Geometry

4th June, 2020

Name: .... Total: ....

1. Write the equation of each line:
   (a) parallel to the y-axis and through $P = (3, 1)$
   (b) parallel to $y = -2x - 1$ with x-intercept 4
   (c) parallel to $3x - 4y = 5$ and through $P = (1, 0)$
   (d) perpendicular to $y = \frac{3}{2}x - 2$ with the same x-intercept as $3x - 5y = 15$
   (e) perpendicular to $5x - 4y = 8$ with the same y-intercept as $-x + 3y = 6$
   (f) gradient 3, passing through $(2, 1)$.

(12 points)

2. Find the x- and y-intercepts of each linear function.
   (a) $y = 3x + 7$
   (b) $y = 5x - 10$

(4 points)

3. Find the equation of the circle with given centre and radius:
   (a) centre $(3, -5)$, radius 3;
   (b) centre $(-2, 3)$, radius 1.

(4 points)

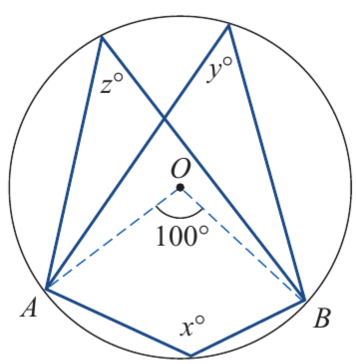
4. A circle of radius length $\sqrt{10}$ contains the points $(1, 2)$ and $(-1, 4)$. Find the equations of the circles that satisfy these conditions.

(4 points)

5. Two chords AB and CD intersect at a point P within a circle. Given that
   (a) $AP = 5cm, PB = 4cm, CP = 2cm$, find PD,
   (b) $AP = 4cm, CP = 3cm, PD = 8cm$, find PB.

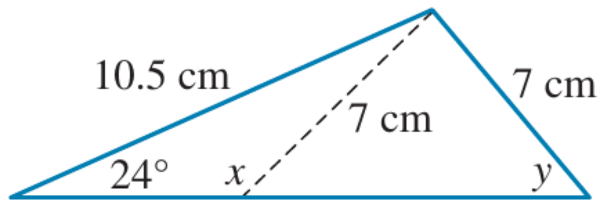
(4 points)

6. Find the value of each of the pronumerals in the diagram. O is the centre of the circle and $\angle AOB = 100°$. (4 points)



7. Find the two unknown angles x and y shown in the diagram below.

(4 points)



8. Three points P, Q and R lie on sides $[AB], [BC]$ and $[CA]$ of triangle ABC. If

$$AP = \frac{2}{3}AB, BQ = \frac{3}{4}BC \text{ and } CR = \frac{1}{7}CA,$$

prove that AQ, BR and CP are concurrent.

(8 points)

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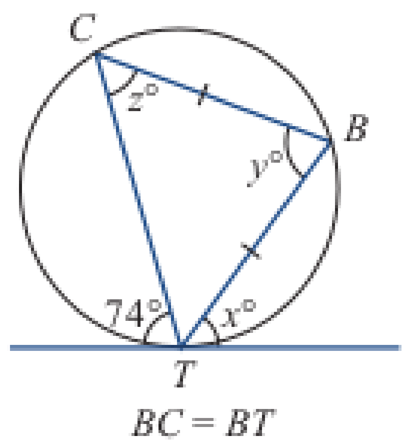
1. A weight is hung from two hooks in a ceiling by strings of length 54 cm and 42 cm, which are inclined at 70° to each other. Find the distance between the hooks. (2 points)
2. Find the values of x, y, z : (2 points)



3. ABC is a triangle in which D divides $[BC]$ in the ratio 2 : 3. If E divides $[CA]$ in the ratio 5 : 4, find the ratio in which $[BE]$ divides $[AD]$. (2 points)
4. P, Q and R lie on sides $[AB], [BC]$ and $[CA]$ of triangle ABC. If $AP = 2/3AB, BQ = 3/4BC$ and $CR = 1/7CA$, prove that $[AB], [BC]$ and $[CA]$ are concurrent. (2 points)
5. Consider a triangle and its inscribed circle. Join each vertex with the point of tangency at the opposite side. Prove using Ceva's theorem that three lines you constructed pass through one point. (3 points)