

## I. Describe the transformations.

See attached sheet

1.  $y = -2 \arcsin \frac{1}{8}(x - 12.7) - 1$

4.  $y = \frac{8}{11} \arccos 5(x + 3.2) + 9\pi$

2.  $y = 7 \arctan(-3x + 8.1) + 7\pi$

5.  $y = -3 \arctan(2x + \pi) + 2$

3.  $y = 7 \arccos \frac{1}{3}(x + \pi) - \frac{2}{7}\pi$

6.  $y = \frac{1}{4} \arcsin(-x + 6)$

## II. Evaluate each inverse expression for principal values only and write your final answer as an exact value. If no solution exists put "DNE".

7.  $\arcsin\left(-\frac{\sqrt{3}}{2}\right) = \boxed{-\frac{\pi}{3}}$

11.  $\cos^{-1}(-1) = \boxed{\pi}$

16.  $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \boxed{\frac{\pi}{4}}$

8.  $\arctan(-\sqrt{3}) = \boxed{-\frac{\pi}{3}}$

12.  $\tan^{-1}(0) = \boxed{0\pi}$

17.  $\arccos\left(-\frac{1}{2}\right) = \boxed{\frac{2\pi}{3}}$

9.  $\arcsin \frac{1}{2} = \boxed{\frac{\pi}{6}}$

13.  $\tan^{-1}(1) = \boxed{\frac{\pi}{4}}$

18.  $\arcsin\left(-\frac{\sqrt{2}}{2}\right) = \boxed{-\frac{\pi}{4}}$

10.  $\arctan \frac{\sqrt{3}}{3} = \boxed{\frac{\pi}{6}}$

15.  $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \boxed{\frac{\pi}{6}}$

## III. Evaluate each composition for principal values only and write your final answer as an exact value. If no solution exists put "DNE".

See Attached Sheet

19.  $\tan\left(\cos^{-1}\left(\frac{8}{11}\right)\right)$

24.  $\sin^{-1}\left(\cos\left(\frac{5\pi}{6}\right)\right)$

29.  $\tan\left(\cos^{-1}\frac{1}{x}\right)$

20.  $\sin^{-1}\left(\sin\left(\frac{4\pi}{3}\right)\right)$

25.  $\tan(\cos^{-1} x)$

30.  $\sin\left(\tan^{-1}\frac{\sqrt{3}}{3}\right)$

21.  $\tan\left(\cos^{-1}\left(\frac{1}{2}\right)\right)$

26.  $\cos\left(\sin^{-1}\left(\frac{1}{x}\right)\right)$

31.  $\tan\left(\sin^{-1}\frac{x}{\sqrt{x^2+4}}\right)$

22.  $\cos^{-1}\left(\sin\left(\frac{2\pi}{3}\right)\right)$

27.  $\tan\left(\sin^{-1}\left(\frac{3}{5}\right)\right)$

23.  $\sin\left(\tan^{-1}\left(\frac{2}{3}\right)\right)$

28.  $\cos\left(\sin^{-1}\frac{\sqrt{2}}{2}\right)$

$$\textcircled{1} y = -2 \arcsin \frac{1}{8} (x - 12.7) - 1$$

- Reflect over x-axis
- Vert. Stretch of 2
- Hori. Stretch of  $\frac{1}{8}$
- Right 12.7
- Down 1

$$\textcircled{2} y = 7 \arctan(-3x + 8.1) + 7\pi$$

$$y = 7 \arctan -3(x - 2.7) + 7\pi$$

- Vert. Stretch of 7
- Reflect over y-axis
- Hori. Shrink of 3
- Right 2.7
- Up  $7\pi$

$$\textcircled{3} y = 7 \arccos \frac{1}{3} (x + \pi) - \frac{2}{7}\pi$$

- Vert. Stretch of 7
- Hori. Stretch of  $\frac{1}{3}$
- Left  $\pi$
- Down  $\frac{2}{7}\pi$

$$\textcircled{4} y = \frac{8}{11} \arccos 5(x + 3.2) + 9\pi$$

- Vert. Shrink of  $\frac{8}{11}$
- Hori. Shrink of 5
- Left 3.2
- Up  $9\pi$

$$\textcircled{5} y = -3 \arctan (2x + \pi) + 2$$

$$y = -3 \arctan 2(x + \frac{\pi}{2}) + 2$$

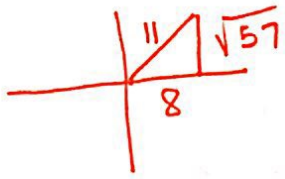
- Reflect over x-axis
- Vert. Stretch of 3
- Hori. Shrink of 2
- Left  $\frac{\pi}{2}$
- Up 2

$$\textcircled{6} y = \frac{1}{4} \arcsin (-x + 6)$$

$$y = \frac{1}{4} \arcsin -(x - 6)$$

- Vert. Shrink of  $\frac{1}{4}$
- Reflect over y-axis
- Right 6

$$\textcircled{19} \tan(\cos^{-1}(\frac{8}{11})) \frac{x}{r}$$



$$\tan = \frac{y}{x}$$

$$\boxed{\frac{\sqrt{57}}{8}}$$

$$8^2 + y^2 = 11^2$$

$$64 + y^2 = 121$$

$$\sqrt{y^2} = \sqrt{57}$$

$$y = \sqrt{57}$$

$$\textcircled{20} \sin^{-1}(\sin(\frac{4\pi}{3}))$$

$$\sin^{-1}(-\frac{\sqrt{3}}{2})$$

$$\boxed{-\frac{\pi}{3}}$$

$$\textcircled{21} \tan(\cos^{-1}(\frac{1}{2}))$$

$$\tan(\frac{\pi}{3})$$

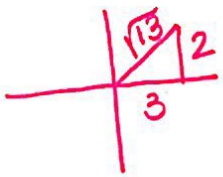
$$\boxed{\sqrt{3}}$$

$$\textcircled{22} \cos^{-1}(\sin(\frac{2\pi}{3}))$$

$$\cos^{-1}(\frac{\sqrt{3}}{2})$$

$$\boxed{\frac{\pi}{6}}$$

$$\textcircled{23} \sin(\tan^{-1}(\frac{2}{3})) \frac{y}{x}$$



$$\sin = \frac{y}{r}$$

$$\frac{2 \cdot \sqrt{13}}{\sqrt{13} \cdot \sqrt{13}}$$

$$\boxed{\frac{2\sqrt{13}}{13}}$$

$$3^2 + 2^2 = r^2$$

$$\sqrt{13} = r$$

$$\sqrt{13} = r$$

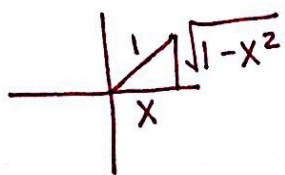
$$\textcircled{24} \sin^{-1}(\cos(\frac{5\pi}{6}))$$

$$\sin^{-1}(-\frac{\sqrt{3}}{2})$$

$$\boxed{-\frac{\pi}{3}}$$



$$(25) \tan(\cos^{-1} \frac{x}{1}) \frac{x}{r}$$



$$x^2 + y^2 = 1^2$$

$$x^2 + y^2 = 1$$

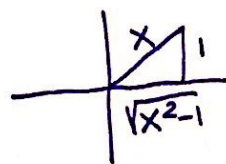
$$\sqrt{y^2} = \sqrt{1-x^2}$$

$$y = \sqrt{1-x^2}$$

$$\tan = \frac{y}{x}$$

$$\boxed{\frac{\sqrt{1-x^2}}{x}}$$

$$(26) \cos(\sin^{-1}(\frac{1}{x})) \frac{y}{r}$$



$$a^2 + 1^2 = x^2$$

$$a^2 + 1 = x^2$$

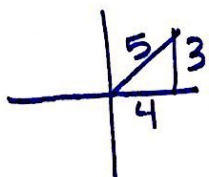
$$\sqrt{a^2} = \sqrt{x^2-1}$$

$$a = \sqrt{x^2-1}$$

$$\cos = \frac{x}{r}$$

$$\boxed{\frac{\sqrt{x^2-1}}{x}}$$

$$(27) \tan(\sin^{-1}(\frac{3}{5})) \frac{y}{r}$$



$$3^2 + x^2 = 5^2$$

$$9 + x^2 = 25$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = 4$$

$$\tan = \frac{y}{x}$$

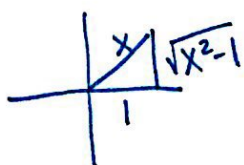
$$\boxed{\frac{3}{4}}$$

$$(28) \cos(\sin^{-1}(\frac{\sqrt{2}}{2}))$$

$$\cos(\frac{\pi}{4})$$

$$\boxed{\frac{\sqrt{2}}{2}}$$

$$(29) \tan(\cos^{-1} \frac{1}{x}) \frac{x}{r}$$



$$1^2 + y^2 = x^2$$

$$1 + y^2 = x^2$$

$$\sqrt{y^2} = \sqrt{x^2-1}$$

$$y = \sqrt{x^2-1}$$

$$\tan = \frac{y}{x}$$

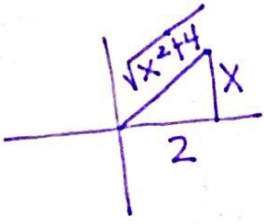
$$\boxed{\frac{\sqrt{x^2-1}}{1}}$$

$$(30) \sin(\tan^{-1} \frac{\sqrt{3}}{3})$$

$$\sin(\frac{\pi}{6})$$

$$\boxed{\frac{1}{2}}$$

$$(31) \tan\left(\sin^{-1} \frac{x}{\sqrt{x^2+4}}\right) = \frac{y}{r}$$



$$a^2 + x^2 = (\sqrt{x^2+4})^2$$

$$a^2 + \cancel{x^2} = \cancel{x^2} + 4$$

$$\sqrt{a^2} = \sqrt{4}$$

$$a = 2$$

$$\tan = \frac{y}{x}$$

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