquad x + y = 1$ $\qquad \frac{3}{4}\ cup = 210\ Cal$
$270 = 280x + 240y$ $\qquad -y \quad -y$ $\qquad 1\ cup = 280$
$x = 1 - y$

$270 = 280(1 - y) + 240y$
$270 = 280 - 280y + 240y$
$-280 \quad -280$
$-10 = -40y$
$\frac{-10}{-40} = -\frac{40y}{-40}$
$y = \frac{1}{4}$

$x = 1 - \frac{1}{4}$
$x = \frac{3}{4}$

SAT #9 - 21,22,23,24

$y = h(x)$ $y - int : (0, d); d > 0 =$

$h(x) = -3(d)^x$
$h(0) = -3(d)^0$
$h(0) = -3(1)$
$h(x) = -3$

$h(x) = d(3)^x$
$h(0) = d(3)^0$
$h(0) = d(1)$
$h(0) = d$

Median

Not Random Sample

$f(x) = 5x^2 - 3$ $f(x + a) = 5x^2 + 30x + 42$
$f(x + a) = 5(x + a)^2 - 3$
$f(x + a) = 5(x - a)(x - a) - 3$
$f(x + a) = 5(x^2 - xa - xa + a^2) - 3$
$f(x + a) = 5(x^2 - 2xa + a^2) - 3$
$f(x + a) = 5x^2 - 10xa + 5a^2 - 3$

$-10xa = 30x$

$$5a^2 - 3 = 42$$
$$+3 \quad +3$$
$$5a^2 = 45$$
$$\frac{5a^2}{5} = \frac{45}{5}$$
$$a^2 = 9$$
$$\sqrt{a^2} = \sqrt{9}$$
$$a = \pm 3$$

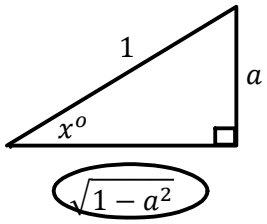
$-10xa = 30x$

$-10(3)a = 30(3)$
$-30a = 90$
$\frac{-30a}{-30} = \frac{90}{-30}$
$a = -30$

$-10(-3)a = 30(-3)$
$+30a = -90$
$\frac{30a}{30} = \frac{-90}{30}$
$a = -30$

SAT #9 - 25,26,27,28

$sinx^o = \frac{a}{1} = \frac{opp}{hyp}$



$$a^2 + b^2 = c^2$$
$$a^2 + b^2 = 1^1$$
$$-a^2 \qquad -a^2$$
$$b^2 = 1 - a^1$$
$$b = \sqrt{1-a^2}$$

$cosx^o = \sqrt{1-a^2}$

$h(x) = -16x^2 + 100x + 10$

$y - int : (0,10)\ Initial\ Height$
$x - int : How\ far\ it\ goes$
$Vertex :\ Max\ Height$

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

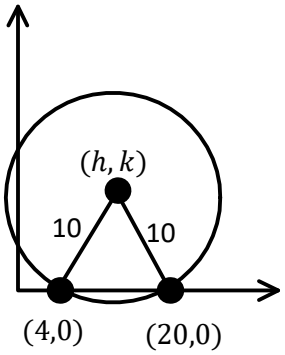
$y - int : (0,2)$

$y = 0.096x - 0.488$

$Slope = 0.096\ \$\ per\ hour\ increase\ per\ year$

$d = 33t + 300$

SAT #9 - 31



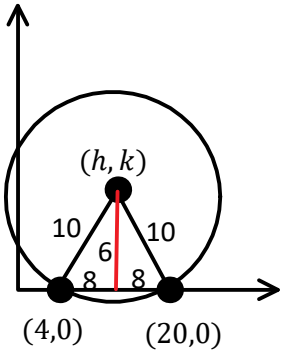
$(x-h)^2+(y-k)^2=r^2$
$(x-h)^2+(y-k)^2=10^2$
$(x-h)^2+(y-k)^2=100$

$(x-h)^2+(y-k)^2=100$
$(4-h)^2+(0-k)^2=100$
$16-8h+h^2+k^2=100$

$(x-h)^2+(y-k)^2=100$
$(20-h)^2+(0-k)^2=100$
$400-40h+h^2+k^2=100$

$$\begin{array}{r} 16-8h+h^2+k^2=100 \\ \underline{-(400-40h+h^2+k^2=100)} \\ -384+32h=0 \\ +384 \qquad\quad +384 \\ 32h=384 \\ \frac{32h}{32}=\frac{384}{32} \\ h=12 \end{array}$$

$$\begin{array}{r} 400-40h+h^2+k^2=100 \\ 400-40(12)+(12)^2+k^2=100 \\ 64+k^2=100 \\ \ldots \\ k=6 \end{array}$$



$k=6$

SAT #9 - 32,33,34,35,36

$y-int:(0,-13)$ $y=-\frac{2}{3}x$ $m_{perp}=\frac{3}{2}$

$y=mx+b$
$y=\frac{3}{2}x-13$

$P(B|-)=\frac{1}{9}$

Rhesus Factor	*A*	*B*	*AB*	*O*	
+	33	9	3	37	82
−	7	2	1	x	$10+x$
	40	11	4	$37+x$	$92+x$

$P(B|-)=\frac{2}{10+x}$

$$\frac{1}{9}=\frac{2}{10+x}$$
$$(10+x)\times 1=2\times 9$$
$$10+x=18$$
$$-10 \quad -10$$
$$x=8$$

$8-1's$
$9-2's$
$6-3's$
$3-4's$
$2-5's$
$1-7$
$29\ Total$

Middle is 15th #

$$d\%=\frac{final-initial}{initial}$$
$$d\%=\frac{13175-15500}{15500}=-0.15=-15\%$$

$\frac{3}{4}x-\frac{1}{2}y=12$ $ax-by=9$ $\frac{12}{9}=\frac{4}{3}$

$a=\frac{3}{4}\times\frac{4}{3}=1$ $b=\frac{1}{2}\times\frac{4}{3}=\frac{2}{3}$ $1+\frac{2}{3}=\frac{3}{3}+\frac{2}{3}=5/3$