Camber Worksheet

1. What is the definition of positive camber?

2. What is the definition of negative camber?

3. Why is camber considered a direct tire wear angle?

4. What would excessive positive camber wear look like on a tire?

5. What is the definition of “cross camber”?

6. How much cross camber does it take to cause a vehicle to drift or pull?

7. Which way would a vehicle pull if the left front camber was 0.00° and the right front camber was 1.00°?
Caster Worksheet

1. What is the definition of positive caster?

2. What is the definition of negative caster?

3. Why is caster considered a non-direct tire wear angle?

4. Why do the front wheels have to be steered to measure caster?

5. What is the definition of “cross caster”?

6. How much cross caster does it take to cause a vehicle to drift or pull?

7. Which way would a vehicle pull if the left front caster was 2.00° and the right front caster was 3.00°?
Toe and Related Geometry Worksheet

1. What is the definition of positive and negative total toe?

2. Why is total toe considered a direct tire wear angle?

3. What is the definition of “individual toe”?

4. Which toe angles directly affect thrust angle?

5. Why do front tires typically wear equally when front total toe is incorrect?

6. What is the definition of geometric centerline?

7. What is the definition of “thrustline”?

8. What is the definition of “thrust angle”?

9. What is meant by designating thrust angle as being positive or negative?
Alignment Procedure Worksheet

1. Why should sensors be mounted using the same method on the same axle of the vehicle?

2. When would a 4-wheel thrust alignment procedure be preferred?

3. When would a total 4-wheel alignment procedure be preferred?

4. Which angles are not adjusted during a 4-wheel thrustline alignment?

5. Why are the rear wheels of a vehicle adjusted before the front wheels?

6. Why would an alignment procedure require all four sensors to be mounted and compensated when only the front wheels are adjustable?

7. What is the correct order of alignment angle adjustment when performing a Total 4-Wheel alignment procedure?
Alignment Display Interpretation #1

Complete the following worksheet based on the above measurements

1. Place an “x” next to any angle contributing to premature tire wear.
   ___ a) left rear camber ___ b) right rear camber ___ c) thrust angle
   ___ d) left rear toe ___ e) right rear toe ___ f) rear total toe
   ___ g) Left front camber ___ h) right front camber
   ___ i) Left front caster ___ j) right front caster
   ___ k) left front toe ___ l) right front toe ___ m) front total toe

2. Place an “x” next to the driving condition, which might be present.
   ___ a) pull left ___ b) pull right ___ c) wander
   ___ d) drift left ___ e) drift right ___ f) dog track

3. The steering wheel is currently level. What will the steering wheel position look like when traveling a straight path?
   ___ a) off-center left ___ b) off-center right ___ c) level
Complete the following worksheet based on the above measurements

1. Place an “x” next to any angle contributing to premature tire wear.

   ___ a) left rear camber ___ b) right rear camber ___ c) thrust angle
   ___ d) left rear toe ___ e) right rear toe ___ f) rear total toe
   ___ g) left front camber ___ h) right front camber
   ___ i) left front caster ___ j) right front caster
   ___ k) left front toe ___ l) right front toe ___ m) front total toe

2. Place an “x” next to the driving condition, which might be present.

   ___ a) pull left ___ b) pull right ___ c) wander
   ___ d) drift left ___ e) drift right ___ f) dog track

3. The steering wheel is currently level. What will the steering wheel position look like when traveling a straight path?

   ___ a) off-center left ___ b) off-center right ___ c) level
Alignment Display Interpretation #3

Complete the following worksheet based on the above measurements

1. Place an “x” next to any angle contributing to premature tire wear.
   ___ a) left rear camber   ___ b) right rear camber   ___ c) thrust angle
   ___ d) left rear toe      ___ e) right rear toe      ___ f) rear total toe
   ___ g) Left front camber  ___ h) right front camber  ___ i) left front toe
   ___ j) Left front caster  ___ k) left front toe      ___ l) right front toe
   ___ m) front total toe

2. Place an “x” next to the driving condition, which might be present.
   ___ a) pull left          ___ b) pull right          ___ c) wander
   ___ d) drift left         ___ e) drift right         ___ f) dog track

3. The steering wheel is currently level. What will the steering wheel position look like when traveling a straight path?
   ___ a) off-center left    ___ b) off-center right   ___ c) level
Complete the following worksheet based on the above measurements

1. Place an “x” next to any angle contributing to premature tire wear.

   ___ a) left rear camber   ___ b) right rear camber   ___ c) thrust angle
   ___ d) left rear toe     ___ e) right rear toe      ___ f) rear total toe
   ___ g) Left front camber___ h) right front camber___ i) Left front caster ___ j) right front caster
   ___ k) left front toe    ___ l) right front toe    ___ m) front total toe

2. Place an “x” next to the driving condition, which might be present.

   ___ a) pull left          ___ b) pull right        ___ c) wander
   ___ d) drift left         ___ e) drift right      ___ f) dog track

3. The steering wheel is currently level. What will the steering wheel position look like when traveling a straight path?

   ___ a) off-center left    ___ b) off-center right ___ c) level
Alignment Display Interpretation #5

Complete the following worksheet based on the above measurements

1. Place an “x” next to any angle contributing to premature tire wear.
   ___ a) left rear camber  ___ b) right rear camber  ___ c) thrust angle
   ___ d) left rear toe       ___ e) right rear toe       ___ f) rear total toe
   ___ g) Left front camber  ___ h) right front camber  ___ i) left front camber
   ___ j) Left front caster  ___ k) left front toe       ___ l) right front toe       ___ m) front total toe

2. Place an “x” next to the driving condition, which might be present.
   ___ a) pull left  ___ b) pull right  ___ c) wander
   ___ d) drift left  ___ e) drift right  ___ f) dog track

3. The steering wheel is currently level. What will the steering wheel position look like when traveling a straight path?
   ___ a) off-center left  ___ b) off-center right  ___ c) level
Homework #1

1. Identify the following steering linkage design and components:

   a. _________________________
   b. _________________________
   c. _________________________
   d. _________________________
   e. _________________________

   Steering Linkage design __________________

2. List four suspension designs you will work on frequently. (course book)

   a. ________________________________
   b. ________________________________
   c. ________________________________
   d. ________________________________

3. Indicate by numbering 1-6 a proper four-wheel alignment procedure:

   ______ adjust front camber          ______ adjust front toe
   ______ vehicle inspection           ______ adjust rear camber
   ______ adjust front caster         ______ adjust rear toe

4. Indicate “Direct” or “Indirect” for each angle as relates to tire wear.

   ______ a) Front camber          ______ e) Rear camber
   ______ b) Front caster          ______ f) Rear toe
   ______ c) Front toe            ______ g) Thrust angle
5. When checking for ball joint wear on a SLA (Short Long Arm) suspension, where should the jack be positioned? Look at your spec book for help!

Standard ball joint design?  
_______ a) Point A  
_______ a) Point A  
_______ a) Point B  
_______ a) Point B  
_______ c) Neither A or B  
_______ c) Neither A or B  

Wear indicator ball joint?  
_______ a) Point A  
_______ a) Point A  
_______ a) Point B  
_______ a) Point B  
_______ c) Neither A or B  
_______ c) Neither A or B

6. Do the sensors have to be compensated before measurements are displayed?
_______ a) Yes  
_______ b) No

7. Indicate if the following angles could be the cause for a vehicle to pull. Y or N
_______ a) Front camber  
_______ e) Rear camber  
_______ b) Front caster  
_______ f) Rear toe  
_______ c) Front toe  
_______ g) Thrust angle

8. Why do alignment angles change as front springs sag?

9. Which of the four steering systems only offers a total toe adjustment?

10. What is meant by the term “Dry Park” inspection?
Homework #2

1. List three reasons for a vehicle to pull, which are not related to camber or caster.
   a. ______________________________________________
   b. ______________________________________________
   c. ______________________________________________

2. List four common wheel alignment adjustment methods
   a. ______________________________________________
   b. ______________________________________________
   c. ______________________________________________
   d. ______________________________________________

3. Why is camber considered a direct tire wear angle?

4. List three methods a slotted upper control arm can be adjusted.
   a. _____________________________________________________
   b. _____________________________________________________
   c. _____________________________________________________

5. Does a thrust condition exist if a vehicle has -0.45° toe-out on the left rear wheel and +0.50° toe-in on the right rear wheel? Draw a picture if needed
6. Using your vehicle specification book, give the specifications for a 2006 Ford Taurus. What front and rear adjustment methods are used?

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<th>Preferred specification</th>
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<tr>
<td>Front caster</td>
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<td>Rear Thrust Angle</td>
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Adjustable angles:

7. What do the terms “inboard” and “outboard” mean when referring to a shimmed control arm?

8. How do you access the front shim program and what preliminary steps must be taken to insure accuracy?

9. Camber and caster are excessively positive and the adjustment is moving a slotted upper control arm. Which end of the control arm is adjusted first and why?

10. Why is it preferred to measure caster by steering the wheels using the vehicle’s steering wheel instead of manually steering the tires?