

(, ") A - x - .
 (, ") B - y -
 (") B A s -
 :

s - "	v - "	t -	
4x	x	4	A -
4y	y	4	B -
s	x	$\frac{s}{x}$	B A -
s	y	$\frac{s}{y}$	A B -

$4x + 4y = s$, 4
 A -

$\frac{s}{x} = \frac{s}{y} + 1.8$ B - 108 -

$s = 4x + 4y$ $\frac{y}{x}$

:

$\frac{4x + 4y}{x} = \frac{4x + 4y}{y} + 1.8$

$4 + 4 \cdot \frac{y}{x} = 4 \cdot \frac{x}{y} + 4 + 1.8 \rightarrow \boxed{\frac{y}{x} = t}$

$4t = \frac{4}{t} + 1.8 \rightarrow 4t^2 - 1.8t - 4 = 0$

$t_{1,2} = \frac{1.8 \pm 8.2}{8}$

~~$t_1 = -0.8$~~ $0 \leftarrow \frac{y}{x} > 0$ $t_2 = 1.25 \rightarrow \frac{y}{x} = 1.25$ o.k.

.1.25 :

$$.B - \frac{s}{y}$$

$$\frac{s}{x} \quad A -$$

$$: \quad y = 1.25x$$

$$\frac{s}{x} = \frac{s}{1.25x} + 1.8 \rightarrow 0.2 \cdot \frac{s}{x} = 1.8 \rightarrow \frac{s}{x} = 9$$

$$\frac{s}{y} = 9 - 1.8 \rightarrow \frac{s}{y} = 7.2$$

7.2 -

B -

9 -

A -

:

$$\frac{4}{x} + \frac{4}{x+1.8} = 1$$

$$4(x+1.8) + 4x = x(x+1.8)$$

$$x^2 - 6.2x - 7.2 = 0$$

$$x_{1,2} = \frac{6.2 \pm 8.2}{2} \rightarrow x = 7.2, \quad x + 1.8 = 9$$

$$, 7.2 : 9 = 4 : 5$$

$$.5 : 4$$

(, , -)

:

a_n	b_n	
$a_1 \neq 0$	$b_1 = 4a_1$	a_1
d	d	d
n	n	n

$$S_{b_n} = 2S_{a_n}$$

$$\frac{n}{2}(8a_1 + d(n-1)) = \frac{2n}{2}(2a_1 + d(n-1)) \quad /: \frac{n}{2} \neq 0$$

$$8a_1 + d(n-1) = 4a_1 + 2d(n-1)$$

$$4a_1 = d(n-1)$$

$$\boxed{a_1 = \frac{d(n-1)}{4}}$$

$$\cdot a_1 = \frac{d(n-1)}{4} :$$

:

a_n	c_n	
$a_1 \neq 0$	$a_1 \neq 0$	a_1
d	$d+3$	d
n	n	n

$$S_{c_n} = 2S_{a_n}$$

$$\frac{n}{2}(2a_1 + (d+3)(n-1)) = \frac{2n}{2}(2a_1 + d(n-1)) \quad /: \frac{n}{2} \neq 0$$

$$2a_1 + (d+3)(n-1) = 4a_1 + 2d(n-1)$$

$$(n-1)(d+3-2d) = 2a_1$$

$$(n-1)(d+3-2d) = 2 \cdot \frac{d(n-1)}{4} \quad /: (n-1) \neq 0$$

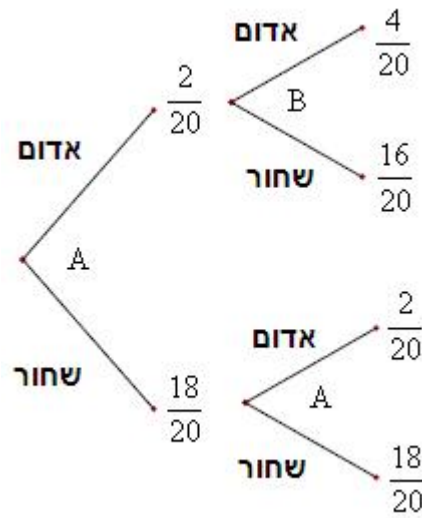
$$12 - 4d = 2d$$

$$-6d = -12$$

$$\boxed{d = 2}$$

. :

"



,B

A

$$\cdot \frac{16}{20} = 0.8$$

$$\cdot 0.8$$

(1)

$$P(\text{at least 1 red}) = 1 - \frac{18}{20} \cdot \frac{18}{20} = 0.19$$

$$\cdot 0.19$$

(2)

$$P(\text{exactly 1 red} / \text{at least 1 red}) = \frac{P(\text{exactly 1 red} \cap \text{at least 1 red})}{P(\text{at least 1 red})} =$$

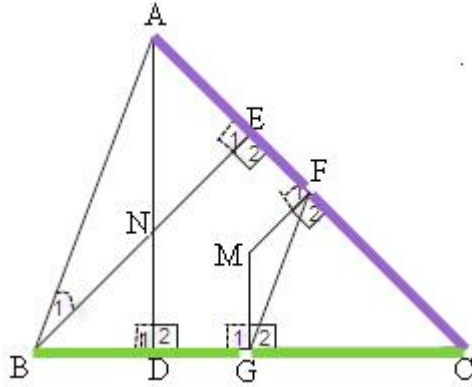
$$= \frac{\frac{2}{20} \cdot \frac{16}{20} + \frac{18}{20} \cdot \frac{2}{20}}{0.19} = \frac{0.17}{0.19} = \frac{17}{19}$$

$$\cdot \frac{17}{19}$$

$$\cdot P(2 \text{ black}) = \frac{18}{20} \cdot \frac{18}{20} = 0.81$$

$$0.81^n$$

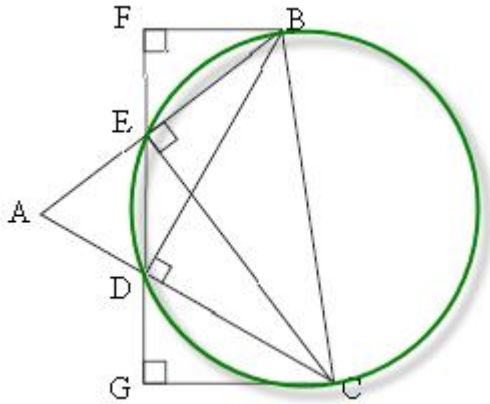
$$\cdot 0.81^n$$



- $\angle D_1 = \angle D_2 = 90^\circ$.2 $\angle E_1 = \angle E_2 = 90^\circ$.1
- $AF = CF$.4 $\angle F_1 = \angle F_2 = 90^\circ$.3
- $BG = CG$.6 $\angle G_1 = \angle G_2 = 90^\circ$.5
- $\angle BAC = \angle GFC$ (1) . : "
- $\angle ABN = \angle MFG$ (2)
- $\triangle ANB \sim \triangle GMF$ (3)
- $\frac{BN}{FM}$.

	$BG = CG$	7	6
	$AF = CF$	8	4
	$\triangle ABC$ FG	9	8,7
	$FG \parallel AB$	10	9
	$\angle BAC = \angle GFC$	11	10
(1) . . .			
	$\angle E_1 = 90^\circ$	12	1
$\triangle ABE$	180°	$\angle ABN = 90^\circ - \angle BAC$	13 12
	$\angle F_2 = 90^\circ$	14	3
	$\angle MFG = 90^\circ - \angle GFC$	15	14
	() $\angle ABN = \angle MFG$	16	15,13,11
(2) . . .			
	$\angle G_2 = 90^\circ$	17	5
$\triangle FMG$	360°	$\angle FMG = 180^\circ - \angle C$	18 17,14
	$\angle D_2 = 90^\circ$	19	2
$\triangle END$	360°	$\angle END = 180^\circ - \angle C$	20 19,12
	$\angle ANB = \angle END = 180^\circ - \angle C$	21	20
	() $\angle ANB = \angle FMG$	22	18,21
	$\triangle ANB \sim \triangle GMF$	23	22,16
(3) . . .			
	$\frac{AN}{GM} = \frac{AB}{GF} = \frac{NB}{MF}$	24	23
	$\frac{AB}{GF} = 2$	25	9

	$\frac{BN}{FM} = 2$	26	25,24
. . .			



$\angle BDC = 90^\circ$.2 $\angle BEC = 90^\circ$.1

$\angle G = 90^\circ$.4 $\angle F = 90^\circ$.3

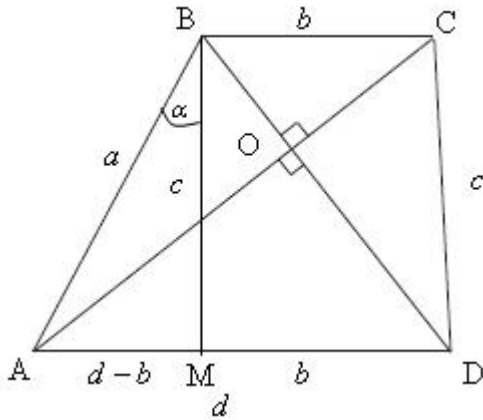
$\triangle BEC \sim \triangle DBC$ (1) . : "

$\angle DBC = \angle DEC$ (2)

$\triangle DGC \sim \triangle BEC$. $\triangle DCB \sim \triangle FEB$.

	$\angle BDC = 90^\circ$	5	2
	BC $\triangle DBC$	6	5
	$\angle BEC = 90^\circ$	7	1
	BC $\triangle BEC$	8	7
	$\triangle BEC \sim \triangle DBC$	9	8,6
(1) . . .			
\widehat{DC}	$\angle DBC = \angle DEC$	10	9
(2) . . .			
	$\angle F = 90^\circ$	11	3
	() $\angle F = \angle BDC$	12	11,5
180°	$\angle FEB = 90^\circ - \angle DEC$	13	7
$\triangle FBE \sim 180^\circ$	$\angle FBE = \angle DEC$	14	13,11
	() $\angle DBC = \angle FBE$	15	14,10
	$\triangle DCB \sim \triangle FEB$	16	15,12
. . .			
\widehat{BE}	$\angle BCE = \angle EDB$	17	9
	$\angle G = 90^\circ$	18	4
	() $\angle G = \angle BEC$	19	18,7
180°	$\angle GDC = 90^\circ - \angle EDB$	20	5
$\triangle CGD \sim 180^\circ$	$\angle GCD = \angle EDB$	21	20,18

	() $\angle GCD = \angle BCE$	22	21, 17
	$\triangle DGC \sim \triangle BEC$	23	22, 19
. . .			



∴ , , .
 () AD ∥ BC , ABCD
 () BM ∥ CD
 () DCBM
 () BM = CD = c
 () MD = BC = b
 () AM = d - b

$$\left. \begin{aligned} \underline{\Delta AOB}: a^2 &= BO^2 + AO^2 \\ \underline{\Delta COD}: c^2 &= CO^2 + DO^2 \end{aligned} \right\} a^2 + c^2 = BO^2 + AO^2 + CO^2 + DO^2$$

$$\left. \begin{aligned} \underline{\Delta BOC}: b^2 &= BO^2 + CO^2 \\ \underline{\Delta AOD}: d^2 &= AO^2 + DO^2 \end{aligned} \right\} b^2 + d^2 = BO^2 + AO^2 + CO^2 + DO^2$$

$$a^2 + c^2 = b^2 + d^2$$

ΔBAM: $AM^2 = AB^2 + BM^2 - 2AB \cdot BM \cdot \cos \angle ABM$
 $(d-b)^2 = a^2 + c^2 - 2 \cdot a \cdot c \cdot \cos \gamma$
 $d^2 - 2bd + b^2 = a^2 + c^2 - 2ac \cdot \cos \gamma$
 $-2bd = -2ac \cdot \cos \gamma \quad \leftarrow a^2 + c^2 = b^2 + d^2$

$\cos \gamma = \frac{bd}{ac}$

ABM

(1).

$$S_{\Delta ABM} = \frac{AB \cdot MB \cdot \sin \angle ABM}{2} = \frac{ac \sin r}{2} = \frac{bd \sin r}{2 \cos r} = \boxed{\frac{bd \tan r}{2}}$$

: ABCD

(2)

$$\underline{\Delta BAM}: \frac{a}{\sin \sphericalangle BMA} = \frac{d-b}{\sin r} \rightarrow \sin \sphericalangle BMA = \frac{a \sin r}{d-b} \rightarrow \sin \sphericalangle BMD = \frac{a \sin r}{d-b} :$$

$$S_{ABCD} = \frac{bd \tan r}{2} + bc \cdot \frac{a \sin r}{d-b} = \frac{bd \tan r}{2} + b \cdot \frac{\sin r}{d-b} \cdot \frac{bd}{\cos r} = \frac{bd \tan r (d-b+2b)}{2(d-b)} = \boxed{\frac{bd \tan r (d+b)}{2(d-b)}}$$

$$(x \neq -2) \quad f(x) = \frac{2x^4 + 4x^3 + 2x^2 - 8}{x+2}$$

$$f(x) = \frac{2x^4 + 4x^3 + 2x^2 - 8}{x+2}$$

$$f(x) = \frac{2x^3(x+2) + 2(x^2 - 4)}{x+2}$$

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

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

$$f(x) = (2x^3 + 2x - 4), x \neq -2$$

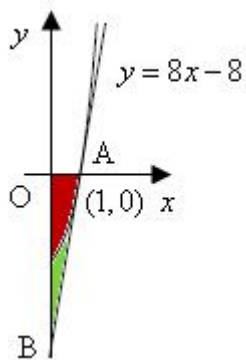
$$\frac{2x^3 + 2x - 4}{2x^4 + 4x^3 + 2x^2 - 8} \Big|_{x+2}$$

$$\frac{2x^4 + 4x^3}{2x^4 + 4x^3} = 2x^2 - 8$$

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

$$= \frac{-4x - 8}{-4x - 8}$$

$$f(x) = \begin{cases} 2x^3 + 2x - 4 & x \neq -2 \\ \emptyset & x = -2 \end{cases}$$



$$f(1) = 2 \cdot 1^3 = 2 \cdot 1 - 4 = 0 = (1, 0)$$

$$f'(x) = 6x^2 + 2 \rightarrow f'(1) = 6 \cdot 1^2 + 2 = 8$$

$$y - 0 = 8(x - 1) \rightarrow \boxed{y = 8x - 8} :$$

$$y = 8x - 8 :$$

$$S_{\Delta AOB} = \frac{AO \cdot BO}{2} = \frac{1 \cdot 8}{2} = 4 \leftarrow B(0, -8)$$

$$S_{\text{RED}} = \int_0^1 (0 - (2x^3 + 2x - 4)) dx = \left(\frac{-2x^4}{4} - \frac{2x^2}{2} + 4x \right) \Big|_0^1$$

$$= \left(\frac{-2 \cdot 1^3}{4} - 1^2 + 4 \cdot 1 \right) - \left(\frac{-2 \cdot 0^3}{4} - 0^2 + 4 \cdot 0 \right) = 2.5$$

$$S_{\text{GREEN}} = 4 - 2.5 = 1.5 :$$

" 1.5 :

"

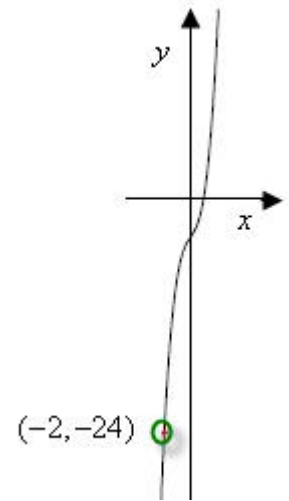
$$f(x) = \begin{cases} 2x^3 + 2x - 4 & x \neq -2 \\ \emptyset & x = -2 \end{cases} \quad (1).$$

$$(\quad) \quad x \neq -2 \quad f'(x) = 6x^2 + 2$$

$$(\quad) \quad x \neq -2 \quad f'(x) = 6x^2 + 2$$

$$x < -2 \quad x > -2$$

$$f(2) = 2 \cdot (-2)^3 + 2 \cdot (-2) - 4 = -24 = (-2, -24) \quad , \quad (2)$$



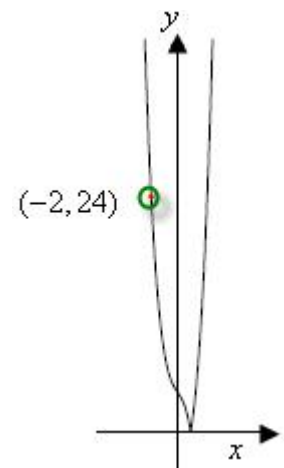
$$f(x) \quad x < 1 \quad f(x) \quad g(x) \quad , \quad g(x) = |f(x)| .$$

$$g(x) = \begin{cases} 2x^3 + 2x - 4 & x \geq 1 \\ \emptyset & x = -2 \\ -2x^3 - 2x + 4 & x < 1, x \neq -2 \end{cases}$$

$$(-2, 24)$$

x -

" " x < 1 ,



$$-f \leq x \leq f \quad f(x) = 2 - \cos x - \sin^2 x :$$

$$f(0) = 2 - \cos 0 - \sin^2 0 = 1 \rightarrow (0, 1) \quad , x = 0 \quad y -$$

$$, y = 0 \quad x -$$

$$2 - \cos x - \sin^2 x \quad \cos x = \pm 1 \rightarrow \sin^2 x = 0 \quad -1 \leq \sin x, \cos x \leq 1 -$$

(0, 1) :

$$f(f) = 2 - \cos f - \sin^2 f = 3 \rightarrow (f, 3), \quad f(-f) = 2 - \cos(-f) - \sin^2(-f) = 3 \rightarrow (-f, 3)$$

$$\boxed{f'(x) = \sin x - 2 \sin x \cos x}$$

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

$$\sin x = 0 \quad \cos x = 0.5$$

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

$$k = 0 \rightarrow x = 0 \quad k = 1 \rightarrow x = f, \quad x = \frac{f}{3}, \quad x = -\frac{f}{3} \quad k = -1 \rightarrow x = -f$$

$$f\left(\frac{f}{3}\right) = 2 - \cos\frac{f}{3} - \sin^2\frac{f}{3} = 0.75 \rightarrow \left(\frac{f}{3}, 0.75\right), \quad f\left(-\frac{f}{3}\right) = 2 - \cos\left(-\frac{f}{3}\right) - \sin^2\left(-\frac{f}{3}\right) = 0.75 \rightarrow \left(-\frac{f}{3}, 0.75\right)$$

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

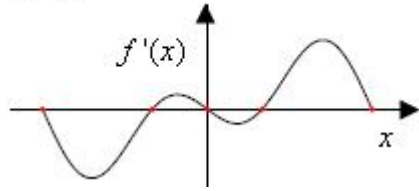
() , ,

$-f$		$-\frac{f}{3}$		0		$\frac{f}{3}$		f	x
3		0.75		1		0.75		3	$f(x)$
0	-	0	+	0	-	0	+	0	$f'(x)$
Max	↘	Min	↗	Max	↘	Min	↗	Max	

$$\left(\frac{f}{3}, 0.75\right), \left(-\frac{f}{3}, 0.75\right), \quad (-f, 3), (f, 3) :$$

(2)

$$f'(x) = \sin x - 2 \sin x \cos x$$



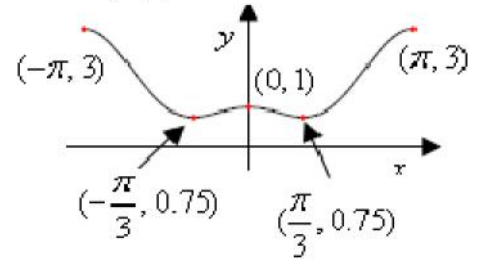
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$x =$

$$\boxed{a=1}$$

(1).

$$f(x) = 2 - \cos x - \sin^2 x$$



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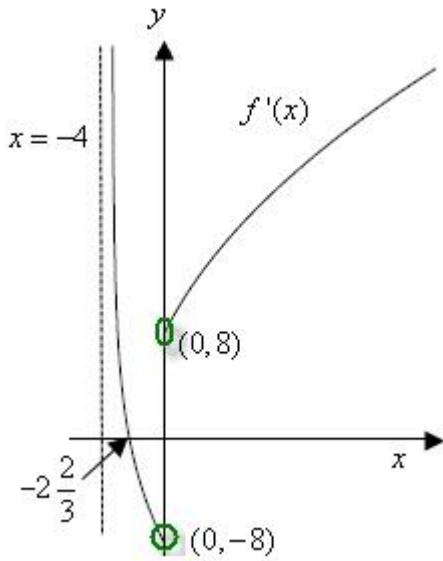
1

.

$$y = 1 - \cos x - \sin^2 x$$

$a = 1 :$

$$f'(x) = \frac{6x^2 + 16x}{\sqrt{x^3 + 4x^2}}$$



$$x^3 + 4x^2 > 0 \rightarrow x^2(x+4) > 0$$

$$x \neq 0 \quad x^2$$

$$x > -4 \quad x+4$$

$$x > -4, x \neq 0 :$$

$$x = -4, \quad x = -4$$

$$\lim_{x \rightarrow 0^-} \frac{6x^2 + 16x}{\sqrt{x^3 + 4x^2}} = \lim_{x \rightarrow 0^-} \frac{x(6x+16)}{|x|\sqrt{x+4}} = \lim_{x \rightarrow 0^-} \frac{x(6x+16)}{-x\sqrt{x+4}} = \frac{16}{-2} = -8$$

$$\lim_{x \rightarrow 0^+} \frac{6x^2 + 16x}{\sqrt{x^3 + 4x^2}} = \lim_{x \rightarrow 0^+} \frac{x(6x+16)}{|x|\sqrt{x+4}} = \lim_{x \rightarrow 0^+} \frac{x(6x+16)}{x\sqrt{x+4}} = \frac{16}{2} = 8$$

(0, -8), (0, 8)

$$x = -4 :$$

x	-4		$-2\frac{2}{3}$		0	
$f'(x)$		+		-		+
		↘	Max	↙		↘

$$0 = \frac{6x^2 + 16x}{\sqrt{x^3 + 4x^2}}$$

$$0 = 6x^2 + 16x \quad /: 2x \neq 0$$

$$0 = 3x + 8$$

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

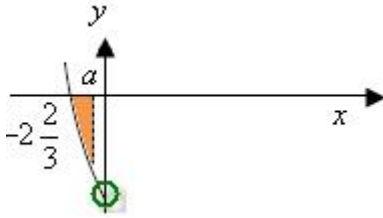
$f(x)$

$f'(x)$

$f'(x)$

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

$$-2\frac{2}{3} < a < 0, f(a) = 4\sqrt{3} :$$



$$-2\frac{2}{3} < x < 0, -4 < x < -2\frac{2}{3} \quad x > 0 \quad : \quad .$$

$$\int_{-2\frac{2}{3}}^a (0 - f'(x)) dx = -f(x) \Big|_{-2\frac{2}{3}}^a = -f(a) + f(-2\frac{2}{3}) .$$

$$\frac{28\sqrt{3}}{9} = -4\sqrt{3} + f(-2\frac{2}{3})$$

$$\boxed{f(-2\frac{2}{3}) = 12.32}$$

12.32

: