D1S2 (1)

Name: Key

Self Evaluation (D1S2)

Take your time and try to answer as many questions as you can. Show your work.

1. Evaluate

a. 6^3 $= 6 \cdot 6 \cdot 6 = 36 \cdot 6 = 216$

b. $5^{-2} = \frac{1}{5^2} = \frac{1}{5 \cdot 5} = \boxed{\frac{1}{25}}$

c. $(-5)^{-3} = \frac{1}{(-5)^3} = \frac{1}{(-5)\cdot(-5)\cdot(-5)} = \boxed{\frac{-1}{125}}$

d. $(-10)^0 = \boxed{1}$

e. $\left(\frac{a}{b}\right)^{x-1} = \left(\frac{b}{a}\right)^{x-3}$ x=?

$\left(\frac{a}{b}\right)^{x-1} = \left(\frac{a}{b}\right)^{-(x-3)}$

$x - 1 = -x + 3$

$2x = 4$

$\boxed{x = 2}$

2. Write $3^2 = 9$ in logarithmic form.

$\boxed{\log_3 9 = 2}$

3. Solve $3^{2x} = 3^{x+1}$.

$2x = x + 1$

$\boxed{x = 1}$

D152 (2)

4. Between which pair of whole numbers does the square root of 20 lie?

$5^2 = 25$

$4^2 = 16$

$16 < 20 < 25$

$4 < \sqrt{20} < 5$

or

Between 4 and 5

5. Evaluate $\sqrt[3]{1} + \sqrt[3]{8} + \sqrt[3]{27} + \sqrt[3]{64}$

$1 + 2 + 3 + 4 = 10$

6. What is the conjugate of $\frac{1}{3+\sqrt{2}}$ (Hint: rationalize first)?

$\frac{1}{3+\sqrt{2}} \cdot \frac{3-\sqrt{2}}{3-\sqrt{2}}$

$= \frac{3-\sqrt{2}}{9+2}$

$= \frac{3-\sqrt{2}}{11}$

$= \frac{3}{11} - \frac{\sqrt{2}}{11}$

The conjugate is $\frac{3}{11} - \frac{\sqrt{2}}{11}$.

D1S1 (1)

Name: Key

Self Evaluation (D1S1)

Take your time and complete as much as you can. Show all your work.

1. Find the equation of the line between the points (1,2) and (3,4).

Slope: $\frac{4-2}{3-1} = \frac{2}{2} = 1$ $\quad m=1$

Point slope form: $y - y_1 = m(x - x_1)$

$y - 2 = 1(x - 1)$

$y = x - 1 + 2$

$\boxed{y = x + 1}$

2. Write the equation in slope-intercept form $x + 11 = 10y + 1$.

goal: $y = mx + b$

$x + 11 = 10y + 1$

$10y + 1 = x + 11$

$10y = x + 10$

$\boxed{y = \frac{1}{10}x + 1}$

4. Solve the following system of equations:

a. $x + y = 6$ and $-3x + y = 2$

$$\begin{array}{r} x + y = 6 \\ -(-3x + y = 2) \\ \hline 4x + 0 = 4 \end{array}$$

$x = 1$

$1 + y = 6$

$y = 5$

$\boxed{x = 1,\ y = 5}$

b. $2x + y - 2z = 3$
$x - y - z = 0$
$x + y + 3z = 12$

$2x + y - 2z = 3$

$0 - \frac{3}{2}y + 0 = \frac{3}{2}$

$0 + \frac{1}{2}y - 4z = \frac{21}{2}$

$2x + y - 2z = 3$

$0 + y + 0 = 1$

$0 + y + 8z = 21$

$2x + y - 2z = 3$

$0x + y + 0 = 1$

$0x + 0y + 8z = 20$

$2x + y - 2z = 3$

$0 + y + 0 = 1$

$0 + 0 + z = \frac{5}{2}$

$2x + 0 + 0 = 7$

$0 + y + 0 = 1$

$0 + 0 + z = 5/2$

$\boxed{x = \frac{7}{2}}$

$\boxed{y = 1}$

$\boxed{z = \frac{5}{2}}$

$2x + y - 2z = 3$

$x - y - z = 0$

$x + y + 3z = 12$

$y = x - z$

$2x + x - z - 2z = 3$

$x - (x - z) - z = 0$

$x + x - z + 3z = 12$

$3x - 3z = 3$

$2x + 2z = 12$

$x - z = 1$

$x + z = 6$

$2x = 7$

$x = \frac{7}{2}$

$\frac{7}{2} - z = 1$

$z = \frac{5}{2}$

$y = \frac{7}{2} - \frac{5}{2}$

$y = \frac{2}{2}$

$y = 1$

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5. Solve the inequalities

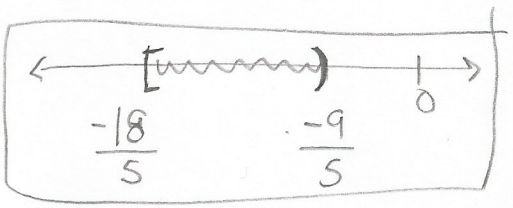
a. $3 \leq -6 - 5x < 12$

$9 \leq -5x < 18$

$-\frac{9}{5} \geq x > -\frac{18}{5}$

$\left[-\frac{18}{5}, -\frac{9}{5}\right)$

or



b. $\frac{x-3}{2} < -5$

$x - 3 < -10$

$x < -7$

or

c. $|x| > 5$

$x < -5$ or $x > 5$

or

d. $|x - 2| = 4$

$x = -2, 6$

D2S1 (1)

Name: Key

Self Evaluation (D2S1)

Take your time and compete as much as you can. Show your work.

1. $P = 4x^4 - 3x^3 + x^2 - 5x + 11$

$Q = -3x^4 + 6x^3 - 8x^2 + 4x - 3$

a. Find $P - Q$

$4x^4 - 3x^3 + x^2 - 5x + 11 - (-3x^4 + 6x^3 - 8x^2 + 4x - 3)$

$= 4x^4 - 3x^3 + x^2 - 5x + 11 + 3x^4 - 6x^3 + 8x^2 - 4x + 3$

$= \boxed{7x^4 - 9x^3 + 9x^2 - 9x + 14}$

b. Find $3Q + P$

$3(-3x^4 + 6x^3 - 8x^2 + 4x - 3) + 4x^4 - 3x^3 + x^2 - 5x + 11$

$= -9x^4 + 18x^3 - 24x^2 + 12x - 9 + 4x^4 - 3x^3 + x^2 - 5x + 11$

$= \boxed{-5x^4 + 15x^3 - 23x^2 + 7x + 2}$

c. Find $2P + 4Q$

$2(4x^4 - 3x^3 + x^2 - 5x + 11) + 4(-3x^4 + 6x^3 - 8x^2 + 4x - 3)$

$= 8x^4 - 6x^3 + 2x^2 - 10x + 22 - 12x^4 + 24x^3 - 32x^2 + 16x - 12$

$= \boxed{-4x^4 + 18x^3 - 30x^2 + 6x + 10}$

2. Evaluate $(3x - 2)(2x + 3)(2x - 3)$

$(3x - 2)(4x^2 - 6x + 6x - 9)$

$= (3x - 2)(4x^2 - 9)$

$= \boxed{12x^3 - 8x^2 - 27x + 18}$

D2S1 / (2)

$$\begin{array}{r} 2x - 3 \\ 3x-4 \overline{)\ 6x^2-17x+12} \\ -(6x^2-8x) \\ \hline 0\ -9x+12 \\ -9x+12 \\ \hline 0 \end{array}$$

3. Simply $\dfrac{6x^2-17x+12}{3x-4}$ using long division.

$= \boxed{2x-3} \quad \boxed{x \neq \frac{4}{3}}$

$$\begin{array}{r} x - 3 \\ x+5 \overline{)\ x^2+2x-15} \\ -(x^2+5x) \\ \hline -3x-15 \\ -3x-15 \\ \hline 0 \end{array}$$

4. Simplify $\dfrac{x^2+2x-15}{x+5}$ using long division.

$= \boxed{x-3} \quad \boxed{x \neq 5}$

5. Graph $f(x) = x^2 - 2x - 8 = (x+2)(x-4)$

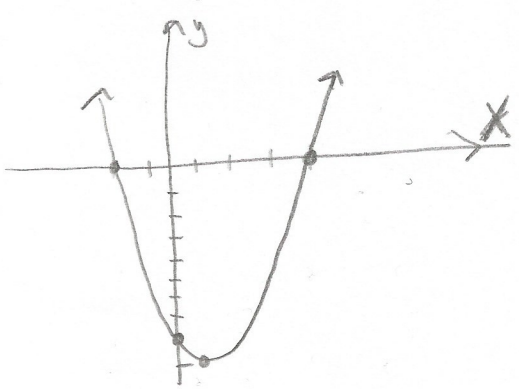
intercepts $f(0) = 0^2 - 2(0) - 8$
$= -8$
y int. $(0, -8)$

$0 = (x+2)(x-4)$
$x = -2, \quad x = 4$
x int $(-2, 0)$ and $(4, 0)$

Domain $(-\infty, \infty)$

Vertex $x = \dfrac{-b}{2a} = \dfrac{-(-2)}{2(1)} = 1$

$y = 1^2 - 2(1) - 8 = -9$
$(1, -9)$



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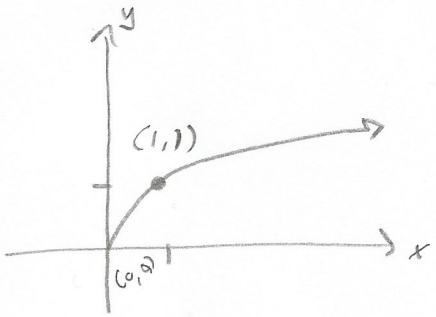
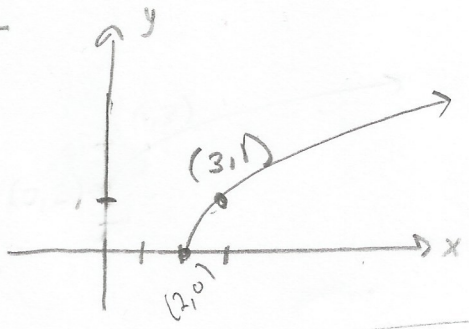
6. Sketch the graph of $f(x) = \sqrt{x-2} + 3$ label at least one point.

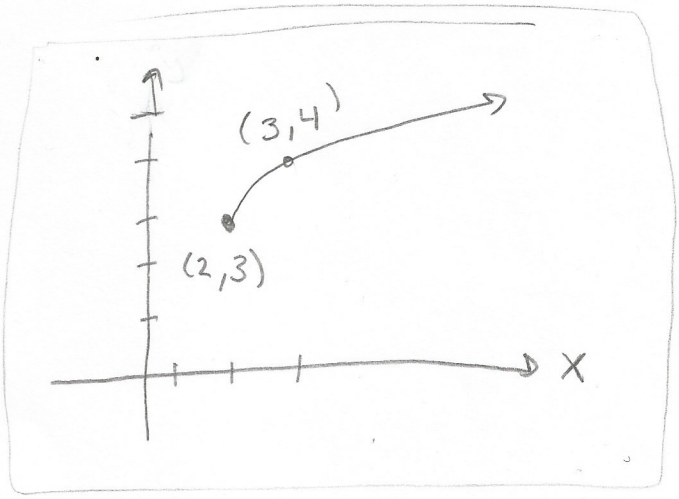
Basic graph: $y = \sqrt{x}$



$y = \sqrt{x-2}$



$f(x) = \sqrt{x-2} + 3$



D2 S2 (1)

Name: Key

Self Evaluation (D2S2)

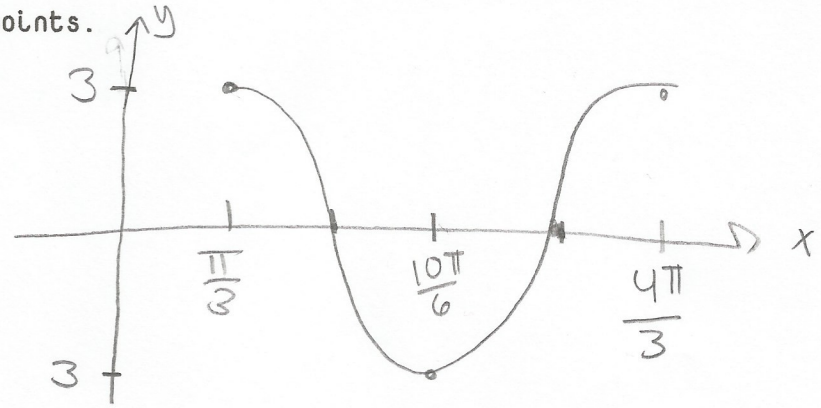
Take your time and complete as much as you can. Show all your work.

1. Graph $y = 3\cos(3x - \pi)$. State the period, amplitude, phase shift and label the key points.

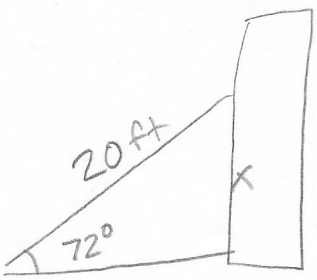
Period $= \frac{2\pi}{3}$

Phase shift $= \frac{\pi}{3}$

Amplitude $= 3$



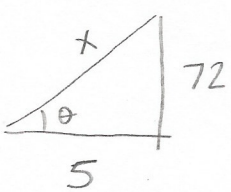
2. A 20-ft ladder leans against a building so that the angle between the ground and the ladder is 72 degrees. How high does the ladder reach on the building?



$\sin 72^\circ = \frac{x}{20}$

$x = 20 \sin 72^\circ$

3. Given $\tan\theta = \frac{72}{5}$ and θ is acute, what is the value of $\cos\theta$?



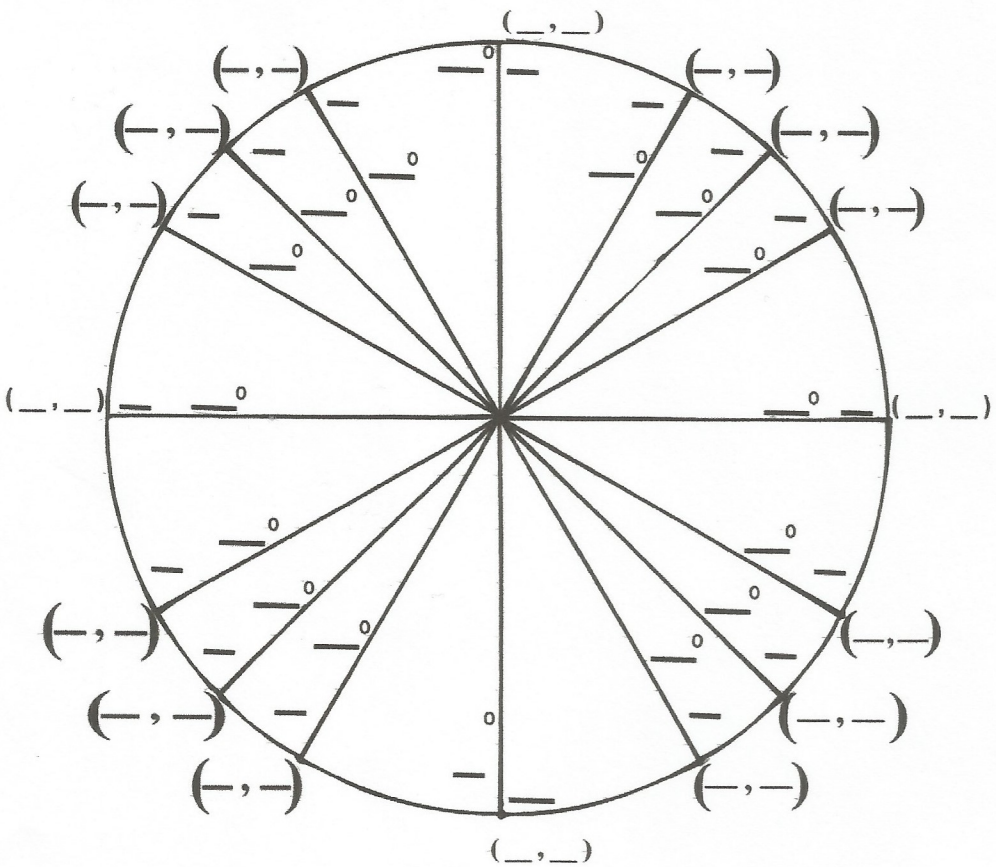
$72^2 + 5^2 = x^2$

$5184 + 25 = x^2$

$x = \sqrt{5209}$

$\cos\theta = \frac{5}{\sqrt{5209}}$

4. Fill in the values of the unit circle:



5. Solve $3tan^3(x) - 3tan^2(x) - tan(x) + 1 = 0$

$y = \tan(x)$

$3y^3 - 3y^2 - y + 1 = 0$

$3y^3(y-1) - (y-1) = 0$

$(3y^3 - 1)(y-1) = 0$

$3y^3 - 1 = 0$

$y = \sqrt[3]{\frac{1}{3}}$

$y - 1 = 0$

$y = 1$

$\tan x = 1$

$x = \frac{\sqrt{2}}{2} + 2\pi k$