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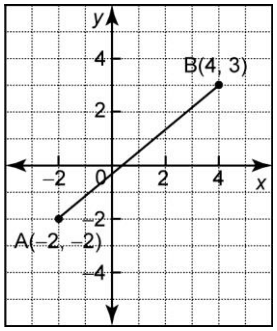
Chapter 2 Review

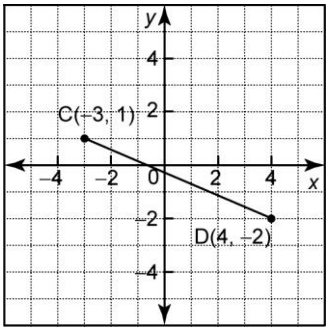
2.1 Midpoint of a Line Segment

1. Find the midpoint of each line segment.

a)



b)



2. a) Determine the midpoint of the line segment with endpoints E(−6, 7) and F(−2, 1).

b) Determine the midpoint of the line segment with endpoints E(−5, −9) and F(2, 4).

3. a) Draw the triangle with vertices A(−5, 2), B(−1, − 4), and C(3, 3).

b) Draw the median from vertex A. Then, find an equation in the form $y = mx + b$ for this median.

c) Draw the right bisector of AC. Then, find an equation in the form $y = mx + b$ for this right bisector.

d) Draw the altitude from vertex C. Then, find an equation in the form $y = mx + b$ for this altitude.

2.2 Length of a Line Segment

4. Determine the length of the line segment defined by each pair of points.

a) R(−5, 6) and S(−2, 6)

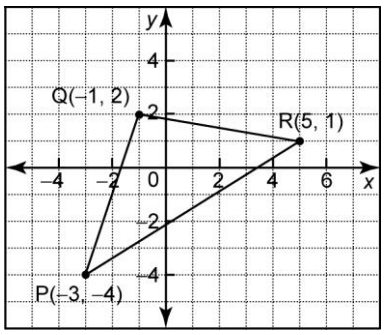
b) T(4, −5) and U(4, 5)

c) M(−5, 6) and N(3, −4)

d) P(−2, 6) and Q(7, −3)

5. a) Determine the length of the median from vertex R of △PQR.

b) Determine the perimeter of △PQR. Round your answer to the nearest tenth of a unit.



6. a) Draw the triangle with vertices X(1, 4), Y(−3, −2), and Z(3, −6).

b) Use analytic geometry to show that ∠XYZ = 90°.

c) Determine the area of △XYZ.

2.3 Apply Slope, Midpoint, and Length Formulas

7. Show that the triangle with vertices P(−1, 0), Q(0, $\sqrt{3}$), and R(1, 0) is equilateral.

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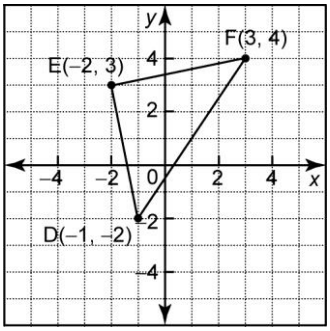
8. a) Show algebraically that this triangle is isosceles.



b) Find the midpoints of the equal sides.

c) Show algebraically that the line segment joining the midpoints of the equal sides is parallel to the third side of the triangle.

9. On a map, a ski hill has a chair lift running straight from A(30, 25) to B(60, 55).

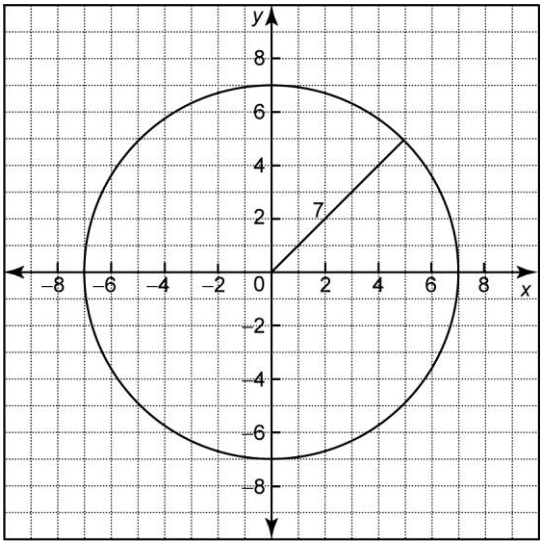
a) How long is the section of the chair lift if each unit on the map grid represents 1 m, to the nearest tenth of a metre?

b) Is the point C(50, 45) on the chair lift? Explain your reasoning.

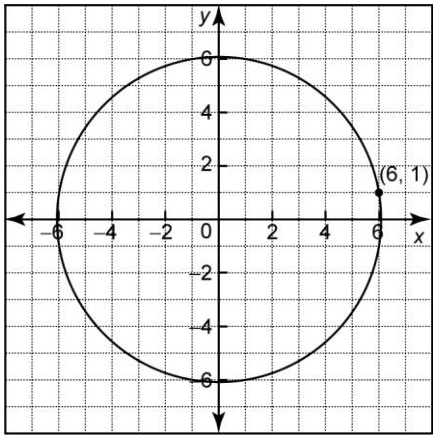
2.4 Equation for a Circle

10. Determine an equation for each circle.

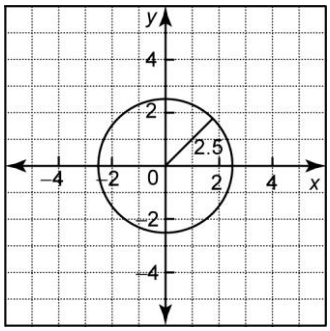
a)



b)



c)



11. Find an equation for the circle that is centred at the origin and

a) has a radius of 3.7

b) has a radius of $\sqrt{8}$

c) has a diameter of 18

d) passes through the point (3, 5)

12. a) Show that the line segment joining C(−2, 5) and D(−5, 2) is a chord of the circle defined by $x^2 + y^2 = 29$.

b) Determine an equation for the right bisector of the chord CD.

13. a) Show that point B(−3, −2) lies on the circle defined by $x^2 + y^2 = 13$.

b) Find an equation for the radius from the origin O to point B.

c) Find an equation for the line that passes through B and is perpendicular to OB.

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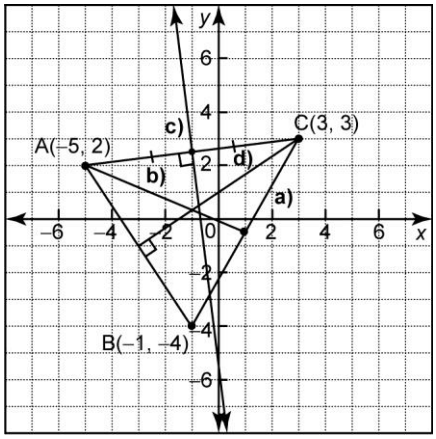
Chapter 2 Review

1. a) $\left(1, \frac{1}{2}\right)$ **b)** $\left(\frac{1}{2}, -\frac{1}{2}\right)$

2. a) $(-4, 4)$ **b)** $\left(-\frac{3}{2}, -\frac{5}{2}\right)$

3. a), b), c), d)



b) $y = -\frac{5}{12}x - \frac{1}{12}$ **c)** $y = -8x - \frac{11}{2}$

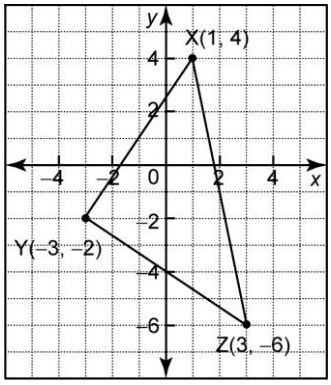
d) $y = \frac{2}{3}x + 1$

4. a) 3 **b)** 10

c) $\sqrt{164}$ **d)** $\sqrt{162}$

5. a) $\sqrt{53}$ **b)** 21.8

6. a)



b) slope XY = $\frac{3}{2}$; slope YZ = $-\frac{2}{3}$; since the slopes are negative reciprocals, $\angle XYZ = 90°$.

c) 26 square units

7. PQ = QR = PR = 2; all three sides have equal length, so $\triangle PQR$ is equilateral.

8. a) DE = EF = $\sqrt{26}$; since two sides have equal length, $\triangle DEF$ is isosceles.

b) $G\left(-\frac{3}{2}, \frac{1}{2}\right)$ is the midpoint of DE; $H\left(\frac{1}{2}, \frac{7}{2}\right)$ is the midpoint of EF.

c) slope GH = $\frac{3}{2}$; slope DF = $\frac{3}{2}$; since the slopes are equal, the two segments are parallel.

9. a) 42.4 m

b) Yes. The line $y = x - 5$ contains the points A and B. Since it also contains the point C, and C is between A and B, C is on the chair lift.

10. a) $x^2 + y^2 = 49$ **b)** $x^2 + y^2 = 37$ **c)** $x^2 + y^2 = 6.25$

11. a) $x^2 + y^2 = 13.69$ **b)** $x^2 + y^2 = 8$

c) $x^2 + y^2 = 81$ **d)** $x^2 + y^2 = 34$

12. a) Check that both endpoints are on the circle.

C(−2, 5):

L.S. $= x^2 + y^2$ **R.S.** $= 29$

$= (-2)^2 + 5^2$

$= 4 + 25$

$= 29$

L.S. = **R.S.**

D(−5, 2):

L.S. $= x^2 + y^2$ **R.S.** $= 29$

$= (-5)^2 + 2^2$

$= 25 + 4$

$= 29$

L.S. = **R.S.**

b) $y = -x$

13. a) Check that the point B(−3, −2) satisfies the equation $x^2 + y^2 = 13$.

L.S. $= x^2 + y^2$ **R.S.** $= 13$

$= (-3)^2 + (-2)^2$

$= 9 + 4$

$= 13$

L.S. = **R.S.**

b) $y = \frac{2}{3}x$ **c)** $y = -\frac{3}{2}x - \frac{13}{2}$