Core Mathematics C12(GCE)

Practice Answer 3

Standard A★

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Critical thinking is the key to solve real world problems.

Children must be taught how to think, not what to think.

A great teacher will be creating students to do new things through critical thinking, Not simply repeating what other generations have done before. We do not need another Albert Einstein or Isaac Newton.... we need a person better than them.

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Answer:

Method 1

$(x+4)(x-5)(x+6)(x-7)=504$

$(x^2-x-20)(x^2-x-42)=504$

Let $y=x^2-x$

$(y-20)(y-42)=504$

$y^2-62y+840=504$

$y^2-62y+336=0$

$(y-6)(y-56)=0$

We obtain $y=6\,,56$

So $x^2-x=6$ and $x^2-x=56$

Solving both quadratics $x=-2,\ 3,\ -7,\ 8$

Answer:

Method 2

$(x+4)(x-5)(x+6)(x-7)=504$

$\left(x-\frac{1}{2}+\frac{9}{2}\right)\left(x-\frac{1}{2}-\frac{9}{2}\right)\left(x-\frac{1}{2}+\frac{13}{2}\right)\left(x-\frac{1}{2}-\frac{13}{2}\right)=504$

$(2x-1+9)(2x-1-9)(2x-1+13)(2x-1-13)=8064$

Let $y=2x-1$

$(y+9)(y-9)(y+13)(y-13)=8064$

$(y^2-81)(y^2-169)=8064$

$y^4-250y^2+5625=0$

$(y^2-225)(y^2-25)=0$

We obtain $y=-15,\ 15,\ -5,\ 5$

So $\boxed{x=-7,\ 8,\ -2,\ 3}$

Golden Rules

If $ax^2 + bx + c = 0$, then the roots are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The discriminant $= b^2 - 4ac$

- *There will be two distinct real roots if* $b^2 - 4ac > 0$
- *There will be only one real root if* $b^2 - 4ac = 0$
- *There will be no real roots if* $b^2 - 4ac < 0$

Traditonal or Online classes

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