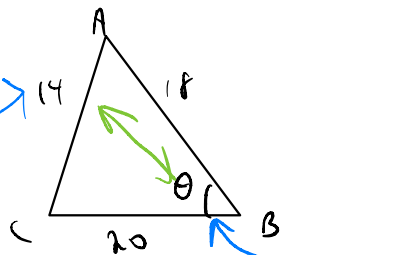
Lucy

2-12 Math Preparing for ACT 2015-2016

60)

Khan Academy



$\cos C = \frac{adj}{hyp}$

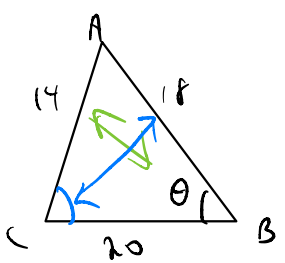
only for right triangles

$c^2 = a^2 + b^2 - 2ab\cos C$

$14^2 = 18^2 + 20^2 - 2(18)(20)\cos\theta$

Law of cosines

1. find c and C (opposite side angle pair)
2. Fill in the rest (easy)



???

$\frac{\sin A}{a} = \frac{\sin B}{b}$ $\boxed{\frac{\sin\theta}{14}} = \frac{\sin C}{18}$

Law of Sines doesn't work here

43)

$$p = \frac{\frac{1}{2}arcy + a}{12y} \Rightarrow \frac{\frac{1}{2}(2a)rcy + 2a}{12y} \qquad \frac{1\,arcy + 2a}{12y}$$

2x as 6 is as p

$a = 2a$

$$\frac{2\left(\frac{1}{2}rcy + a\right)}{12y} = 2p$$

If something takes n^2 time $\quad T = n^2$

And n increases by a factor of 10 $(n \Rightarrow 10n)$
How long does it take to do the new task

$(ab)^3 = a^3 b^3$

$T = (10n)^2$
$= 100n^2$

$10^2 = 100x$
from a 10x increase in

42) $\dfrac{1}{\frac{1}{2}} = 2 \qquad 1 \div \frac{1}{2}$

$1 \cdot \frac{2}{1} = 2$

$f(g(1/2)) \qquad g(1/2) = 2$

$f(1/2) = 2 - \frac{1}{2} = 3/2$

$1/2$

$\dfrac{1}{\frac{2}{4}} \qquad \dfrac{1 \cdot 4}{2} = 2$

$(f \circ g)(1/2)$

$f(g(1/2))$

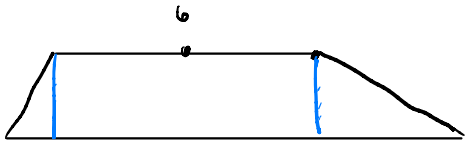
$- \cdot - = +$

$\dfrac{\frac{1}{2}}{\frac{2}{4}}$

$\frac{1}{2} \cdot \frac{4}{2}$

$\dfrac{1 \cdot 4}{2 \cdot 2} = 1$

41)



E.g. $x = 6.5$

$\frac{3+9}{2} = 6$ = midpoint

When doing brute force approach, test smart answers first

29) $16 - (3c)^2 = 16 - (-9) = 25$

$(3c+1)^2$

53) $A = 2(2l\,2w) = 2(4lw)$ — $2lw$

51) $b \leftrightarrow$ vertical shift $a \leftrightarrow$ horizontal shift $(x+a)$ $(x-a)$

59) $\left(\frac{1}{3}\right)^4 = \frac{1}{81}$

$10 \cdots (r+1)$

10 balls, 4 red

Draw 4 without replacement

P("4 red balls")

permutation $nPr = \frac{n!}{(n-r)!}$

You have 10 balls labelled 1–10. How many ways are there to arrange 5?

$\frac{4}{10} \cdot \frac{3}{9} \cdot \frac{2}{8} \cdot \frac{1}{7} < 1$

$\frac{4!}{2!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{2!}$

10 9 8 7 6

10 P 5

P(10, 5)

$\frac{10!}{(10-5)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$

combination

permutation $nPr = \frac{n!}{(n-r)!}$

$(1,2,3)$ $(2,1,3)$
$(1,3,2)$ $(2,3,1)$
$(3,1,2)$
$(3,2,1)$

You have 10 balls labelled 1-10, How many ways are there to arrange 3?

$6 = 3 \cdot 2 \cdot 1$
$= 3!$

$\underline{10} \quad \underline{9} \quad \underline{8}$

$10P3$ $P(10,3)$ $\frac{10!}{(10-3)!} = \frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}$

combination $nCr = C(n,r) = \binom{n}{r}$ = "n choose r" $= \frac{n!}{r!(n-r)!}$

You have 10 balls labelled 1-10, How many ways are there to choose 3?

$\{1,2,3\}$