Name _____

06-10-21-T11

Chap 3 practice

■ Probable percent of exam by topic

Topic	Wgt
Dividing points	0.05
Distance	0.15
Straight line	0.60
Distance line to pt	0.05
Locus	0.05
Circle	0.05
Translation	0.05

■ A. Dividing points (pps 125-126 & 230-132)

[1] Find the point P that internally divides the line segment AB in the ratio 3 : 5 when $A(-2, 3)$, $B(5, 9)$. ANS: $P(\frac{5}{8}, \frac{21}{4})$

[2] Find the point P that externally divides the line segment AB in the ratio 3 : 5 when $A(-2, 3)$, $B(5, 9)$. ANS: $P(-\frac{25}{2}, -6)$

[3] Find the midpoint P of the line segment AB when $A(-2, 3)$, $B(5, 9)$.
ANS: $P(\frac{3}{2}, 6)$

[4] Find the point P that internally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-\frac{1}{5}, \frac{6}{5})$

[5] Find the point P that externally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-17, -18)$

[6] Find the midpoint P of the line segment AB when $A(-3, -2)$, $B(4, 6)$.
ANS: $P(\frac{1}{2}, 2)$

[7] Find the point P that internally divides the line segment AB in the ratio 1 : 4 when $A(-10, -4)$, $B(5, -12)$. ANS: $P(-7, -\frac{28}{5})$

[8] Find the point P that externally divides the line segment AB in the ratio 1 : 4 when $A(-10, -4)$, $B(5, -12)$. ANS: $P(-15, -\frac{4}{3})$

[9] Find the midpoint P of the line segment AB when $A(-10, -4)$, $B(5, -12)$.
ANS: $P(-\frac{5}{2}, -8)$

■ B. Distance between two points (pps 128-129)

[1] Find the distance between the following points

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06-10-21-T11

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[1] Find the point P that internally divides the line segment AB in the ratio 3 : 5 when $A(-2, 3)$, $B(5, 9)$. ANS: $P(\frac{5}{8}, \frac{21}{4})$

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[3] Find the midpoint P of the line segment AB when $A(-2, 3)$, $B(5, 9)$.
ANS: $P(\frac{3}{2}, 6)$

[4] Find the point P that internally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-\frac{1}{5}, \frac{6}{5})$

[5] Find the point P that externally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-17, -18)$

[6] Find the midpoint P of the line segment AB when $A(-3, -2)$, $B(4, 6)$.
ANS: $P(\frac{1}{2}, 2)$

[7] Find the point P that internally divides the line segment AB in the ratio 1 : 4 when $A(-10, -4)$, $B(5, -12)$. ANS: $P(-7, -\frac{28}{5})$

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[4] Find the point P that internally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-\frac{1}{5}, \frac{6}{5})$

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[4] Find the point P that internally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-\frac{1}{5}, \frac{6}{5})$

[5] Find the point P that externally divides the line segment AB in the ratio 2 : 3 when $A(-3, -2)$, $B(4, 6)$. ANS: $P(-17, -18)$

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[9] Find the midpoint P of the line segment AB when $A(-10, -4)$, $B(5, -12)$.
ANS: $P(-\frac{5}{2}, -8)$

■ B. Distance between two points (pps 128-129)

[1] Find the distance between the following points

(1) (3, 2), (3, 4). ANS: 2

(2) (−1, −2), (3, 4). ANS: $2\sqrt{13}$

(3) (−10, −12), (−8, −4). ANS: $2\sqrt{17}$

(4) $(-1, 0), (\frac{1}{2}, 3)$. ANS: $\frac{3\sqrt{5}}{2}$

(5) (1, 3), (10, 6). ANS: $3\sqrt{10}$

■ C. Straight line. Write answers in standard form ($a\,x + b\,y = c$) (pps 133-139)

■ Given points

[2] The line through the points $A(-3, -5)$, $B(2, 3)$. ANS: $8\,x - 5\,y = 1$

[3] The line through the points $A(1, 2)$, $B(3, 7)$. ANS: $7\,x - 6\,y = -21$

[4] The line through the points $A(1, 2)$, $B(-3, -5)$. ANS: $-7\,x + 4\,y = 1$

[5] The line through the points $A(3, 5)$, $B(4, -8)$. ANS: $13\,x - y = -44$

■ Given slope and point

[1] The line through the point $A(2, 5)$ with slope $\frac{2}{3}$. ANS: $2\,x - 3\,y = -11$

[2] The line through the point $A(-2, -5)$ with slope -2. ANS: $2\,x + y = -9$

[3] The line through the point $A(-2, 3)$ and parallel to the line $y = 2\,x + 5$.
ANS: $3\,x - 2\,y = -1$

[4] The line through the point $A(1, 5)$ and perpendicular to the line $y = 3\,x + 5$.
ANS: $x + 3\,y = -16$

[5] The line through the point $A(2, -3)$ and perpendicular to the line $y = \frac{-1}{3}\,x + 2$.
ANS: $3\,x - y = 9$

■ D. Distance point to line (pps 140-141)

[1] Find the distance of the point $P(3, 4)$ to the line $\ell: 1\,x + 2\,y + 9 = 0$
ANS: 4

[2] Find the distance of the point $P(-12, 5)$ to the line $\ell: 2\,x + 3\,y + 22 = 0$
ANS: 1

[3] Find the distance of the point $P(4, 3)$ to the line $\ell: 2\,x - 3\,y + 11 = 0$
ANS: 2

[4] Find the distance of the point $P(4, 3)$ to the line $\ell: y = x + 9$
ANS: 2

(1) (3, 2), (3, 4). ANS: 2

(2) (−1, −2), (3, 4). ANS: $2\sqrt{13}$

(3) (−10, −12), (−8, −4). ANS: $2\sqrt{17}$

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[3] The line through the point $A(-2, 3)$ and parallel to the line $y = 2\,x + 5$.
ANS: $3\,x - 2\,y = -1$

[4] The line through the point $A(1, 5)$ and perpendicular to the line $y = 3\,x + 5$.
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■ Given slope and point

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[2] The line through the point $A(-2, -5)$ with slope -2. ANS: $2\,x + y = -9$

[3] The line through the point $A(-2, 3)$ and parallel to the line $y = 2\,x + 5$.
ANS: $3\,x - 2\,y = -1$

[4] The line through the point $A(1, 5)$ and perpendicular to the line $y = 3\,x + 5$.
ANS: $x + 3\,y = -16$

[5] The line through the point $A(2, -3)$ and perpendicular to the line $y = \frac{-1}{3}\,x + 2$.
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ANS: 1

[3] Find the distance of the point $P(4, 3)$ to the line $\ell: 2\,x - 3\,y + 11 = 0$
ANS: 2

[4] Find the distance of the point $P(4, 3)$ to the line $\ell: y = x + 9$
ANS: 2

[5] Find the distance of the point $P(7, 24)$ to the line $\ell : y = -\frac{x}{2} - 10$

ANS: 3

■ E. Equation of locus (pps 143-146)

[1] Find the locus of points P equidistant from the points $A(2, 0)$, $B(8, 0)$.

ANS: $x = 5$

[2] Find the locus of points P that are 3 units from the point $A(0, 0)$.

ANS: $x^2 + y^2 = 9$

[3] Find the locus of points P that are 3 units from the point $A(2, 5)$.

ANS: $(x-2)^2 + (y-5)^2 = 9$

[4] Find the locus of points P that are equidistant from the point $A(2, 5)$ and the line $\ell : y = -5$.

ANS: $y = \frac{x^2}{20}$

[5] Let ℓ be the line $y = 3x - 2$ and let $A(4, 1)$ be a point not on ℓ. Find the locus of the midpoint Q of the line segment AP when the point P move along ℓ.

ANS: $y = 3x - \frac{13}{2}$

■ F. Circles and straight lines (pps 151-156)

[1] Find the point(s) at which the circle $C : x^2 + y^2 = 16$ and the line $\ell : y = x + 2$ intersect.

ANS: $\left(-1-\sqrt{7}, 1-\sqrt{7}\right), \left(-1+\sqrt{7}, 1+\sqrt{7}\right)$

[2] Find the range of the values of m if the circle $C : x^2 + y^2 = 1$ and the line $\ell : y = mx - 3$ intersect at two different points.

ANS: $m < -2\sqrt{2} \vee m > 2\sqrt{2}$

[3] Find the equation of the line tangent to the circle $x^2 + y^2 = 25$ at the point $\left(1, 2\sqrt{6}\right)$.

ANS: $x + 2\sqrt{6}\, y = 25$

[4] Find the equation of the line tangent to the circle $x^2 + y^2 = 25$ at the point $\left(2, \sqrt{21}\right)$.

ANS: $2x + \sqrt{21}\, y = 25$

[5] Find the equation of the line tangent to the circle $x^2 + y^2 = 9$ at the point $\left(1, 2\sqrt{2}\right)$.

ANS: $x + 2\sqrt{2}\, y = 9$

[6] Find the equation of the line tangent to the circle $x^2 + y^2 = 9$ at the point $\left(2, \sqrt{5}\right)$.

ANS: $2x + \sqrt{5}\, y = 9$

[7] Find the equation of the tangent to the circle $x^2 + y^2 = 1$ through the point $(1, 2)$.

ANS: $\frac{-3}{5}x + \frac{4}{5}y = 1,\ x = 1$

[8] Find the equation of the tangent to the circle $x^2 + y^2 = 9$ through the point $(3, 2)$.

ANS: $\frac{15}{13}x + \frac{36}{13}y = 9,\ x = 3$

[5] Find the distance of the point $P(7, 24)$ to the line $\ell : y = -\frac{x}{2} - 10$

ANS: 3

■ E. Equation of locus (pps 143-146)

[1] Find the locus of points P equidistant from the points $A(2, 0)$, $B(8, 0)$.

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■ E. Equation of locus (pps 143-146)

[1] Find the locus of points P equidistant from the points $A(2, 0)$, $B(8, 0)$.

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ANS: $x^2 + y^2 = 9$

[3] Find the locus of points P that are 3 units from the point $A(2, 5)$.

ANS: $(x-2)^2 + (y-5)^2 = 9$

[4] Find the locus of points P that are equidistant from the point $A(2, 5)$ and the line $\ell : y = -5$.

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[5] Let ℓ be the line $y = 3x - 2$ and let $A(4, 1)$ be a point not on ℓ. Find the locus of the midpoint Q of the line segment AP when the point P move along ℓ.

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■ F. Circles and straight lines (pps 151-156)

[1] Find the point(s) at which the circle $C : x^2 + y^2 = 16$ and the line $\ell : y = x + 2$ intersect.

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ANS: $2x + \sqrt{21}\, y = 25$

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ANS: $x + 2\sqrt{2}\, y = 9$

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ANS: $(x-2)^2 + (y-5)^2 = 9$

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ANS: $y = \frac{x^2}{20}$

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■ F. Circles and straight lines (pps 151-156)

[1] Find the point(s) at which the circle $C : x^2 + y^2 = 16$ and the line $\ell : y = x + 2$ intersect.

ANS: $\left(-1-\sqrt{7}, 1-\sqrt{7}\right), \left(-1+\sqrt{7}, 1+\sqrt{7}\right)$

[2] Find the range of the values of m if the circle $C : x^2 + y^2 = 1$ and the line $\ell : y = mx - 3$ intersect at two different points.

ANS: $m < -2\sqrt{2} \vee m > 2\sqrt{2}$

[3] Find the equation of the line tangent to the circle $x^2 + y^2 = 25$ at the point $\left(1, 2\sqrt{6}\right)$.

ANS: $x + 2\sqrt{6}\, y = 25$

[4] Find the equation of the line tangent to the circle $x^2 + y^2 = 25$ at the point $\left(2, \sqrt{21}\right)$.

ANS: $2x + \sqrt{21}\, y = 25$

[5] Find the equation of the line tangent to the circle $x^2 + y^2 = 9$ at the point $\left(1, 2\sqrt{2}\right)$.

ANS: $x + 2\sqrt{2}\, y = 9$

[6] Find the equation of the line tangent to the circle $x^2 + y^2 = 9$ at the point $\left(2, \sqrt{5}\right)$.

ANS: $2x + \sqrt{5}\, y = 9$

[7] Find the equation of the tangent to the circle $x^2 + y^2 = 1$ through the point $(1, 2)$.

ANS: $\frac{-3}{5}x + \frac{4}{5}y = 1,\ x = 1$

[8] Find the equation of the tangent to the circle $x^2 + y^2 = 9$ through the point $(3, 2)$.

ANS: $\frac{15}{13}x + \frac{36}{13}y = 9,\ x = 3$

■ G. Translation (pps 157-159) Answer to this section are below (so you can cover them up).

[1] Write the equation of the circle centered at $(3, 5)$ radius 5.

[2] The point $P(2, 8)$ is on the circle $(x-3)^2 + (y-5)^2 = 9$. What are the coordinates of point P' on a circle of radius 3, center at origin?

[3] The circle $C: x^2 + y^2 = 49$. What is the equation of the circle C' that results from moving circle C 4 units left and 7 units up?

[4] Write the equation of the parabola $y = 2x^2$ after it is moved 5 units right and 3 units down.

■ Answers to section G

[1] ANS: $(x-3)^2 + (y-5)^2 = 25$

[2] ANS: $x = -1,\ y = 3$

[3] ANS: $(x+4)^2 + (y-7)^2 = 49$

[4] ANS: $y + 3 = 2(x-5)$

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