Review for 1050 Midterm 1

Distance Formula p.4 p9: 2a-36

Find the distance between each pair of points.

1) $(-5, 0), (-7, 0)$ $\sqrt{(-7+5)^2+(0-0)^2} = \sqrt{4+0} = \sqrt{4} = 2$

2) $(-3, 7), (-2, -2)$ $\sqrt{82}$

3) $(-2, -1), (-5, 0)$ $\sqrt{10}$

4) $(-4, 6), (-8, -7)$ $\sqrt{185}$

Midpoint Formula p.5 p.9: 29-36

Find the midpoint of the line segment with the given endpoints.

5) $(3, -9), (-1, 2)$ $(1, -3\frac{1}{2})$

6) $(7, -8), (-3, 9)$ $(2, \frac{1}{2})$

7) $(1, -7), (9, 3)$ $(5, -2)$

8) $(7, 0), (-2, -9)$ $(2\frac{1}{2}, -4\frac{1}{2})$

Equation of a Line in Standard Form p. 26 $Ax+By=C$ $m = \frac{y_2-y_1}{x_2-x_1}$ $y = mx+b$ $y-y_1 = m(x-x_1)$ p.32: 55-64

Write the standard form of the equation of the line through the given points.

9) through: $(4, -5)$ and $(0, 5)$ $5x+2y=10$

10) through: $(0, 3)$ and $(-5, -1)$ $4x-5y=-15$

11) through: $(4, -4)$ and $(5, 5)$ $y-5=9(x-5)$ $m = \frac{5-4}{5-4} = \frac{9}{1} = 9$ $y-5=9x-45$ $-9x+5 \quad -9x \quad +5$ $-9x+y=-40$ $9x-y=40$

12) through: $(-5, -2)$ and $(1, -4)$ $x+3y=-11$

Equation of a Circle p. 17 p. 20: 75, 76

midpoint of diam is (h,k)

$\frac{\text{length of diam.}}{2} = r$

Use the information provided to write the equation of each circle.

1) Ends of a diameter: $(13, 14)$ and $(-13, -14)$ $x^2+y^2=365$

2) Ends of a diameter: $(-9, -1)$ and $(9, 1)$ $x^2+y^2=82$

3) Ends of a diameter: $(-19, -6)$ and $(19, 6)$ $x^2+y^2=397$

4) Ends of a diameter: $(12, 3)$ and $(-12, -3)$ $x^2+y^2=153$

$f(x) = [\![x]\!]$ D: $\mathbb{R}$ R: integers

$\mathbb{R} = (-\infty, \infty)$ **Test for Symmetry Algebraically** p.15 p20: 33-40 p. 106: 15-22

Know Parent Functions, along with their domains and ranges

$f(x) = a$, $y = 2$, D: $\mathbb{R}$, R: 2

$f(x) = x$, $y = x$, D: $\mathbb{R}$, R: $\mathbb{R}$

$f(x) = x^2$, $y = x^2$, D: $\mathbb{R}$, R: $[0, \infty)$

$f(x) = |x|$, D: $\mathbb{R}$, R: $[0, \infty)$

$f(x) = x^3$, D: $\mathbb{R}$, R: $\mathbb{R}$

$f(x) = \sqrt[3]{x}$, D: $\mathbb{R}$, R: $\mathbb{R}$

$f(x) = \sqrt{x}$, D: $[0, \infty)$, R: $[0, \infty)$

$f(x) = \frac{1}{x}$, D: $(-\infty, 0) \cup (0, \infty)$, R: $(-\infty, 0) \cup (0, \infty)$

Domain and Range of Functions

Identify the domain and range of each.

1) $y = \sqrt{x}$

D: $[0, \infty)$

R: $[0, \infty)$

2) $y = 3\sqrt{x}$

D: $[0, \infty)$

R: $[0, \infty)$

3) $y = 3\sqrt{x-4}$ $x - 4 \geq 0$, $x \geq 4$ D: $[4, \infty)$ R: $[0, \infty)$

4) $y = \sqrt{x-4} - 4$

D: $[4, \infty)$

R: $[-4, \infty)$

Graph Using Transformations $y = \sqrt{x-4} - 4$

Find x- and y- intercepts x-int: $0 = \sqrt{x-4} - 4$, $+4 \quad +4$, $4^2 = (\sqrt{x-4})^2$, $16 = x - 4$, $x = 20$, (20,0)

y-int: $y = \sqrt{0-4} - 4$ ← not real, no y-int.

Given a graph, evaluate at certain values, give domain and range, tell when increasing, decreasing, and constant.

Composition of Functions, state domain of composition p 78-79

Sketch piecewise graph and evaluate at given values p.63 p.44: 31, 32

Inverse function, be able to find

Find the inverse of each function.

5) $f(n) = -\frac{4}{n} - 2$

$f^{-1}(n) = -\frac{4}{n+2}$

6) $f(x) = 1 + x^3$

$x = 1 + y^3$

$\sqrt[3]{x-1} = \sqrt[3]{y^3}$

$y = \sqrt[3]{x-1}$ $f^{-1}(x) = \sqrt[3]{x-1}$

7) $g(x) = -\frac{1}{x-1} - 3$ $g^{-1}(x) = \frac{-1}{x+3} + 1$

8) $f(n) = -n - 4$

$f^{-1}(n) = -n - 4$

Vertex and axis of symmetry $a f(x-h)^2 + k$ vertex: (h, k) $\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

Equation of parabola in standard form

Vertex: (2,3) point: (0,2)

$y = a(x-2)^2 + 3$

$y = -\frac{1}{4}(x-2)^2 + 3$

$2 = a(0-2)^2 + 3$

$-3 \quad -3$

$-1 = a(4)$

$-\frac{1}{4} = a$

$-\frac{(-4)}{2(4)} = \frac{4}{8} = \frac{1}{2}$

$f\left(\frac{1}{2}\right) = 4\left(\frac{1}{2}\right)^2 - 4\left(\frac{1}{2}\right) + 21$

$= 1 - 2 + 21$

$= 20 \quad \left(\frac{1}{2}, 20\right)$

$x = \frac{1}{2}$

$(4x^2 - 4x) + 21$

$4\left(x^2 - x + \frac{1}{4}\right) + 21 - 1$

$4\left(x - \frac{1}{2}\right)^2 + 20$

Vertex: $\left(\frac{1}{2}, 20\right)$

axis: $x = \frac{1}{2}$