***Solution Section* 1.5 – Inequalities**

***Exercise***

Find: 

***Solution***



***Exercise***

Find: 

***Solution***



***Exercise***

Find: 

***Solution***



***Exercise***

Find: 

***Solution***



***Exercise***

Find: 

***Solution***



***Exercise***

Find: 

***Solution***



***Exercise***

Solve 

***Solution***







∴ ***Solution***:  

***Exercise***

Solve 2 – 3*x* ≤ 5

***Solution***

 *Divide by – 3 both sides*



∴ ***Solution***:  *or* [–1, ∞)

***Exercise***

Solve 

***Solution***









∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve 

***Solution***

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∴ ***Solution***:  

***Exercise***

Solve 

***Solution***

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∴ ***Solution***:  

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***









∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***









∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***











∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***













∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***











∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***











∴ ***Solution***:  *or* 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***









∴ ***Solution***: 

***Exercise***

Solve 

***Solution***

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∴ ***Solution***:  

***Exercise***

Solve the inequality equation: 1 ≤ 2*x* + 3 < 11

***Solution***

1 − 3 ≤ 2*x* + 3 − 3 < 11− 3

−2 ≤ 2*x* < 8



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***











∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Impossible*, since Absolute value can’t be negative.

∴ No ***Solution***

***Exercise***

Solve the inequality equation 

***Solution***

*Impossible*, since Absolute value can’t be negative.

∴ No ***Solution***

***Exercise***

Solve the inequality equation 

***Solution***

∴ ***Solution:*** 

***Exercise***

Solve the inequality equation 

***Solution***

∴ ***Solution:*** 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***









∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



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∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



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| --- | --- |
|  |  |

∴ ***Solution***: 

***Exercise***

Solve the inequality equation: 

***Solution***

 *Multiply by 7 both sides*







∴ ***Solution***:  

***Exercise***

Solve the inequality equation: 

***Solution***









∴ ***Solution***:  

***Exercise***

Solve the inequality equation: |*x* – 2| < 5

***Solution***

−5 < *x* − 2 < 5

∴ ***Solution***: 

***Exercise***

Solve the inequality equation: 

***Solution***









∴ ***Solution***: 

***Exercise***

Solve the inequality equation: 

***Solution***







∴ ***Solution***:  

***Exercise***

Solve the inequality equation: 

***Solution***



∴ ***Solution***:  

***Exercise***

Solve the inequality equation: 

***Solution***







∴ ***Solution***:  

***Exercise***

Solve the inequality equation: 

***Solution***

∴ ***Solution***:  

***Exercise***

Solve 

***Solution***

∴ ***Solution*** set:  because the absolute value always greater than any negative number.

***Exercise***

Solve 

***Solution***

∴ ***No solution***, because the absolute value cannot be less than any negative number

***Exercise***

Solve the inequality equation 

***Solution***

∴ ***No solution***, because the absolute value cannot be any negative number

***Exercise***

Solve: 

|  |  |  |
| --- | --- | --- |
| 0 2 5 | | |
| **+** | **−** | **+** |

***Solution***







∴ ***Solution***:  

***Exercise***

|  |  |  |
| --- | --- | --- |
| 0 6 | | |
| **+** | **-** | **+** |

Solve: 

***Solution***





∴ ***Solution***:  ******

***Exercise***

Solve the inequality: 

***Solution***





∴ ***Solution***:  

***Exercise***

Solve 

***Solution***



∴ ***Solution***:  ******

***Exercise***

Solve 

***Solution***







∴ No ***Solution***

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***









∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***







∴ ***Solution***: 

***Exercise***

Solve: 

***Solution***

|  |
| --- |
| −∞ −3 3 ∞ |
| − + + |









∴ ***Solution***:  

***Exercise***

Solve 

|  |  |  |  |
| --- | --- | --- | --- |
| −1 0 1 2 | | | |
| − | + | − | + |

***Solution***





∴ ***Solution***:  

***Exercise***



***Solution***





|  |  |  |  |
| --- | --- | --- | --- |
| −3 −1 0 1 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***:  

***Exercise***

Solve 

***Solution***



|  |  |  |  |
| --- | --- | --- | --- |
| 0 **1** | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***:  

***Exercise***

Solve the inequality equation 

***Solution***



|  |  |  |  |
| --- | --- | --- | --- |
| **0** 1 4 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



|  |  |  |  |
| --- | --- | --- | --- |
| **0** 3 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***



|  |  |  |  |
| --- | --- | --- | --- |
| **0** 2 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***





|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** 2 4 | | | | |
| **+** | **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **0** 1 3 | | | | |
| **+** | **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| −4 1 | | |
| **+** | **−** | **+** |

*Restriction*: 





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| −3 **0** 2 | | |
| **+** | **−** | **+** |

*Restriction*: 





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 





|  |  |  |
| --- | --- | --- |
| **0** −8 | | |
| **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 

|  |  |
| --- | --- |
| **0** | |
| **+** | **−** |







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| −4 **0** | | |
| **+** | **−** | **+** |

*Restriction*: 









∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 

|  |  |  |
| --- | --- | --- |
| **0** | | |
| **+** | **−** | **+** |









∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 

|  |  |  |
| --- | --- | --- |
| **0** | | |
| **+** | **−** | **+** |







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 

|  |  |  |
| --- | --- | --- |
| **0** 2 9 | | |
| **−** | **+** | **−** |







∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| 0 3 | | |
| **+** | **−** | **+** |

*Restriction*: 





∴ ***Solution***:  

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| −2 **0** 3 | | |
| **+** | **−** | **+** |

*Restriction*: 





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 

|  |  |  |
| --- | --- | --- |
| −6 −2 | | |
| **−** | **+** | **−** |









∴ ***Solution***:  

***Exercise***

Solve the inequality equation 

***Solution***

*Restriction*: 





|  |  |  |
| --- | --- | --- |
| **0** 2 6 | | |
| **−** | **+** | **−** |



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

|  |  |  |
| --- | --- | --- |
| 0 | | |
| **−** | **+** | **−** |

*Restriction*: 









∴ ***Solution***:  

***Exercise***

Solve the inequality 

***Solution***

***Restriction***: 



|  |  |
| --- | --- |
| **0** 14 | |
| − | + |



 No Solution

∴ ***Solution***:  

***Exercise***

Solve: 

***Solution***

*Conditions*: *x* + 4 ≠ 0 → *x* ≠ −4 *and* *x* −5 ≠ 0 → *x* ≠ 5







|  |  |  |  |
| --- | --- | --- | --- |
| −4 0 1/2 5 | | | |
| **+** | **−** | **+** | **−** |









∴ ***Solution***:  

***Exercise***

Solve: 

***Solution***

*Conditions*: *x* ≠ −3 and *x* ≠ 1

|  |  |  |  |
| --- | --- | --- | --- |
| −3 0  1 | | | |
| **+** | **−** | **+** | **−** |













∴ ***Solution***:  

***Exercise***

Solve: 

***Solution***

*Conditions*: *x* ≠ −3 and 









|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| −3   **0** | | | | |
| + | − | + | − | + |







∴ ***Solution***: 



***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 

|  |  |  |  |
| --- | --- | --- | --- |
| −1 0 2 4 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 

|  |  |  |  |
| --- | --- | --- | --- |
| −5 0 1 4 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 



|  |  |  |  |
| --- | --- | --- | --- |
| 0 1 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 



|  |  |  |  |
| --- | --- | --- | --- |
| 0 1 2 | | | |
| **−** | **+** | **−** | **+** |





∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 





|  |  |  |
| --- | --- | --- |
| **0** 3 5 | | |
| **−** | **−** | **+** |



∴ ***Solution***: 

***Exercise***

Solve the inequality equation 

***Solution***

***Restriction***: 

|  |  |  |
| --- | --- | --- |
| −5 −1 **0** | | |
| **−** | **−** | **+** |







∴ ***Solution***: 

***Exercise***

A car can be rented from Basic Rental for $260 per week with no extra charge for mileage.

Continental charges $80 per week plus 25 cents for each mile driven to rent the same car. How many miles must be driven in a week to make the rental cost for Basic Rental a better deal than Continental's?

***Solution***

*x*: number of miles driven

For Continental, cost: 80 + .25*x*

Basic Rental a better deal than Continental's

260 < 80 + 0.25 *x*

260 - 80 < 0.25 *x*

180 < .25*x*

720 < *x*

***Solution***: more than 720 *miles* per *week*.

***Exercise***

If a projectile is launched from ground level with an initial velocity of 96 *ft* per *sec*, its height in feet *t* seconds after launching is *s* feet, where



When will the projectile be greater than 80 ft above the ground?

***Solution***

*Projectile be greater than 80 ft above the ground*











|  |  |  |
| --- | --- | --- |
| 0 1 5 | | |
| **+** | **−** | **+** |







***Solution ***

***Exercise***

A projectile is fired straight up from ground level. After *t* seconds, its height above the ground is *s* *ft*, where



For what time period is the projectile at least 624 ft above the ground?

***Solution***

Projectile at least 624 ft.

******



 *Divide by* -4





*Solution*: 

***Exercise***

Your test scores of 70 and 81 in your math class. To receive a *C* grade, you must obtain an average greater than or equal to 72 but less than 82. What range of test scores on the one remaining test will enable you to get a *C* for the course.

***Solution***







∴ The range of test scores on the one remaining test will enable you to get a *C* for the course is



***Exercise***

A truck can be rented from Basic Rental for $50 a day plus $0.20 per *mile*. Continental charges $20 per day plus $0.50 per *mile* to rent the same truck. How many miles must be driven in a day to make the rental cost for Basic Rental a better deal than Constiental’s?

***Solution***

Basic Rental: 

Continental: 









∴ **100** *miles* must be driven in a day to make the rental cost for Basic Rental a better deal than Constiental’s.

***Exercise***

You are choosing between two telephone plans. Plan ***A*** has a monthly fee of $15 with a charge of $0.08 per *minute* for all calls. Plan ***B*** has a monthly fee of $3 with a charge of $0.12 per *minute* for all calls. How many calling minutes in a month make plan ***A*** the better deal?

***Solution***

Plan ***A***: 

Plan ***B***: 









∴ Plan ***A*** is a better deal when more than 300 minutes.

***Exercise***

A City commission has proposed two tax bills. The first bill requires that a homeowner pay $1,800 plus 3% of the assesses home value in taxes. The second bill requires taxes of $200 plus 8% of the assessed home value. What price range of home assessment would make the first bill a better deal for the homeowner?

***Solution***

First bill: 

Second bill: 













∴ The first bill is a better deal for the homeowner when greater than 

***Exercise***

A local bank charges $8 per month plus $0.05 per check. The credit union charges $2 per month $0.08 per check. How many checks should be written each month to make the credit union a better deal?

***Solution***

Local bank: 

Credit union: 













∴ The credit union make less than **200** checks for a better deal.

***Exercise***

A company manufactures and sells blank audiocassette tapes. The weekly fixed cost is $10,000 and it costs $0.40 to produce each tape. The selling price is $2.00 per tape. How many tapes must be produced and sold each week for the company to have a profit?

***Solution***

Cost: 

Revenue: 













∴ For the company to have a profit, they must sell more than **6,250** tapes.

***Exercise***

A company manufactures and sells stationery. The weekly fixed cost is $3,000 and it costs $3.00 to produce each package of stationery. The selling price is $5.50 per package. How many packages of stationery must be produced and sold each week for the company to have a profit?

***Solution***

Cost: 

Revenue: 













∴ For the company to have a profit when it produces more than **1,200** packages each week.

***Exercise***

An elevator at a construction site has a maximum capacity of 3,000 *pounds*. If the elevator operator weighs 200 *pounds* and each cement bag weighs 70 *pounds*, how many bags of cement can be safely lifted on the elevator in one trip?

***Solution***

The weight inside the elevator: 









∴ **50** bags of cement or less.

***Exercise***

An elevator at a construction site has a maximum capacity of 2,500 *pounds*. If the elevator operator weighs 160 *pounds* and each cement bag weighs 60 *pounds*, how many bags of cement can be safely lifted on the elevator in one trip?

***Solution***

The weight inside the elevator: 









∴ **39** bags of cement or less.

#56

***Exercise***

You can rent a car for the day from Company ***A*** for $29.00 plus $0.12 a *mile*. Company ***B*** charges $22.00 plus $0.21 a *mile*. Find the number of miles *m* per day for which it is cheaper to rent from Company ***A***.

***Solution***

Plan ***A***: 

Plan ***B***: 









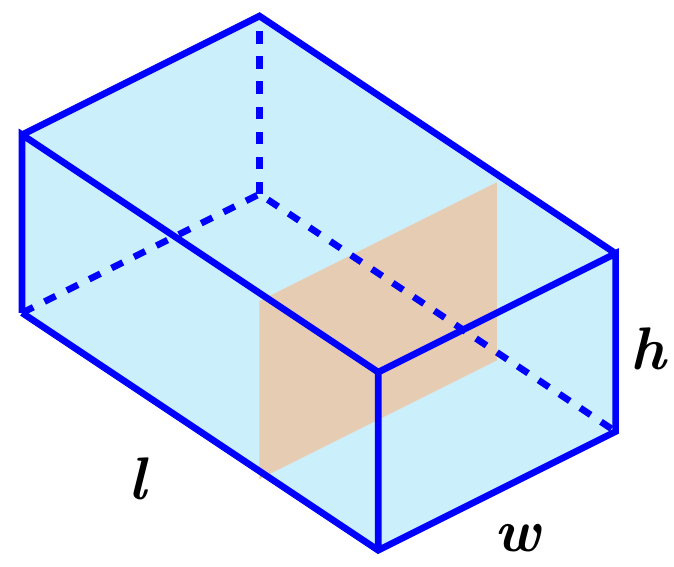




∴ Plan ***A*** is a better deal when more than 78 days.

***Exercise***

UPS will only ship packages for which the length is less than or equal to 108 *inches* and the length plus the girth is less than or equal to 130 *inches*. The length of a package is defined as the length of the longest side. The girth is defined as twice the width plus twice the height of the package. If a box has a length of 34 *inches* and a width of 22 *inches*, determine the possible range of heights *h* for this package if you wish to ship it by UPS.

***Solution***

***Given***: 











∴ The possible range of heights *h* for this package 

***Exercise***

The sum of three consecutive odd integers is between 63 and 81. Find all possible sets of integers that satisfy these conditions.

***Solution***

Let the first odd number is given by: 



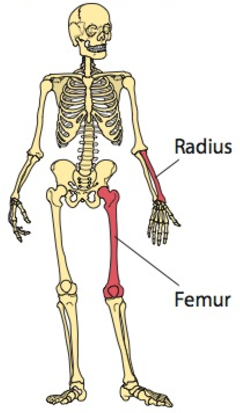






For 

For 

***Exercise***

Forensic specialists can estimate the height of a deceased person from the lengths of the person’s bones. For instance, an inequality that relates the height *h*, in *cm*, of an adult female and the length *f*, in *cm*, of her femur is . Use the inequalities to estimate the possible range of heights for an adult female whose measures 32.24 *cm*.

***Solution***

***Given***: 











***Exercise***

An inequality that is used to calculate the height *h* of an adult male from the length *r* of his radius is



Where *h* and *r* are both in *cm*. Use this inequality to estimate the possible range of heights for an adult male whose radius measures 26.36 *cm*.

***Solution***

***Given***: 









